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Organizing

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First of all my heartiest greetings to organizing committee of National Conference Entitled "Advances in Life Scienc and Human Welfare" 2017, Organized Department of Botany, Dr. Rafiz Zakaria College for Women, Aurangabad Following the advent of diversity of plants and microbes, molecular biology, nanoparticles, bioprospecting in relation to human welfare.

I wish that conference succeeds in providing insight into the fascinating interaction of advances in life science.

I express my deep sense of compliments to all the participants and invited speakers for their enthusiastic contribution in the conference.

✍ *Dr. Satish Patil*

MESSAGE FROM THE DESK OF THE PRINCIPAL

Dr. Rafiz Zakaria College for Women, Aurangabad

I welcome you to the historic place of Navkhanda. Indeed, with the grace of God and Blessings of our beloved President Padmashri Madam Fatma Rafiq Zakaria, this college is progressing day by day. The scientific community of this region get benefitted by various Seminars/Conferences/ Workshops organized by our college in the past. I congratulate to head and College for Woman for arranging this Conference. I hope the deliberations in the seminar will yield fruitful discussion and conclusions.

✍ *Dr.Mazahar Farooqui*

MESSAGE FROM THE DESK OF THE HEAD OF THE BOTANY DEPARTMENT,

Dr. Babasaheb Ambedkar Marathwada University,

Conference is the academic gathering of stalwarts, scientists, academicians, teachers, researchers and students. Conference is the place of sharing and exchanging thoughts and ideas. Students and research scholars enrich their knowledge through the key note address, lead lectures delivered by the eminent scholars. Students and research scholars also get inspiration from such exemplary personalities and promoted towards research. For the development of our Nation, we have to promote our young generation series, competitions, exhibitions etc. conference also provides podium for the beginners to present their research work.

Dr. Rafiq Zakaria College for women, Aurangabad is actively engaged in academic, curricular and co-curricular activities and organizing state and national level conferences regularly. This time, the college is gonging to organize National Conference on "Advances in Life Sciences and Human Welfare." The theme chosen is appropriate in the modern era. Human welfare or wellbeing is only possible through the conservation and sustainable use of biodiversity. All froms of life like microorganisms, algae, fungi lichens, bryophytes pteridophytes, gyhmnosperms angiosperms and from protozoa to mammals are equally important in maintain blance of the ecosystems. Therefore, to know them, identify them, classify them and to find whether they are actually or potentially useful for the human welfare or not, is the important duty of biologist. Every biologist has to discharge his duties promptly and adequately as about half the plant and animal species are yet to describe.

I wish all the best to the Principal, Organizing Secretary and their team for taking efforts for organizing National Conference. I am confident that, this academic event will be grand success.

✍ *Dr.Arwind S. Dhabe*

MESSAGE FROM THE DESK OF THE EX-CHAIRMAN

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I am glad to know that Dept. of Botany, Dr. Rafiz Zakaria College for Women, Aurangabad is organizing a National Conference, sponsored by B.C.U.D., Dr. Babasaheb Ambedkar Marathwada University Aurangabad on "Advances in Life Science and Human Welfare" on 18 February 2017. This conference will be an exciting and congenial opportunity for ranchers, academician to discuss and explore innovative in life sciences.

The Theme of the conference is challenging to the Academic and research scholars. I expect that the outcomes of conference will be of great importance to the participants. I am confident that the conference will be a platform for experts from various fields' life sciences. I express my deep sense of compliments to all the participants and invited speakers for their enthusiastic contribution in this conference.

✍ *Dr. Milind J. Jadhav*

MESSAGE FROM THE DESK OF THE ORGANIZING SECRETARY

Advances in Life Science and Human Welfare-2017

The gathering of scientific people allow to express scientific work infront of society. Conference provides a way to practice your presentation skills and can help you develop the expertise needed to discuss your research in a clear and meaningful way. The papers that you present is likely to be with similar interests, giving you the opportunity to discuss your research and learn valuable information from people working with similar techniques. Establishing contact with other scientist will foster friendships with motivated researches who can be resources for you at any stage of your carreer , hence such gatherings of scientific people is need of today .I mean ,attending and presenting research papers at conferences offers a myriad of opportunities to a young researchers.

✍ *Dr. Sumia Fatima*

INDEX

1	Effect of $FeCl_3$ on Antifungal Activity of *Pseudomonas* and *Bacillus species* against *Fusarium* and *Pythium* **- B. M. Sandikar**	**01**
2	Biodeterioration of Maize Seed by Storage Fungi **Anil U. Kulkarni , Shrimant A. Survase, *Ashok M. Chavan.**	**05**
3	Allelopathic effect of Root and stem extracts of Mangifera indica L on Raphanus sativus L Var. Japani and H^{11} **Bharate S R**	**11**
4	Diversity Of Medicinal Plants In Soegaon, District Aurangabad (M.S.) India **Deepak Devilal Pardhe**	**14**
5	Investigation of Ethnomedicinal plants of Lonar Crater in Buldhana District **Rajbhoj B. G.**	**17**
6	Soil and Water Conservation and Management **Suman A. Khedkar**	**20**
7	Analysis of Aeromycoflora inside Hospitals at Beed M.S. India **Shafa khan[1] Sumia Fatema [2]**	**23**
8	Screening of secondary metabolites from endophytic fungi of *Albizia lebbeck* from various regions of Aurangabad, Maharashtra (India). **Taware A.S.,[*] Chauhan R.P., Rajurkar S.K.**	**26**
9	An in vitro study on the antibacterial effect of some locally available common weed plants **Vijaykumar Biradar[1], M.S. Patil[2] and D.G. Joshi[3]**	**32**
10	Study of fungal airspora over the pigeon pea at Maliwada District Aurangabad. **Nilam Tupe, Suchita Rajurkar, Radhika Hamand**	**39**
11	Some Useful Plants from Nizarneshwar Sacred Grove of Ahmednagar district, Maharashtra, India **Anjali Thete and P. P. Sharma**	**44**
12	Isolation and Identification of Postharvest spoilage Fungi Associated with sweet oranges (*citrus sinensis) F*ruits. **S.L Chandanshiv, M.S.Wadikar**	**49**
13	Medicinal Plants Used In Household Remedies A-Review **Vinayak Rathod, S.L.Shinde**	**51**
14	Organic Manure For Organic Agriculture **S.N.Landge**	**53**
15	Herbal Remedies on Piles & Leprosy used by Tribal's of Satpuda forest region of East Khandesh Jalgaon district, Maharashtra. **R.M.Bagul**	**56**
16	Sewage and sewage components influences the growth of *Azotobacter chroococcum* in vitro **Jadhav P.N. and *L.V. Gangavane,**	**58**
17	Estimation of total carbohydrates content in different parts of *Cassia tora* Linn. **Rahul C. Gaykhe and Kadam Vasant B.**	**61**
18	Studies on Growth and Production of Carotenoids in *Anabaena variabilis* in Different Nutrient Media **Nehul J.N.**	**65**
19	Studies on symptomatology and disease intensity of post harvest fungi causing rot diseases of apple (*Malus domestica* Borkh) **Yogesh C. Khot and Sumia Fatima**	**68**
20	"Studies on biocontrol of collar rot disease of groundnut caused by *Aspergillus niger* with the help of *Trichoderma viride"* **Rucha R. Mali* and P. V. Ramaiah**	**75**
21	Marine Fungi From Mangrove Ecosystem Of Rose Island -Andaman (India) **J. B. Cholake[1], R. K. Aher[2] and A. R. Tuwar[3]**	**79**
22	Detection, isolation and characterisation of etiological agent of yellow sigatoka from Banana field **Sadhana Salve, Suchita Rajurkar, Aparna Taware**	**87**
23	Isolation of Metal Reducing Bacteria **M. Asef Iqbal[1] and Shafa Khan[2]**	**90**

24	Medicinal Uses Of The Family Euphorbiaceae In Marathwada **Ravi Patil, Anilkumar Pardeshi, Kshirsagar A.A.* & Solanke S.N.****	**97**
25	Seasonal Variation of Algae from Bendusara Dam in Beed District of Maharashtra (India) **Santosh Mahadeo Talekar and *Anil Shelke**	**100**
26	Effect of ethyl methane sulphonate and sodium azide mutagens in chlorophyll sectors in M2 generation in chickpea (*Cicer arietinum* L.) **Navnath G. Kashid*, Mukund P. Kulthe** & Santosh M. Talekar***	**102**
27	The relation between pH andradial growth &sclerotia formation of *Sclerotiumrolfsii* causing root rot in chilli **Uzma Quadri & Sumia Fatima**	**105**
28	Ethanobotanical Study Of Ocimum Sanctum **Jige Sandipan Babasaheb, Pawar Subash Bhama**	**107**
29	Soil Algal Flora Of Sugarcane Field **Balasaheb S. Nimbhore and Milind J. Jadhav**	**110**
30	Diversity Of Fungal Endophytes On *Ocimum Sanctum*l **Doli Jain and Suchita Rajurkar**	**113**
31	Anatomical and Pharmacognostic studies of *Oxalis corniculata* L. and *Oxalis rechardiana* Babu. (Oxalidaceae) **Sangeeta S.Sutar,Dharasurkar A.N. ,Bagmar C.M.**	**115**
32	Application of Root Zone Technology : Alternative Approach for Traditional Wastewater Treatment Technology. **Pradeep Jadhav[1], Kshama Khobragade[2]**	**117**
33	A Preliminary Study On Airborne Algae Of Lonar Crater **Rafiullah M.Khan[1] And Milind J. Jadhav[2]**	**121**
34	Green remedies for the treatment of Kidney stones in Aurangabad (M.S). **Rathod Krishna, Rathod Nikhil, *I.H.Zahid, and Rafiuddin Naser***	**123**
35	Algal Flora Of Oil Mill Waste Water **Satish D. Magar[1] and Milind J. Jadhav[2]**	**127**
36	Diatoms of Khelna reservoir in Aurangabad District of Maharashtra **J.H.Sawdekar[1] and Milind J.Jadhav[2]**	**129**
37	Diversity Of Cyanobacteria Over Water Reservoir **Sunita V. Jawale[1] and Milind J. Jadhav[2]**	**131**
38	Soil Algae Of Onion Field Of Ahmednagar District (M.S.) **Swati G. Wagh [1] And Milind J. Jadhav [2]**	**133**
39	Physico-Chemical Profile Of Salim Ali Lake In Aurangabad(M.S.) India. **Sumia Fatima & Shaikh Yasmeen**	**136**
40	Post-harvest mycoflora of different amla varieties (*Emblica officinalis* L.) ***Sonawane B. N. **Sumia Fatima And *** Arsule C. S.**	**139**
41	Diversity of fungal spores over Groundnut fields at Aurangabad District (MS) **Swati Gaikwad and Suchita Rajurkar**	**145**
42	Atomospheric Concentraon Of Curvularia *Spores* Over Sunflower Fields **G. M. Pathare**	**147**
43	Studies Of Advanced Technology In Digital Science For Human Welfare **Gokul G. Harale**	**150**
44	Assessment of Seed Mycoflora of Charoli (Buchanania lanzan) **Baig Mumtaz And Sumia Fatima**	**151**
45	Studies on host range of Alternaria alternata isolated from Ocimum santum. **Sumia Fatima and & Jadhav Reena Girdharilal,**	
46	Studies on Leaf Spot Diseases of Medicinal Plants at Toranmal Area of Nandurbar District **Sumia Fatima and & Jadhav Reena Girdharilal,**	
47	Effect Of Storage Condition On Stability Of B-Carotene Of Some Leafy Vegetables **Manisha G. Sonkamble, Laxman R. Shimple and Narayan B. Pandhure**	

Dr. Rafiq Zakaria College for Women

Effect of $FeCl_3$ on Antifungal Activity of *Pseudomonas* and *Bacillus species* against *Fusarium* and *Pythium*

✍ **B. M. Sandikar**
Associate Professor, Department of Microbiology, Maharashtra Udayagiri College, Udgir- 413517; Dist. Latur (Maharashtra)

ABSTRACT *Four isolates of Pseudomonas and three isolates of Bacillus with high antifungal potency againstFusarium and Pythiumspecies were screened by dual culture (Co-culture) method using PDA and identified on the basis of morphological, cultural and biochemical characters as well as 16S r-RNA gene sequencing asPseudomonas aeruginosa13,P. aeruginosa 58,P. putida71,P. fluorescens106,Bacillus thuringiensis184,B. cereus 220 andB. subtilis252. Effect of ferric chloride on in-vitro antifungal activity of these isolates againstFusarium and Pythiumspecies was studied by Co-culture method, using potato dextrose broth.Pseudomonas aeruginosa13,P. aeruginosa 58 and P. putida71showed good antifungal activity in presence of EDTA as well as in presence of$FeCl_3$. This indicated the siderophore production as one of mechanism of antifungal activity in addition to the other mechanisms like production of antibiotics, hydrogen cyanide and lysis of fungal cell wall. P. fluorescens106,Bacillus thuringiensis184,B. cereus 220 andB. subtilis252 did not show antifungal activity under iron limiting conditions indicating absence of siderophore production ability. These isolated showed good antifungal activity in presence of $FeCl_3$indicating the production of antibiotic and/or HCN as the mechanisms. Considerable increase in antifungal activity was not observed with increase in concentration of $FeCl_3$ from 50µM to 100µM. This indicated that, the $FeCl_3$ favours the antifungal activity of the bacterial isolates up to a limited concentration only. This study provided an idea about the mechanisms of antifungal activity and biological control of phytopathogenic fungi by Pseudomonas and Bacillusisolates. We conclude that, the effect of $FeCl_3$on antifungal activity varies with the species of antagonist and depends on the mechanism of antifungal activity of the species.*

Key words- Pseudomonas, Bacillus, Antifungal activity, $FeCl_3$, Fusarium, Pythium.

Introduction-

Indiscriminate use of chemical agents to control the plant diseases since last few decades has created great harm to human beings, animals, vegetation and the complete environment. Hence, biological control of crop diseases has now become indispensable need for sustainable agriculture. Use of a live organism as such, its structural unit, biomass or metabolite to control crop diseases and increase the yield is called 'Biological control' (1).The control of plant diseases by using various botanical products is practiced since ancient time. However, the technology for plant disease control using microorganisms and their products has been developing since few decades.Among the fungi, species of *Trichoderma*and *Gliocladium* and among the bacteria, species of *Pseudomonas* and *Bacillus* are the most widely studied and proved successful as biocontrol microbes. Some of the serious plant diseases caused by soil-borne fungi are rootrot, crown or collar rot, damping-off, blights, fruit decay, wilts, etc. The soil-borne fungal pathogens mainly include the species of- *Phytopthora*, *Pythium*, *Fusarium*, *Colletotrichum, Macrophomina, Gaueman- nomyces*, *Corticium*, *Verticillium*, *Sclerotium*, etc. Among the soil-borne fungal pathogens,*Fusarium* and *Pythium*species are widely involved in crop diseases(2,3).

Iron plays vital role in growth and metabolic activities of microorganismsas well as all other living beings.It constitutes about0.2% dry weight of cell and acts as component of cytochromes, other metaloproteins and cofactor of some enzymes.Iron content of the soil play important role in efficiency of biological control agents. Selective iron utilization by biocontrol organisms using siderophores, production of antibiotics and hydrogen cyanide are the important mechanisms of antifungal activity which are influenced by iron content of soil. In an aerated environment, iron exists in the ferric form (Fe^{+++}), which is highly insoluble in water. Microorganisms in such habitats have a mean of making the iron soluble for transport into the cell for metabolic purpose. The transport system involves a low molecular weight Fe^{+++}

scavenging compound termed as 'siderophore' or 'siderochromes' (4). These are categorized into two groups on the basis of chemical structure as- hydroxamates and catecholates (5). Fluorescent pseudomonads are proved to be highly potent biocontrol agents due to production of yellow-green or blue-green siderophores such as phenazines, pyoverdine and pseudobactins that fluoresce under ultraviolet light (6,7). Pseudobactin type of siderophores have high affinity for Fe^{+++} than the fungal siderophores (8). The iron competition in pseudomonads has been intensively studied and the role of pyoverdinesiderophores produced by many *Pseudomonas* species has been clearly demonstrated in the control of *Pythium* and *Fusarium* species (9).

Materials and Methods

Isolation and Identification of phytopathogenic fungi-

The infected plant material was collected from field and thephytopathogenic fungi were isolated on Potato dextrose agar by tissue segment method. The cultures were identified on the basis of the shape, size, septation, colour and arrangement of mycelium and spores (10). Among the different isolates, *Fusarium* and *Pythium* isolates were selected for study.

Isolation Identification of rhizobacteria-

Pseudomonas and *Bacillus* cultures were isolated from rhizosphere of healthy crop plants using King's B medium and Nutrient agar, respectively and preserved in refrigerator.

Screening of antifungal *Pseudomonas* and *Bacillus* isolates-

Antifungal isolates of *Pseudomonas* and *Bacillus* were screened by Dual culture (Co-culture) method using PDA and PDB. 100µl bacterial cultures were filled in wells at the center of PDA plates and 10mm PDA discs having fungal growth were placed at two sides of the well 20mm apart. PDA plates were incubated at 28^{o}C for 72hrs and zone of fungal growth inhibition was observed and measured. 100 µl of nutrient broth culture of bacteria and 100 µl of PDB culture of fungi was inoculated in 100ml PDB and incubated at 28^{o}C for 72 hrs. A control flask inoculated with only fungal culture was also incubated. Percent growth inhibition of fungal growth was calculated as-

P. I. = [(C-T)/C x 100]. Where'C'- wet weight of fungal growth in control and 'T'- wet weight of fungal growth in test. (11,12,13).

Identification ofefficient antifungal *Pseudomonas* and *Bacillus* isolates-

Highly efficient antifungal isolates were identified on the basis of morphological, cultural and biochemical characters as well as 16S r-RNA gene sequencing as *Pseudomonas aeruginosa*13,*P. aeruginosa* 58,*P. putida*71,*P. fluorescens*106,*Bacillus thuringiensis*184,*B. cereus* 220 and*B. subtilis*252.

Study of effect of $FeCl_3$ on antifungal activity of *Pseudomonas* and *Bacillus*

Effect of $FeCl_3$ was studied by using- i) PDB amended with50mg/100mlEDTA (EDTA binds with iron and create iron deficiency, the condition favourable for siderophore production), ii) PDB without additional iron iii) PDB amended with $FeCl_3$ 50µM and iv) PDB amended with $FeCl_3$100µM. Appropriate quantity of PDB was prepared, distributed as 100ml in 250ml Erlenmeyer flask and sterilized in autoclave at 121^{0}C for 15min. All these four PDB flasks were inoculated with fungal and bacterial culture along with a control flask with each set, as described above. The mycelial growth of fungus was filtered using Whatman filter paper No.1 and weighed. Percent inhibition of fungal growth was calculated.

Results and Discussion- **Fig.-1 Phytopathogenic fungal isolates**

Fig.2 Antifungal bacterial isolates antagonists

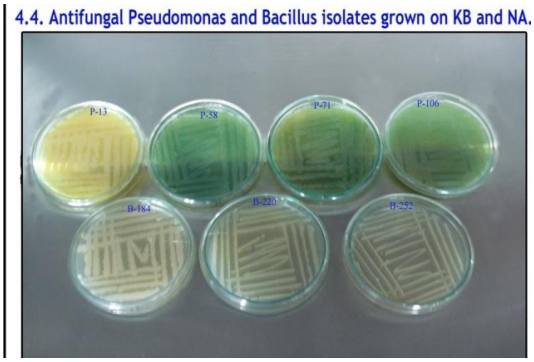

Fig.-3. Primary screening of

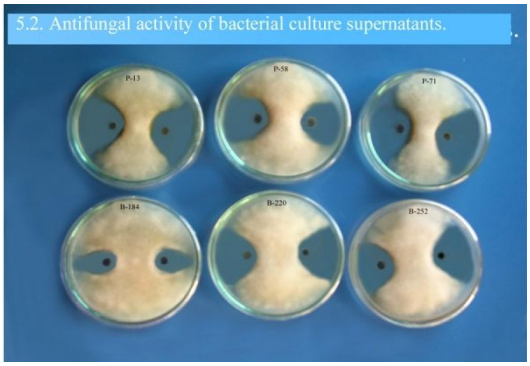

Fig.4 Study of antifungal activity by dual broth culture

Table-1. Effect of $FeCl_3$ on antifungal activity of bacterial isolates-

Antifungal isolate	**Percent growth inhibition* of *Pythiumspecies***				**Percent growth inhibition* of *Fusarium species***			
	PDB + EDTA	PDB	PDB with 50µM $FeCl_3$	PDB with 100µM $FeCl_3$	PDB + EDTA	PDB	PDB with 50µM $FeCl_3$	PDB with 100µM $FeCl_3$
*P. aeruginosa*13	50.00	58.00	60.00	58.50	48.00	55.00	58.00	58.50
P. aeruginosa 58	52.00	55.00	57.50	56.00	50.50	52.50	55.00	54.00
*P. putida*71	50.00	52.00	54.00	55.00	45.00	50.00	55.00	56.00
*P. fluorescens*106	01.00	52.00	58.00	58.50	01.50	528.00	58.00	59.00
*B.thuringiensis*184	00.05	56.00	59.00	60.00	02.00	55.00	60.00	61.50
B. cereus 220	00.00	55.00	56.00	56.50	00.00	52.50	57.00	58.50
*B. subtilis*252	02.00	60.00	62.00	63.00	03.00	55.00	58.00	58.00

*All values are average of triplicate tests.

Effect of $FeCl_3$ concentration-

The isolates- *Pseudomonas aeruginosa*13, *P. aeruginosa* 58 and *P. putida*71 showed antifungal activity on PDA amended with EDTA, indicating siderophore production as one of the mechanism of antifungal activity. Siderophores function as biostatic compounds inhibiting the growth of phytopathogens by iron acquisition. These isolates also showed good antifungal activity on PDA and PDA supplemented with $FeCl_3$. This indicated that, the siderophore production is not the only mechanism of antifungal activity of these isolates butproduction of antibiotics, production of HCN, parasitism and lysis of phytopathogensmay also responsible for antifungal activity. Study of mechanisms of antifungal activity of the antagonists by different methods proved the same fact. Antiphytopathogenicrhizobacteria in soil use alternate mechanisms as per the available conditions and do not depend on a single mechanism. *Pseudomonas fluorescens*106 and all the three *Bacillus* isolates showed antifungal activity on

PDA and PDA amended $FeCl_3$ but did not show antifungal activity under iron limiting conditions. This indicatedthat, these isolates do not produce siderophores andmay use other mechanisms of antifungal activity, especially production of antibiotics and hydrogen cyanide.

The effect of $FeCl_3$ on antifungal activity varies with the species and the probable mechanism involved in the biocontrol. The antagonistic activity of antibiotic or HCN producers found to be enhanced by available iron. However, no considerable increase in antifungal activity was observed with increase in concentration of $FeCl_3$ from 50µM to 100µM. This indicated that, the $FeCl_3$ favours the antifungal activity of the bacterial isolates up to a limited concentration only.

Study of the effect of $FeCl_3$ on antifungal activity of bacterial antagonists by other workers showed variable results. Accumulation of the antibiotic kanosaminewas enhanced by addition of ferric iron and alfalfa seedling exudates and suppressed by addition of phosphate (14). Podile*etal*., (1988) observed that, the antagonistic activity of *Pseudomonas aeruginosa*, *P. fluorescens* and *Bacillus subtilis* against *Rhizoctoniasolani*, showed different responses to $FeCl_3$, indicating the involvement of different mechanisms (15). Jayaswal*etal*., (1990) observed antifungal activity of *Pseudomonas species* against important phytopathogens in presence of 10-100µM $FeCl_3$, indicating antibiotic production as important mechanism of antifungal activity (16). Metal ions as ferrous, manganese, mercury and cobalt showed inhibitory effect on growth as well as siderophore production (17). Mondal*et al*., (2000) observed that, the presence of $FeCl_3$ enhances the production of antibiotics and HCN whereas it inhibits siderophore production (18).
We conclude that, the effect of $FeCl_3$on antifungal activity varies with the species of antagonist and depends on the mechanism of antifungal activity of the species. The biocontrol species with multiple mechanisms of antifungal activity against phytopathogenic fungi shows chances of effective biological control under different conditions.

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Biodeterioration of Maize Seed by Storage Fungi

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ABSTRACT *Utilizations and change in seed contents, affected by associated microorganisms is known as biodeterioration. This may result into different types of abnormalities, discoloration, losses in weight, viability and food nutrients of the seeds. Due to the infection of seeds borne fungi the depletion in seeds content may take place which cause loss in the seed weight, fiber fat and starch. Present investigation made on Biodeterioration of three maize seed, which are All rounder, Kaweri, Supeer 900 by ten dominating storage fungi*

***Key words**: Biodeterioration, weight, fiber, fat, starch, storage fungi.*

Introduction

Utilizations and change in seed contents, affected by associated microorganisms is known as biodeterioration. This may result into different types of abnormalities, discoloration, losses in weight, viability and food nutrients of the seeds. Among various seed contents starch (Vidyasckeran and Govindaswamy, 1968, Panchal 1984).Vaidehi and Lalita (1973) found that proteins, starch and phenole in sesamum seeds were reduced by the action of storage fungi and there was increase of amino acids and fatty acids. Denis and Girard (1978) reported reduction in starch and protein contents of jowar seeds due to the pathogens like *Fusarium, Curvularia* and *Helminthosporium* sp. Panchal (1984) studied that the loss in strach content of jowar seeds was maximum due to *Curvularia lunata*, *Drechslera longifostrata* and *Macrophomia phaseoli* while for protein content it was due to *Curvularia lunata*, *Alternaria tenius* and *Fusarium moniliforme*. The active fungus for starch hydrolysis was noted as *Aspergillus parasiticum* in wheat grains (Premlata and Sinha 1985) .

Panchal (1984) reported that *Curvularia lunata* with *Aspergillus niger* and *Alternaria tenuis* collectively were always found to be maximum destructive to jowar seeds. Mathur and Sinha (1978) studied certain biochemical changes in bajra seeds during storage they had found that reducing sugar decreased in the earlier period of storage and then increased. Changes in protein, nitrogen and total oil were only slight. Fatty acid value steadily increased on storage.

Loss in seed weight

Due to the infection of seeds borne fungi the depletion in seeds content may take place which cause loss in the seed weight. In case of jowar seed borne fungi, like curvularia lunata (Bhatnagar, 1971), *Fusarium* spp. (Castor 1977),*Macrophomina phaseolina* (Anahosur and Patil, 1983) has been reported to cause loss in seed weight. Pedgaonkar (1973) estimated the reduction in grain weight due to mold and reported weight loss ranged from 11.9 to 16.7% in different jowar cultivers while Godbole (1982) recorded that weight loss was maximum 15.2% and minimum 12.1% similar type of reduction in seed pea (Sawhney and Aulakh, 1980), Wheat (Ahmed *et al.,* 1981). Rathod (2007) showed that *A. tenuissima* in cause of wheat, A citri in black gram reduced the weight considerably. Similarly Sonawane (2002) reported loss in seeds weight of *Pisum sativum* due to *Alternaria alternata*.

Starch degradation

The seed starch degradation in legumes due to seed borne fungi has been found significant. It is reported in gram (Sinha *et al* 1979) in mung (Vidyasekaran and kandaswamy 1972) in cowpea (Vijayakumari and Karn, 1981) and in pigean pea (Sinha *et al*, 1979).

Fat content

Seeds are contect fat, decrease in fats contents of seeds caused by associated mycoflora is an important aspects regarding nutritional value of the seeds. Seed mycoflora caused significant reduction in oil content, change in oil colour, increase in the amount of fatty acids have been reported in groundnut (Diener and Devis 1966), Singh *et al.,* (1972) reported biodeterioiration of fat in sesame and safflower.

Material and Methods

Agar plate method (APM)

In this method, pre-sterilized corning glass petriplates of 10cm diameter were poured with 15ml of autoclaved potato dextrose agar (PDA) medium.In order to isolate only internal mycoflora, seeds were pre-treated with 0.1% solution of mercuric chloride for two minutes and subsequently thoroughly washed thrice with sterile distilled water and placed on agar plates.

Identification of seed-borne fungi

The fungi occurring on each and every seed in the plates were identified preliminary on the basis of sporulation characters like sexual or asexual spores with the help of stereoscopic binocular microscope. The identification and further confirmation of seed-borne fungi was made by preparing slides of the fungal growth and observing them under compound microscope. The identification was made with the help of manuals. Pure cultures of these fungi were prepared and maintained on potato dextrose agar (PDA) slants.

For this, freshly harvested mature and apparently healthy seeds were collected from the fields. They were surfaced sterilized with 0.1% mercuric chloride solution and subsequently washed and soaked in sterile distilled water for four hours. Excess water was decanted from the seeds. The seeds were distributed into three flasks (l00g per flask) and were inoculated separately with 2ml spore suspension of the test fungi. The flasks were incubated at room temperature for various period ranging from 10, 20, 30 days and were harvested for studying physical and chemical changes in the seeds.

At the time of harvest, seeds were thoroughly washed under running tap water in order to remove complete mycelial growth from their surface. Subsequently, the seeds were dried at 60°C for 48 hours and crushed into fine powder for the estimation of different chemicals. Seeds incubated in a similar manner but without inoculating spore suspensions of fungi served the control.

Estimation of Dry matter (DM)

Dry matter (DM) is calculated by weighing the sample after drying to a constant weight in an oven at 95±5°C. For this purpose, l00g of sample is taken in a clean dry pre-weighed tray and is kept in oven for 48 hours or more, till constant weight. Weight of the dried sample is reported as percent dry matter (DM).

The dried samples are usually ground to a fine powder and stored in sealed container for further analysis A.O.A.C. (1970).

Estimation of Crude fat

The crude fat in the plant material was estimated by the standard Soxhlet method given in (A.O.A.C., 1970). The fat present in the seed material are extracted in the solvent consisting of chloroform ($CHC1_3$) and methanol (CH_3OH). This is done in Soxhlet extraction assembly and after complete evaporation of the solvent; the amount of extracted fat is measured.

Estimation of crude fiber

Crude fiber (CF) is determined as that fraction remaining after digestion with dilute solutions of sulphuric acid (H_2So_4) and sodium hydroxide (NaOH) under carefully controlled conditions. The major part of it contain carbohydrates and it is valuable parameter in deciding the nutritive quality of animal feed (A.O.A.C; 1970).

Estimation of starch

It was estimated by Anthrone reagent method A.O.A.C.(1970).

Results

1) Change in dry weight

The change in dry weight of seeds due to utilization of their contents by fungi was studied in three maize varieties namely All rounder, Kaweri and Supper 900. The fresh harvested sterilized seeds were inoculated with ten fungi. The seeds without inoculation were used for control estimations.

It is evident from the table. That there was considerable loss in dry weight of seeds due to all the tested fungi. In all rounder variety maximum loss was due to *Helminthosporium tetramera, Aspergillus niger, Aspergillus flavus, Aspergillus terreus, Alternaria alternata.* While in case of kaweri variety it was due to *Aspergillus terrus, Curvularia lunata, Helminthosporium tetramera, Fusarium oxysporum* and *Aspergillus flavus*, where as in supper 900 var. maximum loss was due to *Helminthosporium tetramera, Aspergillus flavus, , Alternaria alternata, Aspergillus terrus, Penicillium notatum* and *Aspergillus niger*.

Table 01: Change in dry weight of seeds due to seed borne fungi

Fungi	Varieties		
	All rounder	Kaweri	Supper 900
	(Dry weight in gm)		
Alternaria alternata	30	31	26
Aspergillus flavus	28	30	24
Aspergillus niger	26	33	27
Aspergillus terreus	28	25	26
Curvularia lunata	34	26	30
Fusarium oxysporum	38	28	31
Helminthosporium tetramera	25	26	25
Penicilium notatum	37	38	26
Rhizoctonia solani	33	33	31
Trichoderma viride	34	35	30
Control	46	40	42

2) Change in crude fibre:

When the seeds were artificially inoculated by ten seed borne fungi at room temperature, for twentyfive days the seeds showed loss in colour as well as loos in crude fibre content.

It is clear from the results summarised in table. That the loss in crude fibre content at twenty five days incubation in all tested fungi. In var. all rounder loss in crude fibre takes place due to *Aspergillus flavus, Alternaria alternata, Aspergillus niger, Helminthosporium tetramera, Penicillium notatum, Rhizoctonia solani* and *Curvularia lunata.* In variety kaweri it is due to *Penicillium notatum, Aspergillus flavus, Curvularia lunata Aspergillus niger, Helminthosporium tetramera, Rhizoctonia solani* and *Alternaria alternata*. In var. supper 900 loss is noted due to *Helminthosporium tetramera, Penicillium notatum, Aspergillus niger, Aspergillus flavus, Alternaria alternata* and *Curvularia lunata* as compared with other fungi.

Table 02: Change in crude fiber in different varieties of maize

Fungi	Maize Varieties		
	All rounder	Kaweri	Supper 900
Alternaria alternata	1.18	1.27	1.05
Aspergillus flavus	1.13	1.08	1.04
Aspergillus niger	1.21	1.15	1.02
Aspergillus terreus	1.96	1.33	1.26
Curvularia lunata	1.29	1.09	1.18
Fusarium oxysporum	1.33	1.45	1.29
Helminthosporium tetramera	1.24	1.15	0.98
Penicilium notatum	1.25	1.05	1.00
Rhizoctonia solani	1.27	1.18	1.25
Trichoderma viride	1.69	1.96	1.60
Control	2.40	2.10	2.35

3) Change in crude fat content in different varieties of maize:

It is clear from the results given in table no. In all three varieties of maize fat content is reduced at twenty five days incubation. In general *Aspergillus flavus, A. terreus, Curvularia lunata* and *Helminthosporium tetramera* are responsible for maximum loss in crude fat content. Whereas on the other hand *Aspergillus niger, Trichoderma viride* and *Fusarium oxysporum* showed minimum loss in crude fat content.

Table 03: Change in crude fat content in different varieties of maize

Fungi	Varieties		
	All rounder	Kaweri	Supper 900
Alternaria alternata	7.7	8.1	7.9
Aspergillus flavus	7.1	7.6	7.5
Aspergillus niger	9.0	9.2	9.1
Aspergillus terreus	7.4	6.5	7.5
Curvularia lunata	7.6	7.9	7.2
Fusarium oxysporum	8.1	8.1	7.4
Helminthosporium tetramera	7.4	7.8	7.8
Penicilium notatum	8.0	7.0	9.4
Rhizoctonia solani	7.5	7.2	8.5
Trichoderma viride	8.4	9.2	9.0
Control	10.6	10.8	10.00

4) Change in starch content: Starch is one of the important constituent of maize seeds which is present 70 to 75% in the seeds. When seeds were artificially inoculated by ten seed borne fungi at room temperature for twenty five days the seeds showed loss in starch content.

It is clear from the results summarised in table that the maximum loss in starch content is seen in all three varieties due to *Helminthosporium tetramera, Fusarium oxysporum, Curvularia lunata, Aspergillus flavus*, followed by *Aspergillus niger, Alternaria, Penicillium notatum, Rhizoctonia solani* and *Trichoderma*

Table 12: Change in starch content

Fungi	Varieties		
	All rounder	Kaweri	Supper 900
Alternaria alternata	65.10	60.3	62.4
Aspergillus flavus	59.8	56.2	53.5
Aspergillus niger	62.0	63.4	61.0
Aspergillus terreus	66.5	64.6	65.5
Curvularia lunata	58.8	57.7	58.7
Fusarium oxysporum	57.9	58.4	57.6
Helminthosporium tetramera	57.2	54.4	54.5
Penicilium notatum	66.5	65.0	64.5
Rhizoctonia solani	68.0	67.5	66.8
Trichoderma viride	66.8	68.5	67.0
Control	72.0	71.8	70.5

Discussions

Seeds in the field as well as in ill storage condition interact with several microbes which deteriorate the seeds, both qualitatively and quantitatively. Fungi bring about a variety of biochemical changes in seeds. They reduce or increase starch, fatty acids, reducing sugar, non reducing sugar and protein content of the stored grains. The loss due to seed biodeterioration has been estimated as about 4% of the world's total grains (Clarke, 1969).

Attempts have been made to know relationship between fungi and biodeterioration; three varieties of maize have been employed. Results regarding change in dry weight content of different varieties of maize in the presence of ten dominating seed borne fungi were studied and the results showed in (table 01). All rounder maximum loss was due to *Helminthosporum tetramera, Aspergillus niger, A. flavus, A. terreus, and Alternaria alternata*, while in var. Kaweri it was due to *Aspergillus terreus, Curvularia lunata, Helminthosporum tetramera, Fusarium oxysporum and Aspergillus flavus*. This clearly suggests that storage fungi are responsible for loss in weight of the seeds. Such seeds have physiological disorders and also reduced the viability. Similar type of observation has been reported by Sawney and Aulakh (1980), in case leguminous seeds. Similar type of observation were represented by Bhatnagar(1971) in case of Jowar, Rathod (2007) in case of wheat and Sonawane (2002) in pea.

Reports regarding the loss in crude fiber in maize varieties, due to seed borne fungi were studied and results showed the decrease in crude fiber in all varities of maize. Maximum loss in var. Supper 900 due to *Helminthosporium tetramera, Penicillium notatum, Aspergillus niger, A.*

flavus and Alternaria alternata. In var. Kaweri it was due to *Penicillium notatum, Aspergillus flavus and Curvularia lunata*. Where as in var. All rounder it was due to *Aspergillus flavus and Alternaria alternata* (table 02). It is clearly indicated that the decrease in crude fibre due to seed borne fungi might be due to secretion of cellulose and other cell wall degrading enzymes of seed borne fungi. Fibre content indicated that amount of cell wall constituents like hemicellulose, lignine, pectinase were degrading. Similar type of observations have been made by Kanaujia and Singh (1975) in case of Jowar, Bhikane (1988) in green gram and black gram , Sonawane (2002) in pea and Rathod (2007), due to *Alternaria alternata* in wheat, black gram and safflower seeds.

Reports regarding the loss in crude fat content due to the enzymatic activity of associated seed borne fungi. Results clearly (Table 03) showed that there were overall decrease in fat content in var. Supper 900, Kaweri and All rounder. Maximum loss in fat content was found in var. Supper 900, due to *Curvularia lunata, Fusarium oxysporum, Aspergillus flavus and A. terreus* in var. Kaweri it was due to *Penicillium notatum, Rhizoctonia solani*. Whereas in var. All rounder it was due to *Aspergillus flavus, Aspergillus terreus*, and *Helminthosporum tetramera*. Similar types of observations were taken by Kanaujia and Singh (1975). Bhikane (1988) observed that *Macrophomina phaseolina, Rhizoctonia solani* and *Aspergillus flavus* showed loss in fat content in green gram; Sonawane (2002) observed that in the varieties of pea maximum loss in fat content due to *Aspergillus flavus, Cladosporium oxysporum, Curvularia lunata* and *Helminthosporium tetramera*.

Starch is one of the important constituent of maize seeds which is present in seeds. Losses in starch content due to associated fungi were studied in detail (table 04). Loss in starch content in var. All rounder due to *Helminthosporium tetramera, Fusarium oxysporum, Curvularia lunata, Aspergillus flavus and A. niger.* In var. Kaweri it showed by *Helminthosporium tetramera, Aspergillus flavus, Curvularia lunata* and *Fusarium oxysporum*. Where as in var. Supper 900 maximum loss was due to *Aspergillus flavus* and *Helminthosporium tetramera*.

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Allelopathic effect of Root and stem extracts of Mangifera indica L on Raphanus sativus L Var. Japani and H^{11}

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ABSTRACT *Allelopathy is a current area of research and plays important role in nature and agro ecosystem. It may be useful in agriculture to increase yield, minimize some problems related to multiple cropping systems, soil productivity and transformed the research from basic to applied. Mangifera indica L Family Anacardiaceae a common, large evergreen tree grow naturally everywhere on agricultural bunds . The fruit ' Amba' is a very delicious fruit and known as king of fruit. Effect of aqueous root and stem extract were tested on the germination and seedling growth of Raphanus sativus L variety Japani and H^{11}. Stem and root extract shows inhibitory effect at all concentration except at 2.5% . Data were analyzed by appropriate statistical method.*
Key words: *Allelopathy, Extract, Mangifera indica L., Raphanus sativus, 'Japani' and H^{11}.*

INTRODUCTION AND REVIEW

Molisch (1937) introduced the word **'Allelopathy'** (Greek words: '*allelon*' means reciprocal and *'pathos'* means that happens to one) for harmful as well as beneficial, biochemical and reciprocal interactions among plants including microorganisms. Allelopathy is defined as "any direct or indirect harmful/useful effect by one plant on another through the synthesis and secretion of chemicals into the environment." Allelopathy is a current area of research. It may be useful in agriculture to increase yield, minimize some problems related to multiple cropping systems, soil productivity and availability of nutrients in soil. Allelopathy, a multidisciplinary subject and research in it will definitely establish a boon in agricultural and forestry production (Narwal and Tauro, 1994).

Leaf extracts of ***Mangifera indica*** L. contain an allelopathin called 'mangiferin' (1, 3, 6, 7-tetra hydroxy 2-c-b-glucopyranosy-lxanthone). It affects germination in *Triticum aestivum* L. and *Abelmoschus esculentus* L. (Venkate-shwarlu *et al* 2001).

Aqueous extracts of ***Mangifera indica* L**. inhibit the germination and growth of maize, soybean*, Cucurbita moschata*, *Echinochloa* and *Digitaria*. Extracts of lower concentration proved stimulating. The rhizosphere soil of *Mangifera* stimulated germination and growth of maize but inhibited groundnut (Yan, 2006).

MATERIAL & METHODS

Extracts were obtained by crushing plant materials.10% aqueous extracts (stock solution) obtained from root of trees viz. *Mangifera indica* L.Extracts were filtered with muslin cloth and Whatman filter paper No.1, stored in refrigerator and further diluted with distilled water to get extracts of 2.5 %, 5 %, and 7.5 % (Narwal, 1994). Extracts were further used for bioassay in laboratory conditions.

Effect of these three concentrations on seedling growth parametersviz. seed germination (Ger), Shoot growth (Sg) , Root growth (Rg) and Total seedling growth(TSg) of test crop plants viz.*Raphanus sativus* L. 'Japani' and 'Hybrid 11' were recorded after 5th day. Seeds of test plants were surface sterilized with 0.01% Mercuric chloride followed by washing with distilled water before use.Ten seeds/ plastic container were germinated in sterilized containers of 12cm diameter, using germination paper or Whatman No.1 filter paper. Triplicates of the containers were maintained. 10 ml of extract was added in the Petri dishes/containers containing 10 seeds each. The slight emergence of radical was considered as a sign of germination. Germination percentage was calculated. Photographs were taken with digital camera ('Sony'make). Percentage inhibition or stimulation of 'Ger' (seed Germination), 'Rg' (Root growth), 'Sg' (Shoot growth) and 'TSg' (Total seedling growth) over control was calculated from which graphs were drawn. Effect of leaves extract, were assessed separately. Statistical analysis were made.

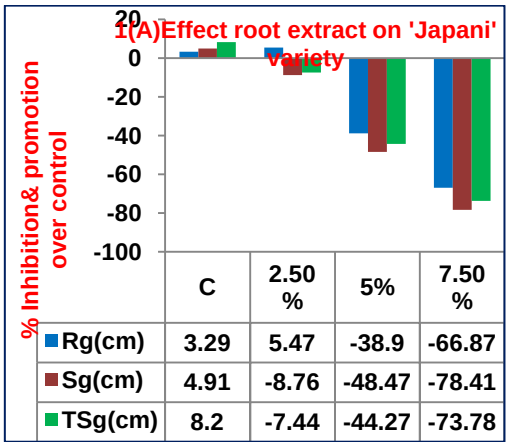
Percentage inhibition or stimulation over control and ANOVA variance was calculated. **% Inhibition or stimulation**: (C-T /C) X100 (Where C: control, T: treatment

Table : Effect of aqueous extracts of R
root and stem of *Mangifera Indica* L. on germination and seedling growth of varieties of *Raphanus sativus* Linn.

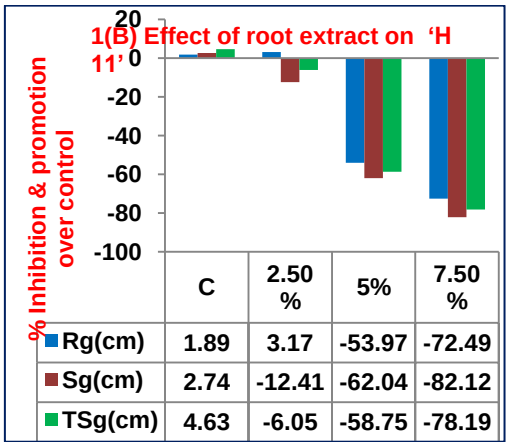
Extract	*Raphanus* Varieties	Growth Parameters	Control	Extract concentration 2.50%	5%	7.50%	CD at 0.05%	P-Value at 0.05%
Root	Japani	Rg(cm)	3.29a ± 0.38	3.47a ± 0.49 (5.47)	2.01b ±0.27 (-38.90)	1.09c ±0.25 (-66.86)	0.68	9.31E-06
		Sg(cm)	4.91a ± 0.55	4.48a ± 0.59 (-8.76)	2.56b ±0.42 (-47.86)	1.06c ±0.31 (-78.41)	0.9	9.13E-08
		TSg(cm)	8.20a ± 23.68	7.95a ± 30.23 (-7.44)	4.57b ±11.02 (-44.27)	2.15c ±8.42 (-73.78)	1.46	1.01E-07
		Ger %	90	93.33 (3.70)	93.33 (3.70)	63.33 (-29.63)		
	Hybrid 11	Rg(cm)	1.89a ± 0.27	1.95a ± 0.28 (3.17)	0.87b ±0.25 (-53.97)	0.52b ±0.15 (-72.49)	0.46	3.01E-05
		Sg(cm)	2.74a ± 0.44	2.40a ± 0.37 (-12.41)	1.04a ±0.26 (-62.04)	0.49ab ±0.17 (-82.12)	1.5	2.53E-06
		TSg(cm)	4.63a ± 0.69	4.35a ± 0.60 (-6.05)	1.91cb±0.47 (-58.75)	1.01b ±0.31 (-78.19)	1.01	1.98E-06
		Ger %	86.67	90.00 (3.84)	50.00 (-42.29)	40 .00 (-53.85)		
Stem	Japani	Rg(cm)	8.47a ±1.08	8.24a±0.79 (-2.71)	7.36a ± 0.58 (-13.11)	5.81b ±0.67 (-31.41)	1.5	0.09
		Sg(cm)	4.32a ± 0.44	5.51ab ± 0.45 (27.55	5.15a ± 0.40 (19.21)	4.42a ±0.52 (02.31)	0.85	0.19
		TSg(cm)	12.79 ± 1.44	13.75a ± 1.13 (7.51)	12.51a± 0.91 (-2.19)	10.23b±1.12 (-20.02)	2.18	0.18
		Ger%	96.66	96.66 (0.00)	93.33 (-3.45)	90.00 (-6.89)		
	Hybrid 11	Rg(cm)	4.35a ± 0.64	4.91a ± 0.68 (12.87)	3.68ab ±0.57 (-15.40)	4.23a ±0.55 (-2.76)	1.15	0.57
		Sg(cm)	3.33a ± 0.42	3.41a ± 0.45 (2.40	2.99a ±0.44 (-10.21)	3.35a ±0.41 (0.60)	0.81	0.90
		TSg(cm)	7.67a ± 1.04	8.32a ± 1.10 (8.47)	6.67a ±0.10 (-13.04)	7.58a ± 0.90 (-1.17)	1.9	0.71
		Ger %	90	80.00 (-11.11)	73.33 (-18.52)	90.00 (0.00)		

[Data presented are means of three replicates; values within the same row with different letters are significantly different at 0.05% P-level by Single factor ANOVA test followed by CD & Tukey's test. [Figures in parentheses indicate % stimulation (+) and % inhibition (-) over control; Sg: shoot growth, Rg :root growth, TSg: total seedling growth and Ger: seed : germination].

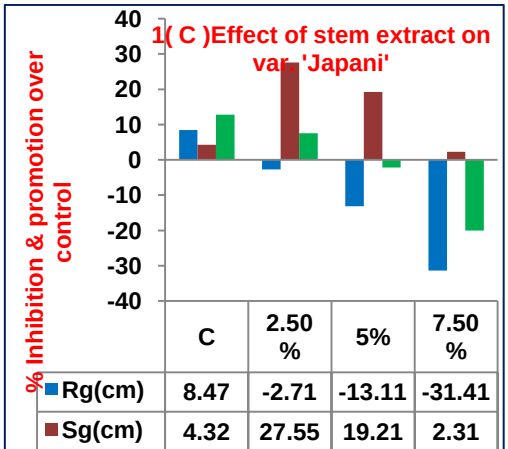
Graph No: Effect of root & Stem extracts of *Mangifera Indica* L. on seedling growth of varieties of *Raphanus sativus* and H[11]Linn.



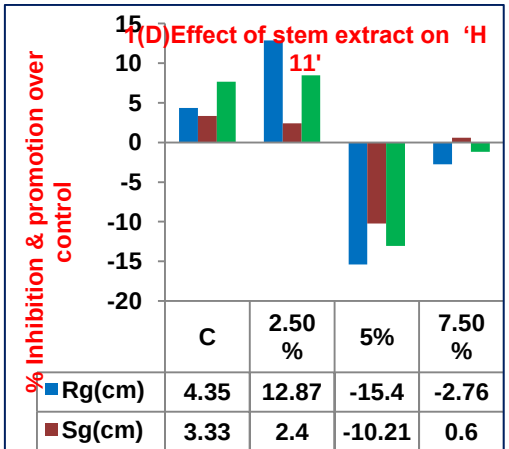
	C	2.50 %	5%	7.50 %
Rg(cm)	3.29	5.47	-38.9	-66.87
Sg(cm)	4.91	-8.76	-48.47	-78.41
TSg(cm)	8.2	-7.44	-44.27	-73.78



	C	2.50 %	5%	7.50 %
Rg(cm)	1.89	3.17	-53.97	-72.49
Sg(cm)	2.74	-12.41	-62.04	-82.12
TSg(cm)	4.63	-6.05	-58.75	-78.19



	C	2.50 %	5%	7.50 %
Rg(cm)	8.47	-2.71	-13.11	-31.41
Sg(cm)	4.32	27.55	19.21	2.31
TSg(cm)	12.79	7.51	-2.19	-20.02



	C	2.50 %	5%	7.50 %
Rg(cm)	4.35	12.87	-15.4	-2.76
Sg(cm)	3.33	2.4	-10.21	0.6
TSg(cm)	7.67	8.47	-13.04	-1.17

[Where Rg: root growth, Sg: shoot growth, TSg: total seedling growth, H11:Hybrid 11
figures indicate % inhibition (-) and % promotion (+) over control, C: control,2.50 to7.50% : Extract concentration].

RESULT AND DISSCUSSION

1 A Effect of root extracts of *Mangifera indica* L. on 'Japani' variety:

Except **slight promotion** of 'Rg' by 5.79% over control at 2.50 % extract concentration, root extracts of *Mangifera* exerted **inhibitory** effect on seedling growth parameters of 'Japani' variety. Extracts significantly inhibited seedling growth parameters viz. 'Rg', 'Sg', 'TSg' and 'Ger' by 38.90 to 66.86%, 8.76 to78.41%, and 7.44 to 73.78% and 29.63% respectively over control (Table NO.1, Graph NO. 1A).

1B.Effect of root extracts of *Mangifera indica* L. on 'Hybrid 11' variety:

Root extract of 2.5 % concentration **slightly promoted** germination (Ger) and root growth (Rg) by3.84% and 3.17% respectively over control. Root extracts of higher conc. significantly **inhibited** seedling growth parameters viz. 'Rg', 'Sg', 'TSg' and 'Ger' of the test plant by 53.97 to 72.49 %, 12.41 to 82.12%, 6.05 to 78.19% and 42.29 to 53.85% respectively over control (Table NO.1, Graph NO. 1B).

1 C Effect of stem extracts of *Mangifera indica* L. on 'Japani' variety (Plate NO11):

Aqueous extracts of all concentrations of *Mangifera indica* L. **promoted** shoot growth (Sg) by 2.31 to 27.55 % over control. However, 'Rg' was **inhibited** by 2.71to 31.41% over control. TSg was slightly **promoted** at lower concentration by 7.51%. Extracts of 5.00 to 7.50% conc. **inhibited** 'TSg' and 'Ger' by 2.19 to 20.02% and 3.45 to 6.89% over control respectively (Table NO1 and Graph NO 1C).

1D Effect of stem extracts of *Mangifera indica* L. on 'Hybrid 11' variety:

Extract of lower conc.(2.50%) promoted root growth (Rg), shoot growth (Sg) and Total seedling growth (TSg) by 12.87 %, 2.40% and 8.47% over control respectively (Table No.1, Graph No. 1D). Extracts of higher concentrations (5% to7.5%), however proved **inhibitory.** Seedling growth parameters viz. 'Rg', 'Sg', 'TSg' and 'Ger' were inhibited by 2.76 to15.40%, 10.21 %, 1.17 to 13.04% and 18.52 % respectively over control. Extracts of 5.00% exerted more inhibition. Inhibition was not significant (P<0.05%) (Table NO.1, Graph NO. 1D).

SUMMARY AND CONCLUSION

Root extracts of *Mangifera indica* L. inhibited maximally all seedling growth parameters of 'Hybrid 11' and 'Japani' varieties of *Raphanus sativus* L. Stem and root extracts of lower conc. were promotory. Inhibition followed an order: **Root > stem**. Extracts of different plant parts exerted differential effects on seedling growth of the two varieties.

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Diversity Of Medicinal Plants In Soegaon, District Aurangabad (M.S.) India

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ABSTRACT *Maharashtra state flora abounds in medicinal plants which can be called as storehouse as it covers varied geographical area and phytogeographical area. Soegaon is situated at 20.6^0 North latitude, 75.62^0 East longitude and 375 meters elevation above the sea level. There are a number of advantages of associated with using herbal medicines as oppose to pharmaceutical products. Medicinal plants have been identified and used throughout human history. In present investigation 15 medicinal plants were collected from a various places which are abundant in Soegaon, Aurangabad. The importance of collected medicinal plants is discussed in this investigation.*

KEYWORDS: *Medicinal plants, diversity, geographical area, advantages*

INTRODUCTION

Plant containing active chemical constituents (alkaloid, glycosides, saponins, essential oils, bitter principles, tannins and mucilages) in any of its part like root, stem, leaves, bark, fruit and seed, which produces a definite curing physiological response in the treatment of various ailments in humans and other animals, is regarded as medicinal plant. The present day knowledge about medicine considered to be a gift of ancient men to the mankind. The herbal medicines are in great demand in both developed and developing countries in primary health care because of their great efficacy and little or no side effects (Narula *et al*., 2000). Most of the plant species are used in preparation of drugs (Nautiyal *et al*., 2002). The two most important woves in Indian system of medicine are charaksamhita and susurtasamhita. The charaksamhita provides description of the materiamedica in which 484 medicinal plants are mentioned whereas susurhitasamhita has an account of 573 plants of medicinal importance (Kumar and Srivastava, 2002).

According to Schippmann *et al*. (2002) more than 50000 species are used for medicinal purposes worldwide, of which almost 13% are flowering plants. Over 8000 plant species are used in traditional and modern medicine in India (Planning Commission 2000) and 90-95% collection of medicinal plants is from the wild, of which more than 70% collection involves destructive and unscientific extraction. The World Health Organisation (WHO) estimated that 80% of the populations rely on traditional medicines, mostly plant drugs, for their primary health care needs in developing countries. Conservation and sustainable use of medicinal plants are issues on which immediate focus is required in the context of conserving biodiversity (Kshirsagar *et al*.,2012) .

MATERIAL AND METHODS

The frequent visits to various places in Soegaon and villages namely Kankarala, Kawali, Galwada etc. The traditional local healers sell herbal medicines. Data was collected on the sources and uses were recorded. Some of the plants are conserved in gardens.

1

Table 1. List of collected medicinal plants and their uses

Sr. No.	Genus & Species Vernacular Name	Family	Distribution	Parts Used	Medicinal Uses
1.	*Terminalia bellirica* (Bahede)	Combretaceae	Scattered in forest	Fruits	Used in popular Indian herbal rasayana treatment Triphala, control vomiting, remove vata and cures bronchitis, cures kapha, throat and respiratory problems etc.
2.	*Anona sqamosa L.*	Annonaceae	Commonly found	Leaf, root, fruits and seeds	Suppurative, antispasmodic, antihelminthic, carthartic, Antiemiticex pectorant,antiphthistic, abortifacient etc.

	(Sitaphal)				
3.	*Tribulus terrestries* L. (Gokharu)	Zygophyllaceae	Common in sandy places	Root, Fruits, and Leaf etc.	Diuretic in painful micturition, aphrodisiac, antighnorrhoicantiasmetic,in skin and heart disease, haemastasis, stomachic etc.
4.	*Cleome viscosa L.* Higul/Burga.	Brassicaceae	Commonly found	Seed, Leaf and Bark.	Carminative, antihelmintic,antiseptic,externaly as rubefacient etc.
5.	*Aegle marmelos* L. Bel	Rutaceae	Occasional found	Fruit, pulp, root, bark, stem, leaf	stomachic,inpiles,antigonorrhoeic,cardiotonic Laxative,tuberculosis,hepatitisantidysentric,emetic,antiinflamatory,expectornt in opti-Helminthic,jundice,urinary troubles etc.
6.	*Azadirachta indica* A.Juss. Neem	Meliaceae	Commonly found	Fruits,seed oil,gum, bark, stem and flower etc.	Antiperiodic,astringent,in skin trouble,anticeptic, ulcer,stmatic,antihelminthic purgative stimulant etc.
7.	*Tamarindus indica L.* Chinch/Imali	Caesalpiniaceae	Commonly found	Bark,Leaf, Ash, flowers, fruits and seed etc.	Antiparalytic,astringent,ulcers in ring worm, smallpox, bleedingpiles, laxative ,antiinflamatory, liver complaints, cough, useful in vaginal discharge etc.
8.	*Citrus medica* L. Nimbu, Limbu	Rutaceae	Cultivated for edible fruits	Fruit juice, root bud and flower etc.	Antihelminthic,purgative,antiemetic in urinary calculus, astringent, stimulant. etc.
9.	*Adhatoda zeylanica* Medic. Adhulsa	Acanthaceae	Commonly Found	Leaf and root etc.	Uterotonic, abortifacient, antiseptic, in chronic bronchitis, expectorant, antidiarrhoeal etc.
10.	*Withania sominifera* (L).Dunal. Ashwagandha	Solanaceae	Common in dry places	Leaf,root, seed and fruit etc.	Narcotic,abortifacient, antiinflamatory, tonic, inconsumption, female dis- Orders,ulcer, scabies, lesions, painfulswellings, soreeyes, hypotonic etc.
11.	*Quisqualis indica* L. Rangun	Combretaceae	Commonly found	Leaf and flower etc	Antihelmintic, febrifuge,antidiarrhoeal, carminative etc
12.	*Butea monosperma* Palash	Fabaceae	Commonly found	Seeds, bark, gum, leaves,flower and roots	Tonic, antihelminthic, anti-inflammatory, antimicrobial, antidiabetic, antianalgesic, antitumor, night blindness treatment
13	*Calotropis gigantean* Rui plant	Apocynaceae	Commonly found	Leaves, flowers, latex	Pitta dosha, pain relievers, vomiting therapy, anti-inflammatory, purgative
14	*Accacia pinnata* (L)Willd. Babhul	Mimosaceae	Commonly found	Bark,Leaf etc.	Antidote for snake poision,in bronchitis, scalding of urine etc.
15.	*Lantana camara* Ghaneri	Verbenaceae	Commonly found	Leaves, dried roots, flower	Relief from headache,toothache, relief from indigestion, flu, colds, fever, to cure malaria, influenza, mumps etc.

RESULT AND DISCUSSION

Traditional medicinal plants available in Soegaon can be used as major source of ayurvadic drugs in curing a number of diseases. A herbal prices for common man, they are time

tested and considered safer than modern synthetic drugs. Hence many diseases can be effectively cured with medicinal plants. In present research records 15 local medicinally important plants collected and their medicinal information collected by traditional medical practioners, folk peoples and available literature..

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Investigation of Ethnomedicinal plants of Lonar Crater in Buldhana District

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ABSTRACT *The paper deals with an ethnomedicinal study of Lonar crater in Buldhana district in Maharashtra.The survey of medicinal plants was carried out on June 2010.There are 30 different ethnomedicinal plants of 30 species 30 genera and 27 famalies was recorded.The present work deals with different ethnomedicinal practices and their uses performed by local vaidus.*

Keywords: *Ethnomedicinal plants, Lonar crater Buldhana dist.Conservation*

Introduction:

The use of medicinal plants by different groups as a source of medicinal agents lies deep in the antiquity (Raghunatam et.al.2009) near about 80% of world population use traditional medicinal plants to cure various diseases (Manual J.m.et.al) Indian literature shows use of plants in siddha(600) ayurveda (700) amchi(600) unani (700) and allopathy (300) for the preparation and uses of medicinal plants for various diseases (Tiwari D.N.et.al 2000) Lonar crater is a very well known for its huge Biodiversity of flora and fauna.There are about 37 species of mammals 16 species of reptiles and 108 species of avifauna(Kulsunder.S.P et.al 2005).

Study area:

Lonar is the taluka place of Buldhana district of Maharashtra state.It is the third biggest meteoritic crater pact in the world and is formed about 52 thousand years ago. The lonar lake is situated about 1km to the south west of Lonar town (19^{O} 58^{I}N,$76^{o}31^{1E}$).Fig No.1and 2 .The lake lies circular depression surrounded by all sides of steeply rising escarpment to an height of 150 m above lake level, The circumference of the lake is 6 km on the top and inner rim is 3.5 km with shallow saline lake and diameter is 1.830 km (Kshirsagar et.al 2005).It is the tourist place having importance in ecological, geological and photographical point of view.This creator is important for ethnomedicinal plants gond ,kol, bhui, dusadh, banjara people lives in this district.These people believe in supernatural power use for medicine in the treatment of their diseases.They also utilize a number of herbal drugs, and consume leaves, vegetables, tubers, bulbs flower, and fruits.

Fig no1 .Map showing location of lonar .Fig No 2. Lonar crater

Material and methods: Ethnomedicinal survey was conducted during the month of june 2010 around the lonar lake.The plants were collected and correctly identified with the help of pertinent literature(Almeida2003, Yadav.2000, Naik 1998) similar survey conducted by (Dabhadkar etal.2013:Zare et.al 2014) Attempts will be made in this directions to study ethnobotanical importance of plants with the help of forest dwellers, old knowledge persons and prepared list of 30 plants which are given below in Table No.1

Table:No 1. Different Ethenobotanical plants collected from the Lonar crater Buldhana district .

Sr.No	Scientific Name/ Family	Local name	Plant parts use	Uses
1	*Adhatoda zeylanica* Med.c.Hist Acanthaceae	Adulsa	Leaf ,flower	Antispasmodic,respiratory ,stimulant.
2	*Bacopa monniri L* .Scrophulariaceae	Brahmi	Leaves	Nervous,memory enhancer,Mental disorder.
3	*Bombax malabaricum*.DC. Bombacaceae	Kate saver	Stem bark, flower and young fruit ,seeds.	Skin disease and snake bite.
4	*Balanites aegyptiaca* .Del. Balanitaceae	Hinganvbet	Stem bark, flower fruit ,seeds	Anthelmintic,diuretic,worm infection diabetes,vermifuge.
5	*Cardiospermam helicacabum* .L. Sapindaceae	Kapal phodi	Root and leaf	Diaphoretic,rheumatism,ear disease.
6	*Eclipta alba* L .Compositae(Asteraceae)	Bhringraj	Leaf	Anti inflammatory digestive,hair tonic .
7	*Chlorophytum borivilianum*. Sand and Fern. Liliaceae	Safed musli	Leaf ,stem and roots	Tonic spurce,piles,disorderof blood.
8	*Dalbergia sisso*.Roxb. Fabaceae	Shisham	Root bark	Urinary disease.
9	*Emblica officinalis* Gaertn .Fruct. Euphorbiaceae	Awala	Fruit,leaf,	Vitamin C,Cough,diabetes ,cold,hyper acidity.
10	*Cymbopogon citrates* (Dc) Poaceae(Pooideae)	Gawti chaha	Leaves	Hair lotion cut injured scratches.
11	*Asparagus racemosus* .Willd.Asparagaceae	Shatavari	Leaves root	Enhance lactation general weekness fatigue,cough
12	*Mamordiea dioica* .Roxb. Cucurbitaceae	Kartoli	fruits	Vegetables and digestive problems .
13	*Glossocardia bosvallea* (L.F)DC Compositae(Asteraceae)	Kadak shepu	Whole plant	Emmenagogue vegitable sag ,fever.
14	*Celastrus paniculatus* .willd. Celastraceae	Malkagoni	Stem bark and seeds	Abortifacient,aphrodisiac,brain tonic stomach disorder.
15	*Quisqualis indica*. L. Combritaceae	Madhumalti	Fruit and seeds	Fever,Rickets,purgative,skin disease.
16	*Ficus benghalensis* .L. Moraceae	Wad	Young root and bark	Obstraction of urine flow,exudation of pus and piles .
17	*Helictreres isora*.L. Sterculiaceae	Murud sheng	Root fruit and leaf	Diabetes,stomach affections,diarrhoea,dysentery,appetite.
18	*Morinda citrifolia* L. Rubiaceae	Bartondi	Fruit and root	Eczema ,ulcer,digestive disorder.
19	*Hemidesmus indicus*(L.)sch.in Roem. Periplocaceae	Anant mul	Root	Rheumatism,urinary diseaseand skin truble .
20	*Withania somnifera* (L) dunal.in DC. Solanaceae	Ashwagandha	Whole plant	Restorative tonic,stress,nerve disorder.
21	*Terminalia elliptica* .willd. Combretaceae	Ain	Stem bark and fruit	Cardiotonic Chronic dysentery,fever.
22	*Sesamum mulayanum*. Nair.Bull. Pedaliaceae	Raan til	Leaf, seeds	Ulcer, antiseptic.
23	*Syzygium cumini* .(L.) skeels. Myrtaceae	Jambhul.	Stem,bark,and seeds	Diabetes, burning sensation eczema.
24	*Gloriosa superbha* .L. Liliaceae	Kallavi	Whole plant	Skin disease,abortion,
25	*Semicarpus anacardium* .L. Anacardiaceae	Bibba	Gum resin	Toumers abdominal disorder leucoderma.

26	*Menthha spicata* .L. Lamiaceae	Pudina	Whole plant	Indigestion ,jaundice,diarrhea, intestinal worm.
27	*Merremia gangetica* L. Convolvulaceae	Undirkani	Leaves	Pain, wounds, hand finger pain.
28	*Ocimum basilicum* .L. Lamiaceae	Sabja	Seeds,leaf	Cough and cold bronchitis,expectorant.
29	*Thespesia populena* .L. Malvaceae	Ran Bhendi	Whole plant	Astergent,skindisease,Leucorrhoea.
30	*Malachra capitata* .L. Malvaceae	Ran ambadi	Roots	Emollientism,rheumatism.

Result and discussion : The present work describe the ethnomedicinal plants for curing various diseases such as diabetes,ear disease, ulcer,piles,dysentery,fever asthma etc.There are different collected ethnomedicinal plants collected from lonar crater of 27 families 30 genera and 30 species. We can also observe that small herbs which are having adoptive nature would survive in the ecosystem in the company of large trees. Herbs,shrubs,trees,insects birds, animals and also other biotic and abiotic factors have remained interdependent on each other. It is related in the creation of food chain and food web, if there is any kind of disturbance and interference in the creative processes of herbs, shrubs and trees it resulted in a disturbance of the whole food chain, it creates threat for ecosystem. So it is an always felt that we must take care to ban the use of non-biodegradable products so that we can protect ecosystem and environment of crater and also put some restriction on tours and tourism of educational institutions so that they did not disturb the environment..

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Soil and Water Conservation and Management

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ABSTRACT *Planning of scientist for soil and water conservation and management to control land degradation, particularly soil erosion. Soil and water conservation requires knowledge of the relations between those factors that cause loss of these two and those that help to reduce such losses. The soil loss prediction procedure presented provide specific guidlines which are needed for selecting the control practices best suited to the particular needs of each site. The farming and land management practices that maintainence of soil mulch cover.*

This paper gives some achievements in soil and water conservation on agricultural lands throuh adoption and spread of Conservation Agriculture (CA) World wide. Conservation agriculture is an agro-ecological approach to sustainable production and involves three applications which are inter-linked principles based on locally formulated practices.a) Permanant no. or minimum mechanical soil disterbances, which entails direct seeding through mulch into notill soils. b) Maintenance of soil cover with plant residuces and green mamure crops, particularly legumes and c) Diversified cropping system involving annuals perennial in rotations, sequences and associations.

Environmental sciences created water management modules, covering such topics as basic soil and water. Different types of wind and water erosion. Recogning the different ways in which water moves through soil. Water management practices that reduce solute transport to protect water use efficiency and maximize yields.

Key Words:- *Degradation, achievements, sustainable, Diversified cropping etc.*

Introduction

Soil and water most important natural resources and basic needs for production of food, vegetable and fruits. During the last centur increasing population and degradation of both these natural resources. In other words increasing population is only possible if there is sufficient fertile land and water available for forming.

In India, out of 328 million hectares of geographical 68 million hectares critically degraded while 107 million hectares severely eroded. That's why soil and water givenn the first priority from the conservation point of view and appropriate methods used to ensure their sustanability and future availability.

Water conservation is the use and management of water for the good of all users. Water is abundant throughout the erarth, but only 3% of all water is fresh and less than seven-tenths of freshwater is usuable. Much of usuable water is utilized for irrigation. Detail analysis will show that in 15 years, about 2/3 of the world's population will be living in some sort of water shortage. Water is used nearly every aspect of life. Multiple domestic,industrial and agricultural uses . Water conservation is rapidly becoming a hot topic, Yet many people do not realize the importance of soil conservation.

Soil conservation is as the control of soil erosion in order to maintain agricultural productivity.soil erosion is often many natural causes,such as water and wind. Human factors are also increase the soil. erosion such as contraction, cultivation, and other activities. Some argue that since it is a natural process it is not harmful. Due to erosion top lager of soil removel and organic matter and nutrients ai also removed.

Sustainable agricultural development would require the combined use of soil,nutrient and water management strategies that enhance crop productivity and at the same time promote environmental sustainability.

There is a strong need for high-quality innovative research and soil-water-specific technologies most important issues of soil/land and water management and conservation in agrosystems.

The world is facing on dual challenge of enhancing food security and ensuring environmental sustainability,particularly the natural resources ie (soil and water), and genetic (plant and animal) resources. The present World popullation is 7 billion will exceed 9 billion.

Methods for soil and Water Conservation/Management :-- The continuing need to enhance food security and reduce climate change impacts demands an activity program that leads to sustainable soil and water conservation and management.

This provides a) sustainable intensification of crop production.b) Development of conservation agriculture systems and c)Sustainable land (soil)/ water management and conservation.

I]Sustainable intensification of crop production:-- Several CRPs (Coordinated Research Projects) were conducted adopting an integrated approach to soil, water and nutrient management in selected cropping systems of the main agrochemical zones of the World. Recent trends highlight an agrochemical management through nutrient recycling from on farm organic resources (animal manure and crop residuces).

2] Integrated Nutrient management :-- Extensive tracts of land worldwide, particularly those in the tropical and subtropical regions of Asia, Africa,and Latin America contain fragile soils with poor soil fertility, where nutrient imbalances, especially low **Nitrogen and phophorous.**

The seven micronutrients,including Boron (B),Copper (cu),chlorine,(cl), Iron (Fe), Manganese (Mn), Molybdenum (Mo), and Zinc (Zn), are equally important to plants as like Macronutrients in soils.

3] Agricultural Water Management :-- Water is the most precious resource that supports life on the planet and connects the various components of the ecosystems. Agriculture is the largest user of fresh water, for about 75% of the global freshwater use.

Cropland under irrigated agriculture contributes approximately 40% of World food production while the remaining 60% comes from the cropland under rainfed agriculture.

4] Rain water harvesting:-- All our need a water is required. Harvesting of water in rain is collected on Rooftops and other surfaces is carried down and it can be used immediately of stored. Some of the benefits of rainwater are as follows.

* prevents soil erosion and flooding especially in urban areas.
* Increase water availability.
* Checks the declaring water table.
* Improves the water quality.
* Environmentally friendly.

5] Agriculture :-- Conservation of soil and water in the agricultural sector is essential for the plants and crops.

There are numerous methods to reduce losses of soil and water are listed below.

a) Mulching -ie The application of organic or inorganic material such as plant deberis compost etc. slows down surface run-off water as well as soil and improves the soil moisture reduces evaporation losses and improves soil fertility.

b] Soil covered by crops slows down run-off and retains and minimizes evaporation losses.

c] Ploughing helps to move the soil around and retains more water by reducing evaporation.

d] Shelter belts of trees and bushes slow down the wind speed and reduces evaporation and erosion.

e] Planting of trees, grass and bushes helps rainwater penetrate the soil and reduces the soil erosion and increases the water table.

f] Contour farming is adopted in hilly areas for paddy fields.

g] Transfer of water from surplus areas to deficit inter linking systems through canals.

h] Drip and sprinklers will reduce the water consumption and soil erosion also.

Conclusion :-- Water and Soil conservation and management is so important because all living organisms need water and food to survive. Water and soil conserves is helpful for the balances environment. Fresh, clean water is limited resource while most of the planet is covered in water, but it is salty water.The loss of vegetation is also cause of drought and reduction of rainfall and indirectly a cause of lowering of the water table.

Deforestation is also a cause of soil erosion and to maintain humidity in the atmosphere which help in rainfall and to minimise evaporation rate of water. Water tanks should be covered to avoid evaporation and also for cleanliness. Due to high rain there is floods which follows

heavy and along with it soils also flows rapidly.People need to to take steps to reduce water use and save as much water as possible . The conservation of ground water should be based on proper relation of land and groundwater management taking socioeconomic and ecological aspects also. There is need for comprehensive soil and water conservation and management program. The Civil society Organizations (CSOs) and Non-governmental Organizations (NGOs) continueto play an important role in programming positive changes in the water resource management.

Integrated practices such as soil-water conservation, adequate land preparation for crop establishment, rainwater harvesting, efficient recycling of agricultural wastewater, conservation tillage to increase water infiltration, reduce runoff and improve soil moisture strage.

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Analysis of Aeromycoflora inside Hospitals at Beed M.S. India

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ABSTRACT *Aerobiological investigation of* ***Hospitals*** *at Beed was conducted during June 2015 to May 2016 to identify fungal spores which are allergenic nature in Air causing allergic diseases and Air pollution .The atmospheric Air of Hospital environment contains variety of fungal spores transported through air current are the main source of human allergic, and different diseases. The fungal spores are toxic and responsible for causing serious health hazard diseases in human beings and create lot of environmental pollution in the entire surrounding of Hospital . Total 20 fungal spores were recorded, Aspergillus , Curvularia,Cladosporium , Fusarium ,Mucor, penicillium ,Candida and Alternaria were found present in almost all seasons through the year which are known to be the major Allergic and causes Sinusitis , Rhinitis's ,Asthma , Eczema , Dermatitis ,Mycoses, Utricaria. The Present investigation proved that Patients, Visitor , Doctors, hospital staff and children's are exposed to fungal spores in Hospital environment which are Allergic and pathogenic in nature and may causes serious health hazards problems in them and therefore cleanness should be maintained .*

Keywords: *Aermycoflora, Fungal spores, Allergic diseases*

Introduction

Atmospheric pollution is one of the most serious problems and in recent times it has reached its climax which poses a great threat to human health that deteriorates well being of the population .Air pollution is the introduction of particulate matter, chemicals and biological materials into the atmosphere that causes discomfort, diseases or even death to humans, damage to other living organisms including food crops. Exposure to bio-aerosols, containing airborne microorganisms and their by-products, can result in respiratory disorders and other adverse health effects such as infections, hypersensitivity and toxic reactions. Microbes are the basic sources of indoor air contamination. Microbial damage in indoor or outdoor areas is caused most frequently by molds and bacteria. Patients are exposed to greater risk in indoor air environment because confined areas contained aerosols and allow them to develop an infectious level. Indoor air of hospital contains a variety of microbial population. Nosocomial infection also known as hospital acquired infection is infection acquired in a hospital environment, which was not present in the patient at the time of admission. Nosocomial infections can cause urinary tract infections, severe pneumonia and infections of other parts of the body. The microorganisms implicated can enter the body through wounds, catheters as well as by inhalation. In the tropics, researchers have identified microorganisms such as Penicilliuim sp, Aspergillus sp and Cladosporium sp are some of the most commonly isolated microorganisms from hospital environments. The measurement of the quantity and aeromicroflora types serves as an index for cleanliness of the environment as well as profile revealing human health and nosocomial infections. The source and spread of microorganisms inside the hospital are of important concern, human related organisms or body flora, also found in clothing are disseminated through shedding during human activities. Patients activity such as coughing, sneezing, yawning, talking and the number of patients per room may likewise be sources of hospital infection. This present study was aimed at investigating the types of airborne micro-flora of a major hospitals in Beed District Maharashtra, India.

Materials and Methods

This work was carried out at two different hospitals of Beed District Maharashtra, India. Different wards of the hospital were selected for sample collection. These wards were the general ward, female ward, and children's ward. .

Isolation of Aeromycoflora

For isolation of aeromycoflora , PDA media (Potato Dextrose Agar) was used. Aeromycoflora of the given area was observed by gravity settle plate method containing PDA medium. Ten sterilized Petri plates containing PDA media were exposed 5 to 10 min. in the study area after the interval of fifteen days throughout the study period. These exposed Petri plates were brought in to the laboratory and incubated at 28±1 0C for 3-7 days. After three days of incubation, the fungal colonies were counted for individual species and the total number CFUs were calculated. Microscopic slides stained with cotton blue were prepared from each CFUs and observed microscopically under the light microscope to identify directly them up to species level. The colony forming units (CFUs) that could not be identified directly from plates were sub cultured in PDA media again and identified later on. Standard staining procedures were used to identified the culture.Cultured fungi on agar plates of different hospital sites and the identified fungal taxa up to their generic level are given in tables Percentage occurrence of individual fungus was determined and plotted in the form of tables and graphs.

Calculation of Percentage contribution of an individual fungus:

Percentage occurrence of the fungus

$$= \frac{\text{Total CFUs recorded by the individual fungus}}{\text{Total CFUs recorded by total number of fungi}} \times 100$$

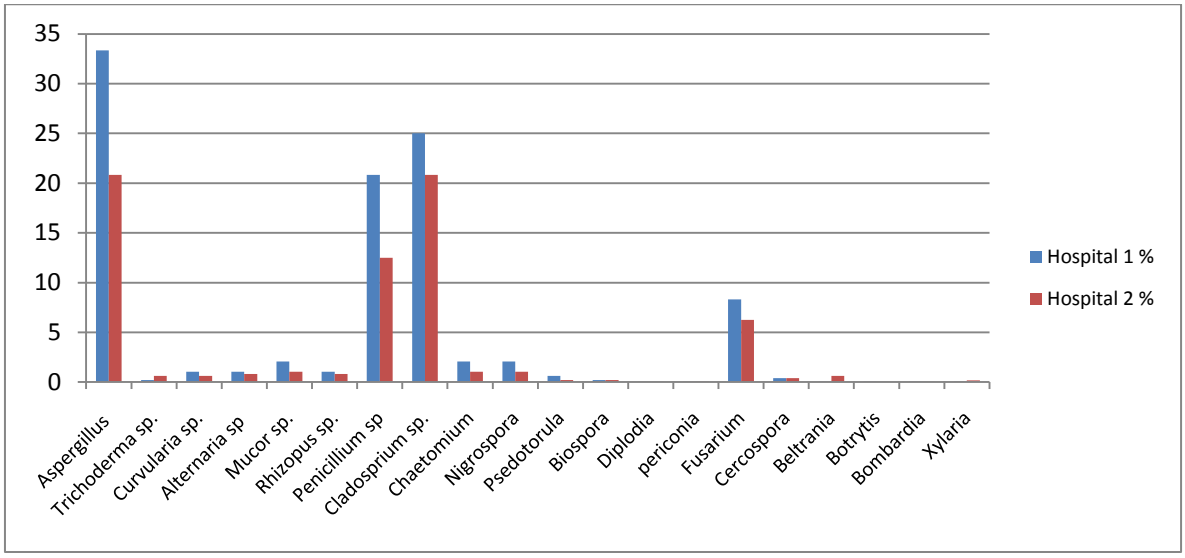
Percentage of Fungal spore colonies recorded during study period

Sr.No.	Name of the fungal spores	Hospital 1 %	Hospital 2 %
1	Aspergillus	33.33	20.83
2	Trichoderma sp.	0.20	0.62
3	Curvularia sp.	1.04	0.62
4	Alternaria sp	1.04	0.83
5	Mucor sp.	2.08	1.04
6	Rhizopus sp.	1.04	0.83
7	Penicillium sp	20.83	12.50
8	Cladosprium sp.	25.00	20.83
9	Chaetomium	2.08	1.04
10	Nigrospora	2.085	1.04
11	Psedotorula	0.62	0.20
12	Biospora	0.20	0.20
13	Diplodia	0.04	0.04
14	periconia	0.04	0.08
15	Fusarium	8.33	6.25
16	Cercospora	0.41	0.41
17	Beltrania	0.08	0.62
18	Botrytis	0.08	0.04
19	Bombardia	0.08	0.04
20	Xylaria	0.08	0.16

Results and Discussion

A total 20 genera of fungal colonies were recorded from two different sites of Hospitols as shown in table . Aspergillus ,Cladosporium, Fusarium and Penicillium were more dominant in all the seasons .Majority of the fungi are of Deuteromycotina groups. The seasonal variations in the Aeromycoflora were observed. In the month of April and October the percentage of fungal spores was to much more while in the month of January and June the Percentage contribution of the fungi was low as compared to the other months .In the winter seasons all the spores type were recorded while in the summer seasons Aspergillus , Cladosporium and Penicillium were maximum while in rainy season the maximum percentage was of Aspergillus,Rhizopus and Mucor. In the present study Aspergillus was observed as most dominant and frequent species similar result were found by earlier workers **Sharma 2001** ,**Verma 1992** , **Aghashe 1997**, **Mahajan 2007** ,**Pund 2007** ,**Saroja 2007** and **Giri 2010 , A Nanda; B K Nayak; N Behera 2014 .**

Graphical representation of Percentage of Fungal spore colonies recorded during study period



Conclusion

From this study it was revealed that a large number of pathogenic microorganisms are always presents in the hospital atmosphere that cause serious health hazards so it is important that the hospital ambient air should be continuously monitored for air-borne pathogens. Periodic cleaning operations and maintenance activities of different indoor environment should be taken as a preventive measure, though isolated fungi are tentatively identified by morphological and physiological it needs further identification through 16S and 18S rRNA sequencing for bacteria and fungi respectively. Because it was observed that most of patient in the Hospitals are affected with toxic Aeromycoflora and showing the symptoms of some allergic diseases. So it is necessary to keep the hospitals clean daily cleaning is necessary and peridicaly monitoring of Aeromycoflora is also necessary and control measures of the Aeromycoflora is also very much essential.

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Screening of secondary metabolites from endophytic fungi of *Albizia lebbeck* from various regions of Aurangabad, Maharashtra (India).

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ABSTRACT *In the present study diversity of endophytic fungi associated with Albezia lebbeck (L.) Benth. were analyzed. Sampling were done in the five different areas of Aurangabad i.e. Bidkin region, Khultabad, Osmanpura, Shenrda, Beed bypass in which healthy Albezia plants were collected from the area. Endophytic fungi were isolated from leaf with midrib, without midrib, petiole and stem. Colonizing frequency and dominancy were calculated. Colletotrichum and Alternaria sp. was dominant among isolated endophytes. From the isolated strains, some of them were screened for the production various secondary metabolites. Some of the endophytes were able to produce flavonoids, phenols, tannins and alkaloids. Alternaria species reported to produce all mentioned secondary metabolites along with terpenoids .*

Keywords: *Endophytes, Albizia lebbeck, Colonizing frequency, secondary metabolites*

Albizia lebbeck is a tree well known in the Indian subcontinent for its range of uses. It is also known 'Shirish' which is an astringent, also used by some cultures to treat boils, cough, to treat the eye, lung problems, pectoral problems, as a tonic, and used to treat abdominal tumors (Duke 2008). The bark is used medicinally to treat inflammation (Lowry 1994). This plant have already been reported as anti asthamatic property (Faisal *et. al* 2012), anti oxidant (Mohamad *et. al.* 2013) The leaves are also used as cattle fodder, mulch, and manure due to high nitrogen contents. The bark is bitter, cooling, alexiteric, and anthelmintic, and cures diseases of blood, leucoderma, itching, skin disease, piles, excessive perspiration, inflammation, bronchitis, and toothache and strengthens the gums and teeth; it is used for paralysis, and weakness (Mohamad *et. al.* 2013). No reports up till published about the endophytic fungi from this host plant and its bioactive compounds.

Endophytes are microbes that live in the internal tissues of plants without causing any immediate disease symptoms or any negative effects (Bacon & White 2000). Entophytes shows a activity against insect herbivores and many of them produces the unique antimicrobial secondary metabolites (Arnold *et.al*.2001). Most of the research work conducted on the mere presence and identity of endophytes in the stem or leaf tissues [Bettucci & Sarava (1993), Geris *et.al.* (2003), Schweigkofler & Prillinger (1997)].

Endophytes have the ability to produce a huge chemical diversity, including alkaloids, peptides, steroids, terpenoids, isocoumarins, quinones, phenylpropanoids and lignans, phenols and phenolic acids, aliphatic compounds, lactones, and others. Among these compounds, several have interesting biological activity. Comprehensive reviews regarding endophytic chemical diversity reported up to May 2006, and also biological activities, have been published and confirmed endophytes as an outstanding source of natural products (Tan and Zou, 2001; Gunatilaka, 2006; Zhang *et al.*, 2006).

Endophytic fungi were isolated from healthy, living, and symptomless tissues of inner bark, leaf, and roots of *Aegle marmelos*, a well-known medicinal plant, growing in different parts of India including Varanasi. A total of 79 isolates of endophytic fungi were isolated, representing 21 genera *Fusarium* spp. had maximum colonization frequency (8.00%) in this plant. The other dominant endophytic genera were *Aspergillus* spp., *Alternaria* sp., *Drechslera* sp., *Rhizoctonia* sp., *Curvularia* sp., *Nigrospora* sp., and *Stenella* sp. Only two ascomycetous members *Chaetomium globosum and Emericella* sp.(Gond *et.al.*2007)

Endophytic microorganisms have been proved as an outstanding source of both novel and bioactive natural products, which have an enormous potential for the development of new drugs and agricultural products. In spite of the increased number of reports about their natural

products in the last years, endophytes are still a relatively poorly investigated group of microorganisms. Therefore the present research was carried out.

Materials and Methods

Collection of Sample

Five different locations were selected for sampling and were denoted as location 1, Zalta corner (Locl); location 2, the Shendra MIDC (Loc2); location 3, Osmanpura (Loc3) , location 4 , Bidkin area (Loc 4) and location 5, Khultabad (Loc 5) Leaves, stem were collected from individual plants at each location. Samples were labeled and collected, and each was assigned a code .All samples were immediately brought to the laboratory in sterile bags, and the tissues were screened for endophytic fungi.

Screening, Identification of Endophytes

All the samples were washed properly in running tap water for half an hour before processing. The samples were cut into small pieces. Leaves with midrib, leaves without midribs, petiole and stem samples were cut into 1.0 x 1.0 cm pieces. To eliminate epiphytic microorganisms, all the samples were initially surface treated (Petrini *et.al.* 1992). The samples were immersed in 0.1 % mercuric chloride for two minutes followed by 70% ethanol for 1-3 min and then sterilized with distilled water for 3-5 min. Each sample was then dried under aseptic conditions. Segments of each sample were placed on potato dextrose agar (PDA) . The Parafilm -sealed petri dishes were then incubated for 72 hrs. The endophytic fungi were identified according to their macroscopic and microscopic characteristics such as the morphology of fruiting structures and spore morphology. Standard taxonomic manuals were used to identify the fungal genera [Ainsworth *et.al.* (1973), Barnett & Hunter (1998)]. All isolated and identified endophytic fungi were assigned specific code and subcultured and cultures were kept in deep freeze.

Estimation of Secondary metabolites

Endophytic fungi which are showing dominance were selected for further analysis.Fungal strains previously were grown on glucose nitrate medium then grown on Czepdosk liquid medium as it was observed that fungi are growing rapidly on CZ as compare to liquid PDA and GN medium. Initially fungi mycelium as well as medium extract were used to estimate secondary metabolites but it was observed that mycelium was producing more amount of secondary metabolites as compare to medium extract. Fungi samples were grown on liquid CZ for eight days then mycelium were collected then air dried. Dried mycelium were extracted with 70 % ethanol in mortar and pestle and filtered. Filtered extract were used for further analysis.

Estimation of Phenols

The amount of total phenolic was determined using the Folin-Ciocalteu reagent (Thimmaiah 2009).1 ml sample was dissolved in 1.5 ml distilled water and 0.5 ml Folin-Ciocalteu's reagent. After 1 min, 1 ml 20% sodium carbonate solution was added. The final mixture was shaken and incubated at 25ºC for 2 h in the dark. The absorbance of the mixture was measured at 760nm.Catechol was used as standard.

Estimation of Tannins

Filtrate of isolated fungi was taken for estimation of tannin content present in given mixture. The amount of total tannin was determined using the Vanillin reagent. Reagent was prepared by mixing same amount of 8% HCL and 4% vanillin in 100ml methanol. 0.5ml sample was dissolve in 0.5ml distilled water and 5ml of vanillin HCL reagent.Incubate the tubes for 20min at room temperature. After incubation take the absorbance at 500nm

Estimation of Flavonoids

For the estimation of flavonoids content ethanol extract of the mycelium was used. The flavonoid content was determined based on the formation of flavonoid-aluminium (Djeridane *et. al.* 38, 2006). 0.5 ml sample was dissolve in 0.5ml of distilled water and 1 m l of 2% aluminium chloride solution. Incubated the tubes at room temperature for 15 min then absorbance of the reaction mixture was measured at 430 nm. Rutin was used as standard (Thimmaiah 2009).

Estimation of Alkaloids

For the estimation of alkaloids content ethanol extract of the mycelium was used. Filtrate was warmed to 70 ^{0}C in a water bath and conc.H_2SO_4 was added drop wise till the pH 10. Mixture was centrifuged and precipitate was washed with 1% NH_4OH. Precipitate was dissolved in 1:1 mixutre of 96% ethanol and 20% H_2SO_4. To 1 ml of alkaloidal solution 5 ml of 60 % H_2SO_4 and after 5 minutes 5 ml of formaldehyde reagent was added. Atropine was used as standard. Absorbance was measured at 570nm. (Thimmaiah 2009).

Estimation of Terpenoids

Qualitative estimation was done for terpenoids. 2 ml of extract was treated with 2.5 ml of acetic anhydride with 2.5 ml Chloroform and few drops of con. H_2SO_4. Red violet colour indicate the presence of terpenoid.

Estimation of Glycosides

Qualitative estimation of glycosides was done. Few drops of the extract were dissolved in pyridine. Then 10% sodium nitroprusside solution was added. After that solution was made alkaline using 10 % sodium hydroxide. Pink colour indicates presence of glycosides.

Estimation of Steroides

Qualitative estimation was done for terpenoids. 2 ml of extract was treated with 2.5 ml of acetic anhydride with 2.5 ml Chloroform and few drops of con. H_2SO_4. Green bluish color indicate the presence of steroids.

Analysis of Data.

The relative frequency (percent CF) of colonization of endophytic species was calculated as the number of segments colonized by a single endophyte divided by the total number of segments observed x 100 (Hata & Futai 1995).

This is expressed as %CF = (N*R*col*R*/ N*R*t*R*) x 100; where N*R*col *R*the number of segments colonized by each fungus, and N*R*t*R* = the total number of segments. The dominant endophytes were calculated as the percentage colony frequency of a given endophyte divided by the sum of the percentage of colony frequencies of all endophytes x 100 (Kumaresan & Suryanarayanan 2002)

Results and Discussion:

Albizia plants were collected from five different localities. A total 61 isolates belonging to 14 fungal taxa were obtained from 120 segments observed from leaf, leaf with midrib, petiole and stem were isolated, identified and evaluated for their existence. Out of total endophytes isolated most of the genera are from hypomycetes, coleomycetes and sterilla. Maximum endophytes isolated from Loc 4 (13.11%) followed by Loc 5 (9.83%) while other locations had same endophytes range (8.19 %). Among 61 isolates, 5 isolates were separated from Loc1, Loc 2 and Loc 3 respectively , 9 isolates recovered from Loc 4 and from Loc 5, 6 isolate were recovered (Table 1).The percent colonization at tissue samples by endophytic fungi at location 4 was higher than percent colonization of other locations. A variation from various locations was observed with respect to occurrence of fungi from various tissue samples. Location 3 with respect to leaf isolates reported none of the endophytes. Various locations showed presence of different endophytic fungi.

Among the entire total screened samples *Aspergillus* sp. was observed as the dominant endophytes fungus. But *Colletotrichum truncatum* was showing dominance only from location 5. From total isolates *Curvularia* were reported only from Loc 1 with only one isolates showing lower dominance. Similarly *Periconia* and Ascomycetes were reported with lower dominance form Loc 1 and Loc 2 respectively. According to Varma *et.al.* 2007, leaf samples harboring higher colonizing percentage, but in our study we recorded, leaf samples as well as stem samples are showing higher percentage of colonizing percentage. Similar type of results are also recorded by Tenguria and Khan 2011. They isolated endophytic fungi from *Azadiracta* leaves from Panchmarhi reservoir. They also recorded *Alternaria sp., Fusarium* Sp. In their work dominant fungi recorded were *Trichoderma*, *Pestalotiopsia* and *Penicillium* sp. But as per our study *Alternaria* and *Colletotrichum* is the dominant sp. (Table No.1)

Secondary Metabolites

Endophytic microorganisms are a rich source of bioactive compounds with a great potential to discover new lead structures for drug discovery. The bioactive strains are possible to cultivate in large scale by fermentation to isolate the active compound(s) in larger amount rather than destroying natural plant resources.

Endophytic fungi isolated from *Albizia* were screened for production of secondary metabolites. Almost all strains were able to produce flavonoids except *Aspergillus* sp. Optimum production of flavonoid was observe in *Curvularia* sp. followed by *Cladosporium* sp. and *Colletotrichum* sp.(Table No.3) In another study done by Govindappa *et.al*.2011 where they recorded *A.niger* and *fuasrium oxysporum* isolated from *Crotolaria pallida* also produced flavonoids. Phytochemical analysis of crude extracts of endophytic fungi isolated from *Plumeria acuminata* L. and *Plumeria obtusifolia* L. revealed the presence of alkaloids, flavonoids, steroids, phenol and phenolic compounds (Kamarian and Ghasemlou 2013).

Only three of the strains *Alternaria, Curvularia* and *Colletotrichum* were detected as positive for phenol production. Phenolic compounds are well-known antioxidant constituents; they are beneficial in terms of nutritional value (Ayala-Zavala *et al*. 2012). Various fungal endophytes and mushrooms have been reported to produce antioxidant activity (Song and Yen, 2002). Murthy *et. al.* (2011) reported that *Fusarium* sp. from *Lobelia nicotianifolia* produced phenolic compounds.

Almost all strains were producing alkaloids except *Cladosporium* sp. Maximum production was obtained from Colletotrichum sp. Endophytic strains of *Alternaria* sp. (Guo & Zhange 1997) and *F. oxysporum* (Zhang *et.al.*1999) from *C. roseus* respectively produced vinblastine and vincristine, while more recently another strain of the latter species has been found to produce both compounds (Kumar *et.al*.2013). Phytochemical screening of fungal endophytes acetonic, methanolic and water extracts isolated from Salvadora oleoides. Decne shown the presence of alkaloids, flavonoids, saponins, carbohydrates, tannins, sterols and terpenoids (Li *et.al*. 2008).

Tannin was produced by only two endophytic fungi *Aspergillus flavus* and *Alternaria*. *Aspergillus flavus* produced higher amount of tannin. Aqueous and acetone extract of *Aspergillu*s sp., *Penicillium* sp. and *Phoma* sp. isolated as endophytes from *Salvadora oleoides* produced tannin (Dhankhar *et al*., 2012). Only one of the Aspergillus sp.was able to glycoside others were not detected as glycoside producer. . In an another study an orange pigment identified as quercetin glycoside was isolated from an endophytic fungus belonging to *Penicillium sp.* (Liu *et.al*.2008) Few researchers reported concerning the possible production of the secoiridoid glycoside gentiopicrin and of the cardiotonic drug digoxin by endophytic fungal strains, respectively from *Gentiana macrophylla* (Yin *et.al.* 2009) and *Digitalis lanata* (Kaul *et.al.* 2013)There are also reports of various secondary metabolites produced by endophytic Alternaria (Lou *et.al.* 2013). In the present work Alternaria was not found as glycoside producer.

All endophytic strains were producing terpenoids except *Aspergillus* sp. and *Cladosporium* sp. Different endophytic *Aspergillus* sp. were recorded as terpenoid producer by researchers (De Souza *et.al.* 2011). *Trichoderma* sp. was recorded as terpenoid producer (Table No. 4) which is in line with the research done where Trichodermin was isolated from *Trichoderma harzianum*, an endophytic fungus living in *Ilex cornuta*, an evergreen holly shrub from East Asia.

Aspergillus sp and *Cladosporium* sp. were found to produce steroids. Others are tested negative for steroid production. Steroid and steroid derived secondary metabolites are frequently found in filamentous fungi.(Turner & Aldridge 1983).Some of the endophytic strains were screened for steroid production and it was observed that only *Alternaria* sp. was producing steroid. According to Lou *et.al*.2013 endophytic *Alternaria* was also known to produce steroids.

Applications of endophytes in pharmaceutical industries include cost effective drug production, endophytes as drug source help us to conserve biodiversity and drug resistance as they are an alternate source of drugs. Very few studies are available on endophytic distribution of *Albizia*. Endophytic fungi obtained from *Albizia* were proved as a source of secondary metabolites. These can be use for secondary metabolie production after further studies.

Table No.1 Occurrence and identification of endophytic fungi from leaf with midrib and leaf without midrib, stem and petiole samples of *Albezia lebbeck* (L.) Benth. growing at five different locations.

AREA	**Location No. 1**				**Location No.2**				**Location No.3**				**Location No.4**				**Location No.5**			
	Beed bypass				**Shendra**				**Osmanpura**				**Bidkin**				**Khultabad**			
Albizia leeback	LWM	L	S	P	LWM	L	S	P	LWM	L	S	P	LWM	L	S	P	LWM	L	S	P
Daldinia eschscholtzi	2		2																	
Cladosporium		1											3							
Curvularia				1																
Alternaria							1	1												
A.spe.					1		2		1				3	1						
A.flavus												2		3		3				
A.niger											2			1	1					

Periconia											3									
Fusarium												1	1							
Phoma putaminum		1				1														
Colletotrichum sp.																1	2	9	3	4
Ascomycetes																	2			
Corynespora cassiicola																			3	

Table No.2 Colonizing frequency and dominance of fungi isolated from *Albezia lebbeck* (L.)Benth

Name	Total isolates	CF	Dominance of fungi
Albizia leeback			
R3LWM1	4.00	3.33	6.45
Cladosporium	4.00	3.33	6.45
Curvularia	1.00	0.83	1.61
Alternaria	2.00	1.67	3.23
A.spe.	8.00	6.67	12.90
A.flavus	8.00	6.67	12.90
A.niger	4.00	3.33	6.45
Periconia	3.00	2.50	4.84
Fusarium	2.00	1.67	3.23
Sterile hyphae	2.00	1.67	3.23
Colletotrichum truncatum	19.00	15.83	30.64
Ascomycetes	2.00	1.67	3.23
Colletotrichium gloeosporioides	3.00	2.50	4.84

Table No. 3:
Detection of secondary metabolites from endophytic fungi isolated from *Albizia lebbeck*

Name	Flavonoid	Phenol	Tannin	Alkaloid
Aspergillus flavus	0.175	-	0.226	0.059
A. sp.2	-	-	-	0.234
Cladosporium sp.	0.653	-	-	-
Alternaria	0.048	0.858	0.086	0.165
Curvularia sp.	0.851	0.966	-	0.078
Colletotrichum truncatum	0.657	0.423	-	0.349

Table. No. 4: Detection of secondary metabolites from endophytic fungi isolated from *Albizia lebbeck*

Name	Glycosides	Terpenoids	Steroid
Aspergillus flavus		+	
A. sp.2	+		+
Cladosporium sp.			+
Alternaria		+	
Curvularia		+	
Colletotrichum truncatum		+	

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An in vitro study on the antibacterial effect of some locally available common weed plants

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ABSTRACT *Though a weed is undesirable plant, there are several weeds that are edible, medicinal & have other uses. Weeds are also found to be resistant to most of the microbial disease when compared to the crops which shows disease symptoms. The resistance nature and their sustenance towards the microbial disease made us to have an interest to know their antibacterial potency. Hence the present study is conducted to screen the bactericidal effects of locally available common weeds. Antibacterial sensitivity of extracts of four weed plants such as Azadirachta indica (Neem plant), Parthenium hysterophorous (Carrot grass), Calotropis gigantean (Ekki) and Ipomea lacunose(Besharam) have shown significant effect on the bacterial cultures of Eschereschia coli, Shigella sps, Salmonella typhimurium and Staphylococcus aureus. Neem & Carrot grass extracts have shown antibiotic effect on all bacterial sps. except Carrot grass on Staphylococcus aureus. Besharam and Ekki have their effects on only on Salmonella typhimirium & Eschereschia coli. Neem extract has found to be more antibiotic effect than others on microbes. Staphylococcus aureus is found to be more resistant ability against all weed extracts except Neem. Eschereschia coli get effected more by most of weed extracts then other bacteria. Increasing concentration of weed extracts have shown increasing effect on some, whereas increasing concentration has constant effect on some bacteria. Since, all selected plant sps. are natural, therefore extracts of these plants are eco-friendly for using orally as medicine but further psychological work is need to be studied for their side effects.*
Key words: *Antibacterial sensitivity, Weeds, Zone of inhibition, Eschereschia coli, Shigella sps, Salmonella typhimurium, and Staphylococcus aureus.*

I. INTRODUCTION

Weeds are commonly grown in human-controlled settings such as farm fields, gardens, lawns and parks. Weed is any plant that grows or reproduces aggressively or is outside its native habitat that can live in diverse environments. Out of approximately 250,000 species of plants worldwide, about 8,000 (3%) species behave as weeds. Weeds possess some specialized characteristics that allow them to survive and increase in nature, they are i) Abundant seed production, ii)Rapid population establishment, iii)Seed dormancy, iv)Long-term survival of buried seed, v)Adaptation for spread, vi)Presence of vegetative reproductive structures, and vii) Ability to occupy sites disturbed by humans

Harmful Effects of weeds include: Reduction in crop yields because they compete with crops for growth factors. They reduce N and K from soil, weeds transpire more water, they compete for space both in the rhizosphere and atmosphere, they reduce crop quality, & impair the quality of the animal produce (milk, meat & wool). Weeds contain high alkaloids, tannis, oxalates, gulcosides, and other substances that prove poisonous to animals when ingested. Weeds either give shelter to various insect pests and diseases or serve as alternate host. Human health comfort and work efficiency of man are also affected by weeds directly or indirectly. They contaminate water bodies change the flavour, appearance and taste of drinking water. In case of perennial weeds, the carrying capacity of the grazing lands is reduced and cause depreciation of land value. Presence of weeds around our living and working places makes the surroundings dull.

Weeds have a controversial nature. Despite the negative impacts of weeds on all living beings, according to the agriculturist, they are plants that need to be managed in an economical and practical way in order to produce food, feed, fiber & medicine for humans and animals. Some benefits include: Weeds help to maintain more balanced environment by providing food and habitats for insects and other creatures, they provide good compost material & prevent soil erosion, offering aesthetic qualities, serve as a genetic reservoir for improved crops, provide products for human consumption and medicinal use, contain number of compounds that may be

potential anti-microbial agents which may serve as alternative, effective, cheaper and safe antimicrobial agents for the treatment of common microbial infections (Schimmer et al., 1994 and Biradar, 2016) diseases. Weeds are also found to be resistant to most of the microbial disease when compared to the crops which shows disease symptoms. The resistance nature and their sustenance towards the microbial disease made us to have an interest to know their antibacterial potency. Hence the present study is conducted to screen the bactericidal effects of locally available common weeds.

II. MATERIALS AND METHODS

a) Sample collection:

Sample-1: Fresh four types of weed plants such as Neem (Nm), Calotropis (c), Parthenium (P) and Besharam (B), were collected in the morning 10.00am from Naubad region, Bidar district.

Sample-2: Test organisms, such as *Eschereschia coli, Shigella sps, Salmonella typhimurium* and *Staphylococcus aureus* were collected from Microbiology Lab of Basaveshwar hospital, Gulbarga., and each bacterial species were sub-cultured in nutrient broth to maintain their pure culture stock for use.

b) Method of juice extraction from leaves: 300gm (wet wt.) of fresh leaves of each weed was washed with tap water to remove dust particles, if any, later washed with 2% mercuric chloride to remove infectants and then washed with distilled water. These leaves were cut down into small pieces of about 1cm size and dried in the oven at 50-55°C for two days. Leaves of all plants were blended then extracted using 96% ethanol for 72hrs in soxhelt apparatus. Then the crude extract was allowed to evaporate the ethanol and dried in oven leaving dried powder residues of weeds. These residues were stored in the refrigerator for further use (Juss, 1830).

c) Preparation of Antimicrobial discs from weed extract:

Antibacterial sensitivity of weed extract was tested 'Disc diffusion method'. The antibiotic discs of 5mm diameter were prepared using sterilized Watman filter paper No.1. The powder residues of each weed are mixed in distilled water making 0.04, 0.08, 0.16g/ml. The paper discs were dipped in different concentrations of plant extract for inhibition. Then they were dried at room temperature for 24hrs (Mako et al., 2012).

d) Preparation of culture plates:

Nutrient agar medium of 1000ml volume was prepared as a culture medium by dissolving components as shown in table 1.

Table 1: Composition of Nutrient Agar medium

Chemicals	Composition g/l
Peptone	10
Beef extract	3
Sodium chloride	5
Agar	20
Distilled water	1000 ml
P^H	7

The above medium is autoclaved, poured into sterilized petridishes in the Laminar air flow unit and allowed to cool for solidification.

d) Inoculation of bacterial culture and disc on culture medium:

The selected bacteria such as *Eschereschia.coli, Shigella sps, Salmonella typhimurium* and *Staphylococcus aureus* were separately inoculated by swabbing the microbes by sterilized cotton on to the culture medium uniformly so that microbes are to grow in lawns on full surface of the medium. Then the disc of each extract placed on to the medium with control as standard tetracycline disc for comparision. Culture plates were incubated at 37°C in the incubator for 48hrs.

e) Determination of antimicrobial sensitivity of weed extract:

After 48hrs of incubation at 37ºC, clear inhibitory zones in culture plates were observed for zone of inhibition of bacterial growth around each disc along with control. The antibacterial sensitivity of each extract was detected by taking measurement of diameter of each zones using centimeter scale. The percent effect of weed extract on each bacterial culture was thus calculated (Joshi et al., 2010 and Biradar et al.,2015).

Fig 1: Plates showing inhbitory zones of various bacteria

III. RESULTS AND DISCUSSIONS

Table 2: Effect of different weed extracts on *E.coli* at different concentration

Extracts	Concentrations		
	0.04g/ml	0.08g/ml	0.16g/ml
	Zone of inhibition		
Neem	0.2mm	0.2mm	0.4mm
Parthenium	0.2mm	0.2mm	0.2mm
Calotropis	0.1mm	0.3mm	0.6mm
Besharam	0.2mm	0.2mm	0.2mm

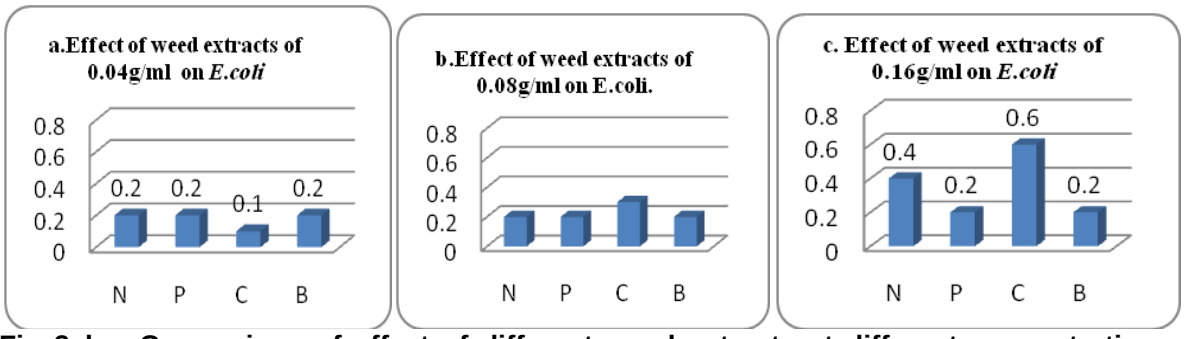


Fig 2abc: Comparison of effect of different weed extracts at different concentration on *E.coli.*

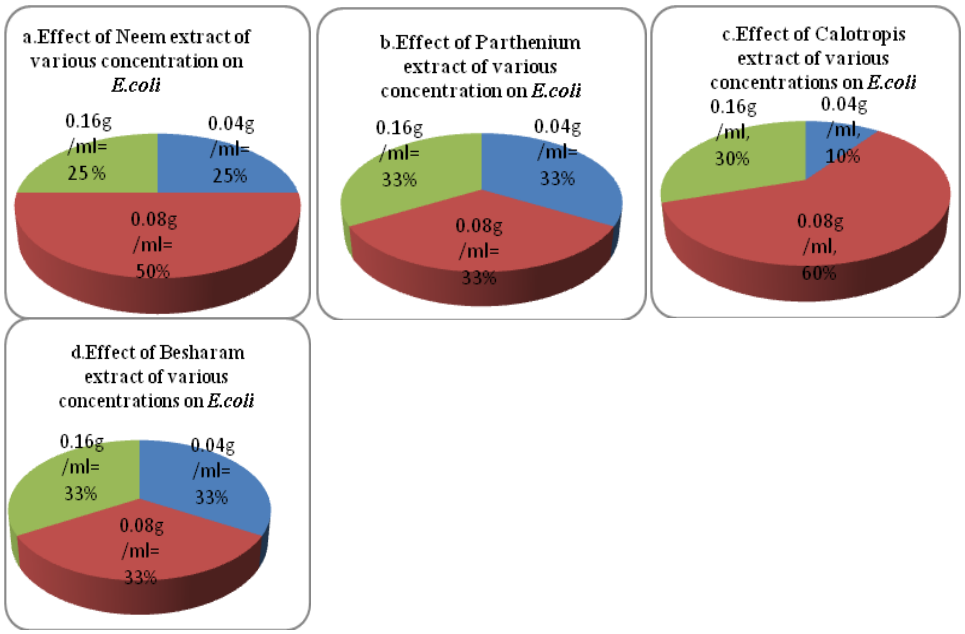


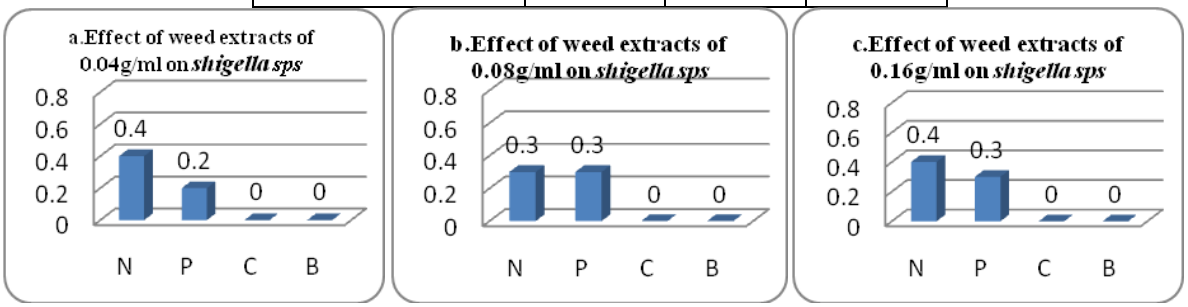
Fig. 3abcd: Comparative effects of various weed extracts at different concentrations on *E.coli*

Overall comparison of effect of different weed extracts on bacteria shown increasing effect with increasing concentration, but in some, effect remains constant with increasing

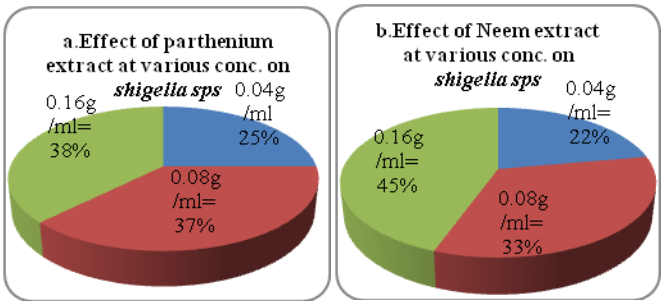
concentration (Figs.2ab&c). On *E.coli* effect of Parthenium and Besharam remain constant with increasing concentration of extract, whereas Neem and Calotropis have shown increasing effect with increased concentration. Further, different concentrations of Parthenium and Besharam on *E.coli* have equal effects whereas Neem and Calotropis shown more effects at 0.08g/ml (Fig.3abc&d).

Table 3:**Effect of different weed extracts on *Shigella sps* at different concentrations**

Name of the Weed	Concentrations		
	0.04g/ml	0.08g/ml	0.16g/ml
	Zone of inhibition		
Neem	0.2mm	0.3mm	0.4mm
Parthenium	0.2mm	0.3mm	0.3mm
Calotropis	0	0	0
Besharam	0	0	0



Figs.4abc: Comparison of effects of various weed extracts at different concentrations on *Shigella sps.*

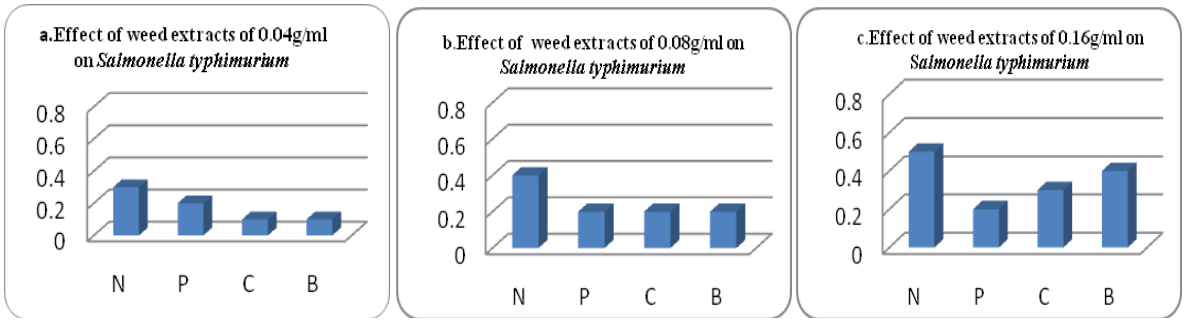


Figs.5ab: Comparative effects of various weed extracts at different concentrations on *Shigella sps*

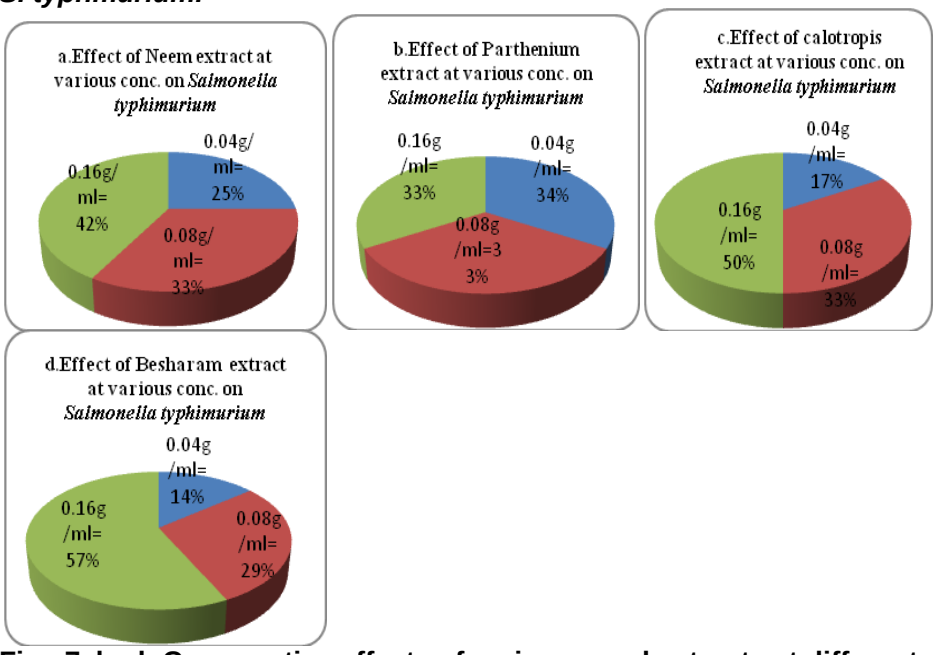
On *Shigella sps* only the Neem and Parthenium extracts shown antibiotic effect almost equal with different concentrations, whereas, Calotropis and Besharam have shown no Antibiotic role on *Shigella sps*.(Figs. 4ab&c). Further extracts of Parthenium and Neem shown increasing inhibition effect on Shigella sps with increasing conc. (Figs.5a&b).

Table 4:Effect of different weed extracts on *Salmonella typhii* at different concentrations.

Name of the sample	Concentrations		
	0.04g/ml	0.08g/ml	0.16g/ml
	Zone of inhibition		
Neem leaves	0.3mm	0.4mm	0.5mm
Parthenium	0.2mm	0.2mm	0.2mm
Calotropis	0.1mm	0.2mm	0.3mm
Besharam	0.1mm	0.2mm	0.4mm



Figs.6abc: Comparison of effects of various weed extracts at different concentrations on *S. typhmurium.*

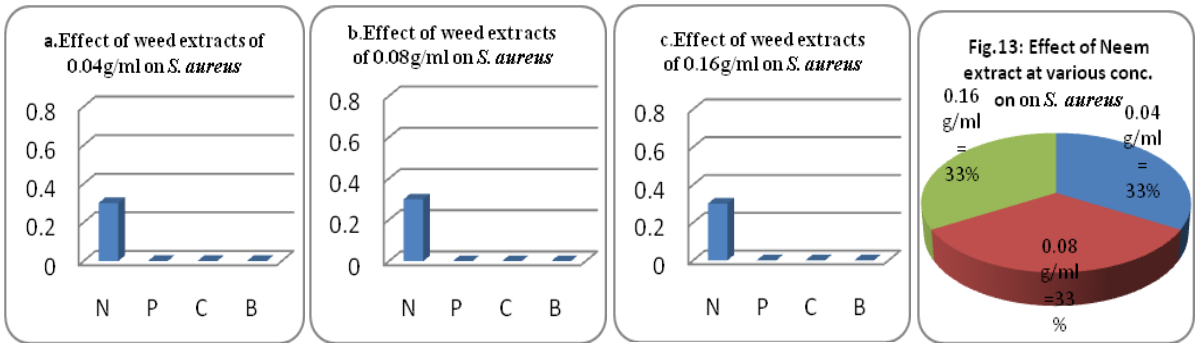


Figs.7abcd: Comparative effects of various weed extracts at different concentrations on *S. typhimurium.*

On *Salmonella typhimurium,* Neem, Calotropis and Besharam extracts have shown increasing effect with the increasing concentration whereas Parthenium extract has constant effect with increasing concentration.(Figs.6ab&c). Further all Weed extracts have shown increasing inhibitory effects with increasing conc. except Parthenium extract which has constant effect with increasing conc. (Fig.7abc&d).

Table-5:Effect of different weed extracts on *Staphylococcus aureus* at different concentrations

Name of the sample	Concentrations		
	0.04g/ml	0.08g/ml	0.16g/ml
	Zone of inhibition		
Neem leaves	0.3mm	0.3mm	0.3mm
Parthenium	0	0	0
Calotropis	0	0	0
Besharam	0	0	0



Figs.8abc: Comparison of effects of various weed extracts at different concentrations on *S. aureus*

On *Staphylococcus aureus,* Neem extract alone has constant antibiotic effect with increasing concentration (Fig. 9) whereas other weed extracts have no antibiotic effects on this sps (Figs.8ab&c). In the present study it was observed that the increasing conc. of extract on bacteria have no significant inhibitory effect and irrespective of there effect as usual at any conc. This shows that these extracts have general bacteriolysing effects when bacteria come in contact with extracts as it was evidenced by our results of constant effects of some extracts on certain bacteria. Similar results have been reported by Kunjal et. al., 2014 & Meenakshi, et. al., 2015).

The development of antibiotic resistance by some pathogenic bacteria has been a serious global problem, giving rise to multi-resistant strains wherein treatment is longer and frequently ineffective. Therefore, there is a constant need of discovering new antimicrobial products. Plants produce a huge number of phytochemicals with antimicrobial activity and a major part of this chemical diversity is related to defense/stress mechanisms against a broad array of microorganisms (Ana, et al., 2013). Phytochemicals may inhibit bacterial growth through different mechanisms than the presently used antibiotics, providing an interesting approach to drug-resistant infections. All extracts were screened for potential antibacterial activity against *Eschereschia coli, Shigella sps, Salmonella typhimurium* and *Staphylococcus aureus,* based on wider zone of growth inhibition. In our results, zone of inhibition caused by the quality of extracts rather than their quantity, however, the results of Harsh et. al. (2011) are antagonistic with our results.

Neem & Carrot grass extracts have shown antibiotic effect on all bacterial sps. except Carrot grass on *Staphylococcus aureus.* Similar results have been reported for Neem by Jerobin et.al.(2015).

Besharam and Ekki have their effects on only on *Salmonella typhimirium* & *Eschereschia coli.* Neem extract has found to be more antibiotic effect than others on microbes. *Staphylococcus aureus* is found to be more resistant ability against all weed extracts except Neem. *Eschereschia coli* get effected more by most of weed extracts then other bacteria. Increasing concentration of weed extracts have shown increasing effect on some, whereas increasing concentration has constant effect on some bacteria.

Harsha, et. al., (2011) reported that the petroleum ether extract of P. hysterophorus and dichloromethane–ether-methanol (1:1:1) extract of A. scholaris showed good antimicrobial effect. Antimicrobial activity of Ipomoea extract was reported by Dhanashekaran et. al., (2010).

Ipomoea species and illustrates the potential of the genus as a source of therapeutic agents. These species are used in different parts of the world for the treatment of several diseases, such as, diabetes, hypertension, dysentery, constipation, fatigue, arthritis, rheumatism, hydrocephaly, meningitis, kidney ailments and inflammations. Some of these species showed antimicrobial, analgesic, spasmolitic, spasmogenic, hypoglycemic, hypotensive, anticoagulant, anti-inflammatory, psychotomimetic and anticancer activities. Alkaloids, phenolics compounds and glycolipids are the most common biologically active constituents from these plant extracts (Marilena, et al.,2012). Flavanoid extraction of Calotropis shown more zone of inhibition on bacteria (Nenaah, 2013 & Meenakshi et. al., 2015) & Calotropis has shown strong inhibitory activity on E. coli & salmonella typhi (Shobowale, et al. 2013). Therefore, all selected weed plants have potential properties of antibacterial activity. Since, all selected plant sps. are natural, therefore extracts of these plants are eco-friendly for using orally as medicine but further psychological work is need to be studied for their side effects. However, their chemical compositions with respect to bacteriolysis need to be studied in near future.

IV. CONCLUSIONS

Neem has Antibiotic effect on all bacterial sps. whereas Parthenium has effect on all sps. except *Staphylococcus aureus* and Besharam and Calotropis have their effects on only *Salmonella typhimirium* & *Eschereschia.coli.* Comparatively Neem has found to be more Antibiotic effect than others on microbes. *Staphylococcus aureus* is found to be more resistant ability against all weed extracts except Neem. *Eschereschia.coli* bacteria was found to be more effected by most of weed extracts then other bacteria. Various conc. of weed extracts have shown increasing effect with increasing concentration in some whereas it was also found that increasing concentration has constant effect on some bacteria. Since, all selected plant sps. are natural, therefore extracts of these plants are eco-friendly for using orally as medicine but further psychological work is need to be studied for their side effects.

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Study of fungal airspora over the pigeon pea at Maliwada District Aurangabad.

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ABSTRACT *Pigeon pea constitutes an important source of protein in the predominantly vegetarian diet of the people. A preliminary survey has been made to study the fungal airspora over the pigeon pea filed at Maliwada, dist. Aurangabad, with the help of volumetric Tilak air sampler. Data collected from 1july 2016 to 30 September 2016. Total, 22 fungal spores were recorded. Out of which some dominant fungal spores are Alternaria, Cladosporium, Curvularia, Rust, Smut, and Nigrospora. Other components like Pollen grain, Mycelium, Hyphae, and Insect parts were also recorded.*

Introduction:-

The pigeon pea is a Legume belonging to family fabaceae. It is predominantly a crop of tropical areas mainly cultivated in semi- arid regions of India. Pigeon pea is an important source of proteins, carbohydrates, B-group vitamins, &minerals. India contributes over 90% of the pigeon pea production in the world where it is mostly consumed as a dhal. It is suitable for inter-cropping, with different crops like Cotton, *Sorghum*, Green gram, Black gram, Maize, Soya bean, Groundnut for increasing production & maintaining soil fertility.

The crop can be described as unique because it is a legume & a woody shrub. Pigeon pea is very heat tolerant & its deep root system allows extraction of moisture from deep layers of the soil & thus makes it a crop that produce biomass including protein rich grain while utilizing residual moisture(Nene & Sheila 1990).

Pigeon pea plays an important role in food security; balanced diet because it can be used in diverse ways as a source of food, feed fodder, fuel wood, soil conservation, green manuring & roofing.

By looking towards all the importance of this pigeon pea, we have to also face certain environmental crices of the crop due to the fungal diseases.

Pigeon pea affected by many fungal diseases like *Alternaria, Anthracnose, Cercospora* leaf spot, *Rust, Smut*, etc. These disease causes loss of growth & productivity of crop to the farmers.

Airborne fungal spores are very much difficult to control once it set in the field area.

So, in this investigation we present study based on monitoring the fungal airspora over pigeon pea field at Maliwada for further study.

Materials & Methods:-

The aerobiological investigation were carried out by using volumetric tilak air sampler (tilak & kulkarni,1970)Sampler was fixed at Maliwada dist. Aurangabad, in the middle of *Cajanus cajan* field, at the height of 1.5 meter above the ground level.These slide were labelled with dates during 1 July 2016 to 30 September 2016.

Scanning:-

Scanning of slides was carried out under the binocular research microscope, using 10x*45x magnification, as per the procedure mentioned by tilak & kulkarni, 1970. The fungal spores so trapped were identified based on morphological characters, visual identification by comparision with reference slides & also from the published available literature.

Result & Discussion:-

Present study was carried out during the month of July, August, and September 2016. Total 5 dominant spores were recorded during the investigation. Among these, *Cladosporium* contributes highest percentage about (38.73%) of total airspora. In the month of August *Cladosporium* were dominant (28.09%) as compared to July(27.38%)& September(10.89%).The spores like *Epicoccum, Beltrania, Masserina, Bertia* shows the lowest percentage (0.04%).

Rust was found to be second highest to the total airspora about (14.35%). Smut having (8.78%), followed by *Nigrospora* (9.77%) and *Alternaria* (8.07 %) of total airspora.(Table I.) .During the month of August *Rust* were dominating spore (28.09%).

Apart from the dominating spores some other spores were also found like *Curvularia* (5.99%), Basidiospore (2.45%),*Hypoxylon* (2.40%),*Dreschlera & Pithomyces* (1.55%) *Diplodia* (1.51%), *Torula* (1.46%), *Helminthosporium (*1.03%), *Bispora (*0.99%),*Pseudotorula & Heterosporium (*0.37%), *Beltrania (*0.18%), *Teichospora* (0.14%), *Tetracoccosporium paxianum ,Epicoccum , Masserina* & *Bertia* (0.04%).

Cladosporium, Rust and Smut Spores were dominated in the September month as compared to month of July & August 2016.The overall percentage of Humidity during the month of September 2016 was 92%, temperatures were 22 to 24˚c & average rainfalls were 30 cm.(Table II.)Increased Humidity & average rainfall were congenial to increase the spore concentration in the atmosphere.

Increased percentage of the airspora also compared with growth stage and meteorological conditions. Other crops & Vegetable are also important for dispersed of inoculums.

Table I.

Table showing the data recorded from July to September2016.

Sr. no.	Name of Fungus	July	August	September	Total	Percentage of fungal spores
1	***Smut***	78	28	80	186	8.78
2	***Rust***	89	34	181	304	14.35
3	***Alternaria***	37	11	123	171	8.07
4	***Cladosporium***	33	11	776	820	38.73
5	***Curvularia***	3	---	124	127	5.99
6	***Pithomyces***	3	1	29	33	1.55
7	***Diplodia***	3	---	29	32	1.51
8	***Nigrospora***	45	16	146	207	9.77
9	***Torula***	---	---	31	31	1.46
10	***Helminthosporium***	3	---	19	22	1.03
11	***Hypoxlon***	6	9	36	51	2.40
12	***Dreschlera***	13	2	18	33	1.55
13	***Bispora***	9	1	11	21	0.99
14	***Basidiospore***	9	5	38	52	2.45
15	***Teichospora***	1	---	2	3	0.14
16	***Pseudotorula***	---	---	8	8	0.37
17	***Heterosporium***	---	---	8	8	0.37
18	***Tetracoccosporiumpaxianum***	---	1	---	1	0.04
19	***Epicoccum***	---	1	---	1	0.04
20	***Beltrania***	---	2	2	4	0.18
21	***Masserina***	1	---	---	1	0.04
22	***Bertia***	1	---	---	1	0.04
	Total	325	121	1661	2117	

Fig A.

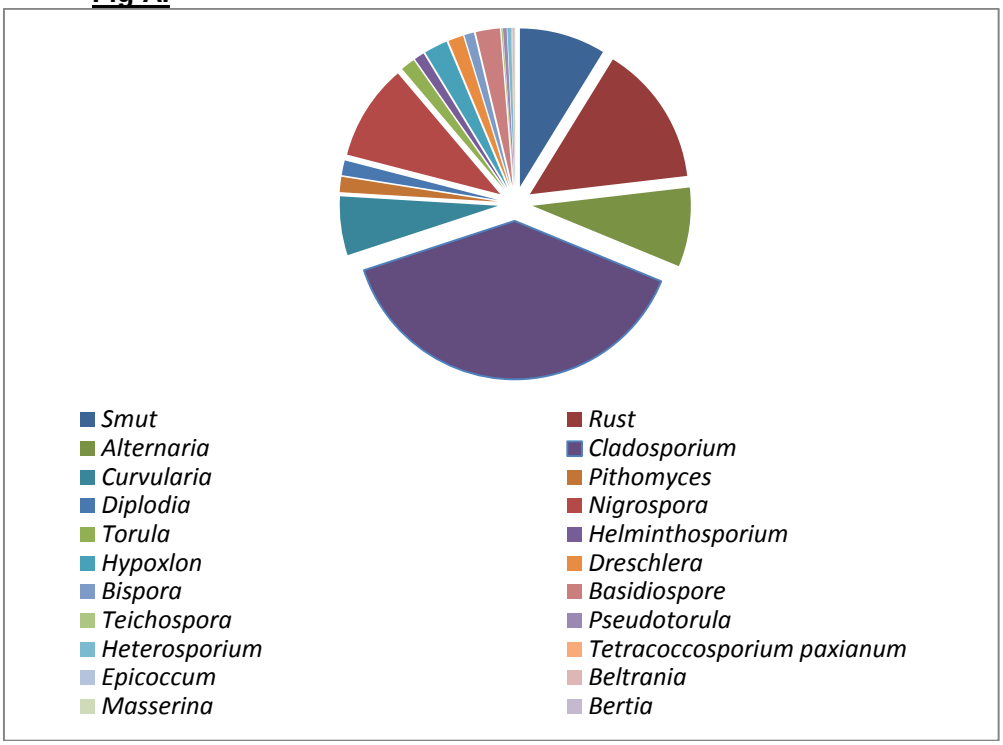
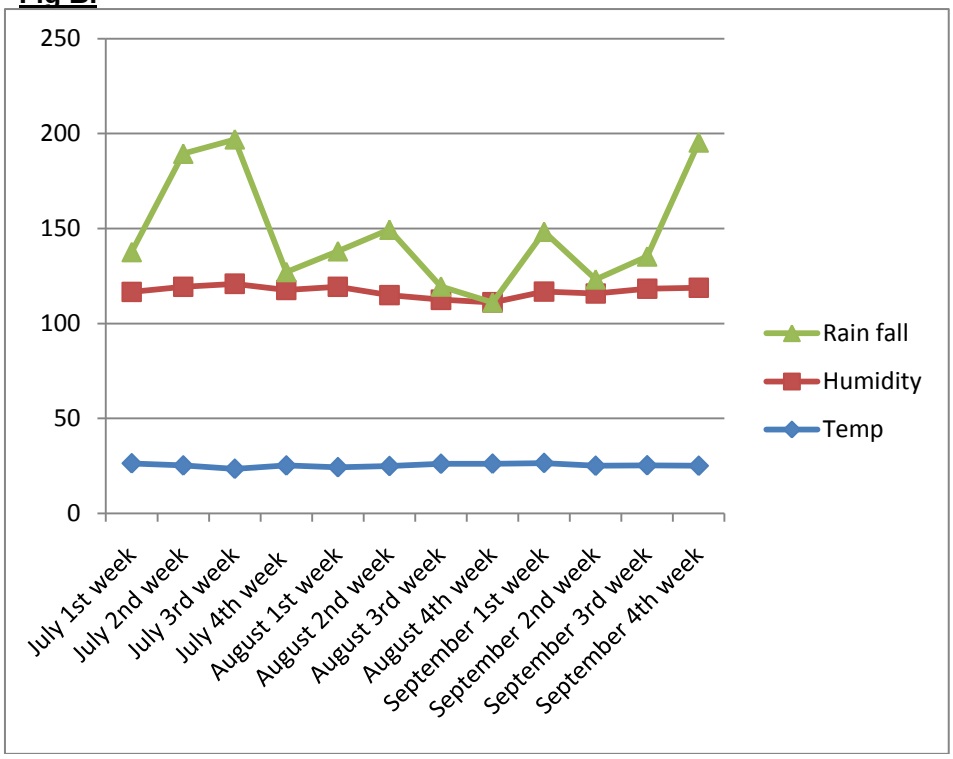


Table II

Table showing Meteorological data from July to September2016

Observed Weeks	Temp	Humidity	Rain fall
July 1st week	26.32	90.29	21
July 2nd week	25.19	94.14	70
July 3rd week	23.465	97.43	76
July 4th week	25.18	92.43	9.5
August 1st week	24.285	95	18.75
August 2nd week	24.89	90	34.5
August 3rd week	26.07	86.43	7
August 4th week	26.125	85	-
September 1st week	26.505	90.29	31.5
September 2nd week	25.025	90.71	7.5
September 3rd week	25.285	93	17
September 4th week	25.035	93.71	76.5

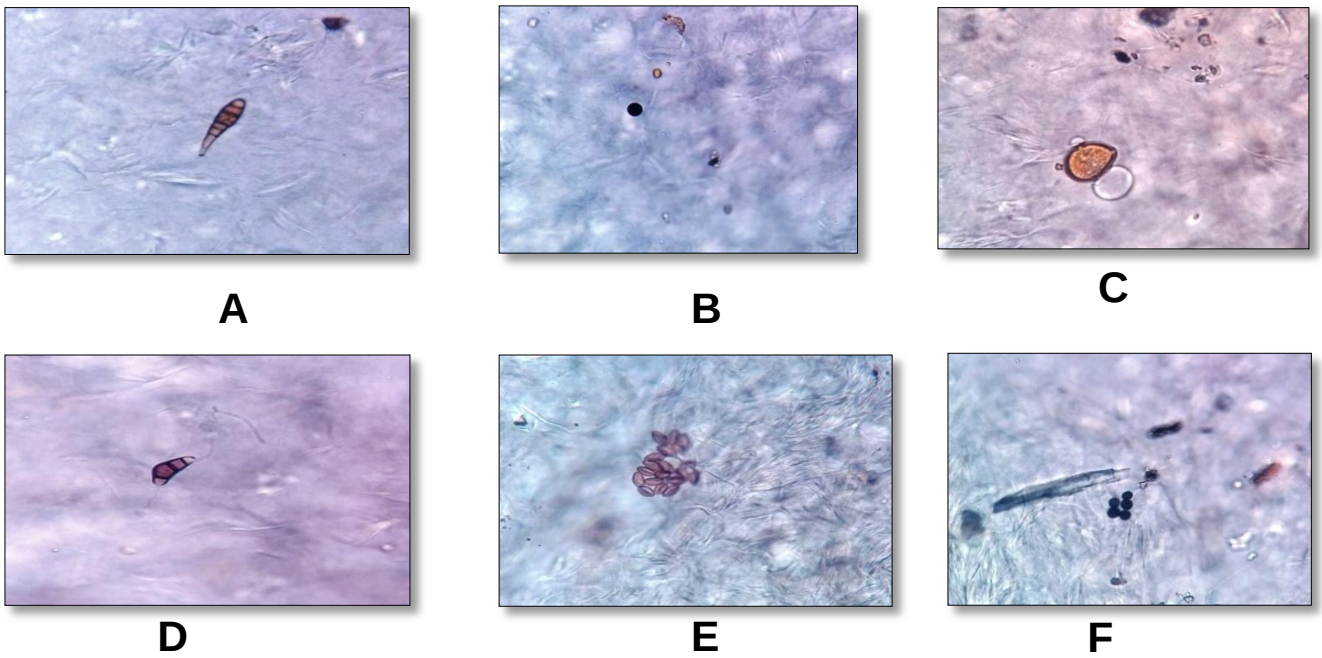
Fig B.



Meterological data

Photo plate 1st

Photo plates of dominant fungal spores



A: *Alternaria,* **B:** *Nigrospora,* **C:** *Rust*, **D:** *Curvularia,* **E:** *Cladosporium,* **F:***Smut*

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Some Useful Plants from Nizarneshwar Sacred Grove of Ahmednagar district, Maharashtra, India

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ABSTRACT *Sacred groves Patches of vegetation protected on the basis of religious faith and beliefs. Present study deals with Nizarneshwar sacred grove situated in Sangamner taluka of Ahmednagar district , for the purpose of documenting the traditional knowledge of tribal communities or local people of this region regarding the useful properties of plants. There are about 53 medicinal uses of 33 plants are listed used by tribal people for the purpose of medicines either single or the combination with other plant species.*

Key words: *Sacred groves , Medicinal plants , uses, Ahmednagar, Maharashtra.*

Introduction :

Sacred groves are patches of vegetation protected on the basis of spiritual trust on god or goddess by tribal peoples or local communities. It is one of the methods of in-situ conservation. Due to rich biodiversity sacred groves are also considered as gene banks. Total 13,720 sacred groves have been reported from different regions of India, while in Maharashtra there are about 1600 sacred groves are listed and locally known as 'devrai (Borthakur, 2013). Being protected areas of forests and because of religious beliefs sacred groves still represent various groups of useful plants together. At the present time these conserved forest patches are only the areas remained which exhibit excellent plant diversity. While the in other regions of the district due to changes in lifestyle of people, deforestation and other several human activities forests are vanishing at very faster rates.

For the ethnomedicinal documentation Nizarneshwar sacred grove selected from Ahmednagar district. There are about 53 uses of 33 plants were studied and documented. The details of the plants and the uses were collected from local medicinemen, such as, Bhagat, Vaidya etc.

Study Area:

Ahmednagar district of Maharashtra state with an area of 17, 035 km^2 lies between 73º 9' to 75º 5' E and 18º 2' to 19º 9' N. Nizarneshwar : Nizarneshwar sacred grove is situated in Sangamner taluka of Ahmednagar district and spread within area of 3 hectors. This place is famous for 'Lord Shiva' temple.

Significant work on the field of ethnobotany has been done in past years in the study area [Khyade *et al,* 2008, Mulay & Sharma 2012 a,b; 2013; Gayake & Sharma, 2014, 2015; Medakkar & Sharma, 2016a,b c & d. Petkar *et al,* 2002; Wable and Petkar, 2005; Thete & Sharma, (2015 & 2016)].

The plant specimens collected were identified using taxonomic keys in the Floras Cook 1958; Pradhan and Singh, 1999; Singh and Karthikeyan, 2000 and vol. -II Singh et al, 2000) and Monocotyledons [Sharma et al, 2000], were used. Herbarium specimens are deposited in the Herbarium, Research Center in Botany, Shri Muktanand College, Gangapur, Aurangabad.

Following is the plant enumeration; botanical name is followed by name of the family in parenthesis and local name in inverted comma'. Then used of plants are given.

1) ***Abutilon indicum*** (L.) Sweet (Malvaceae) '*Petari'.*

Uses:

I. 30-40ml root extract is taken twice a day for two weeks to cure piles.
II. Handful leaves are crushed to prepare a paste, pinch of turmeric powder is mixed and applied on wound.

2) Arbus precatorius L.. (Fabaceae) *'Gunj'.*

Uses;

I. One teaspoonful root extract taken thrice a day, to cure dysentery and diarrhea.

3) *Acacia chundra* (Roxb. ex Rottle.) Willd. (Mimosaceae), '*Khair'.*

Uses :

I. 20-30ml of bark decoction taken at bed time twice a week to repel intestinal worms.

4) *Acacia nilotica* (L.) Willd. ex Del (Mimosaceae.) '*Babhul'.*

Uses :

I. Stem bark is crushed to the paste, paste is warmed over fire and applied locally for treating abdominal pain.

II. Tender twigs of the tree are used as tooth brush and for massage of gums and cleaning teeth.

5) *Achyranthes aspera* L. (Amaranthaceae.) , '*Aghada.'*

Uses:

I. Leaves are burnt to ash, half teaspoon ash taken with water twice a day for 7-8 days to treat cough.

II. 1gm of seed powder taken twice a day with water for 10-15 days to treat rheumatism.

6) *Aegle marmelos* (L.) Corr. (Rutaceae.) '*Bel*'.

Uses :

I. Handful of leaves crushed into paste and given with water twice a day to treat venom of poisonous insects and animals.

II. 5gms of leaves crushed and taken with one teaspoon honey for 5-6 days to treat Asthama.

7) *Agave americana* L. (Agavaceae.) ,' *Ghaypat*.'

Uses:

I. A poultice made from root and leaves is often used to treat toothache.

II. The leaves and juice are applied externally to treat open wound , snake bites .

8) *Ailanthus excelsa* Roxb. (Simaroubaceae) '*Maharukh*.'

Uses:

I. The crushed leaves and flowers are used as insect repellent.

II. Dried stem powder (1gm) taken with water in treatment of asthma.

9) *Aloe vera* (L.) Burm.f. (Liliaceae), '*Korphad*.'

Uses :

I. Leaf pulp with pinch of turmeric powder is applied to treat burn wounds.

II. One glass of the leaf extract taken early morning to treat constipation.

10) Amaranthus spinosus L. (Amaranthaceae.) '*Katemath*.'

Uses :

I. The root paste is applied to treat scabies and itch.

II. 10-20ml of root juice is taken twice a day to diarrhea.

11) *Argemone Mexicana* L. (Papaveraceae), '*Pivala-dhotra.'*

Uses :

I. Juice of leaf is prepared, one spoon twice a day for 15-20 days is given in leucorrhoea.

II. Root juice is applied to treat cuts and wounds.

12*) Asparagus racemosus* Wild. (Liliaceae.) , *'Shatavari'.*

Uses :

I. The roots boiled with cow milk and eaten to improve lactation in women.

II. 15-20ml fresh root juice is mixed with one teaspoon of honey and given to treat dyspepsia.

13) *Azadirachta indica* *A.* Juss. (Meliaceae.) , '*Kadu-nimba.*'

Uses :

I. Leaves are boiled in water and that water is used to take bath which is useful in treating skin diseases.

14) *Barleria prionitis* L*. ssp* ***prionitis****.* (Acanthaceae), '*Pivali-koranti'.*

Uses :

I. 1gm of root powder taken twice a day for 2-3 days to treat fever.

II. Crushed leaves are applied on scalp to stop hair fall and promote hair growth.

15) *Bauhinia variegata* L. (Caesalpiniaceae.), '*Kanchan or Apata.*'

Uses:

I. Leaf extract 30-40ml for adult and 15ml for children is taken to treat jaundice.

II. 20gm bark in 200ml of water and boiled till it ramains 50ml, filter the mixture and taken 25 ml twice a day for 3-4 days to treat Tonsil.

16) *Boerhavia repens* L. *var* ***diffusa*** *(*L.) Hook. f. (Nyctaginaceae.) , '*Punarnava.'*

Use :

I. The roots are boiled and applied as poultice to cure wounds.

17) *Caesalpinia bonduc* (L.) Roxb . (Caesalpiniaceae.), '*Sagargota.'*

Uses :

I. Seeds are roasted, crushed and cow ghee is added. This mixture is eaten to treat abdominal pain.

II. One teaspoonful seed powder is taken with water twice a day for 5-6 days in burning sensation during urination.

18) *Calotropis procera* *(*Ait.) R.Br. (Asclepiadaceae) , '*Rui.'*

Uses :

I. Roots juice is applied locally to treat snakebite.

19) *Senna auriculata*(L.) Roxb*.* (Caesalpiniaceae.), '*Tarwad.'*

Uses :

I. Whole plant with the leaves and stem of *Tinospora cordifolia* (taken in equal proportion) crushed to form paste and taken with water to treat diarrhea.

20) *Celosia argentea* L. (Amaranthaceae.) , '*Kurdu.'*

Uses :

I. 1gm of seed powder taken with water twice a day for 8-10 days to dissolve kidney stone.

II. Whole plant with seeds crushed and paste applied on joints to cure joint pain.

21) *Cissus quadrangularis* L. (Vitaceae.) , '*Kandvel.'*

Uses :

I. Lukewarm paste of stem is applied for muscular pains.

II. The stem paste applied topically in broken bones and bandaged.

22) *Cynodon dactylon*(L.) Pers*.* (Poaceae.) , '*Harali.*'

Uses :

I. 2 drops of whole plant juice is instilled in each nostril, it stops bleeding.

II. Whole plant is crushed by adding water in it and paste is applied to treat itching.

23) *Datura metel* L. (Solanaceae.) , '*Dhotra.'*

Uses :

I. Leaf paste applied on forehead to relieve headache.

II. Leaf juice applied over wound and skin diseases.

24) *Euphorbia hirta* L. (Euphorbiaceae) , '*Dudhi.'*

Uses :

I. Decoction of fresh herb is used as gargle for the treatment of throat infection.

25) *Hemidesmus indicus*(L.) R. Br. ex Schult. (Asclepiadaceae.) , '*Anantavel.'*

Uses :

I. Roots paste is applied to treat mouth ulcer.

26) *Ocimum basilicum*L*. (*Lamiaceae.) , '***:*** *Ram- Tulsi.'*

Uses :

II. Leaf paste is applied on skin diseases.

III. 10-15ml of leaf decoction is taken twice a day for two days to treat cough and cold.

27) *Pergularia daemia*(Forssk.) Choiv. (Asclepiadaceae.) , '*Utaran.'*

Uses :

I. 20-30ml of leaf decoction is taken early morning for 4-5 days to treat urinary disorders.

28) *Sida cordifolia* L. (Malvaceae.) , '*Bala.'*

Uses :

I. Leaf paste is applied over wound to cure.

29) *Solanum anguivi* Lam. (Solanaceae) , '*Mothi ringani'*

Uses :

I. 1gm of seed powder is taken with water is useful in asthama**.**

II. 2 spoon of boiled fruit decoction administered twice a day for 3 day.

30) *Tamarindus indica* L. (Fabaceae.) , '*Chinch.'*

Uses:

I. Inner bark paste is applied to treat wound.

31) *Terminalia bellirica*(Gaertn.) Roxb. (Combretaceae) , '*Behada.'*

Uses :

I. 10-15ml decoction of green fruit is taken twice a day for 5-6 days to treat cough and cold.

32) *Thespesia populnea*(L.) Sol. ex Corrêa (Malvaceae.) , '*Parosa pimpal.'*

Uses :

I. Leaves are crushed to make a paste, warmed over fire and applied on joint to treat joint pains.

II. Juice of unripe fruit is applied on ringworm infection two times a day till cure.

33) *Tridax procumbens* L. (Asteraceae) , '*Ekdandi.'*

Uses :

I. Leaf paste is applied externally on skin rashes to cure.

Result and discussion :

During the ethnomedicinal documentation study of the sacred groves of Ahmednagar district ,53 medicinal uses of 33 plants are studied i.e details of plants and their medicinal uses were collected from the informers reside in or nearby sacred groves.

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Isolation and Identification of Postharvest spoilage Fungi Associated with sweet oranges (*citrus sinensis) F*ruits.

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ABSTRACT *Present investigation was carried out to isolate andindentify fungi associated with the deterioration of sweet orange fruits. The citrus fruits were collected from local markets of Aurangabad in month of September 2015 and 2016. The samples were kept under room temperature and observed after two weeks for spoilage. The infected portion offruits were cultured on Potato Dextrose Agar andincubated aerobically at room temperature for 7 days. Pure cultures of the resulting fungal colonies were obtained from the sub cultures of the primary plates. These were identified morphologically and microscopically. The investigation revealed that up to 90 percent of the samples were infected with one or more fungal species. The most prominent pathogenic fungus isolated from the sample was AspergillusSP.,and otherinclude Mucorsp., Penicillumsp., Rhizopus sp., Fusarium sp., Phytophorasp,. Proper handling from the farm as well as during storage and evidence of mixing of diseased ones with the healthy ones were identified as important factor in preventing loss.*

KEYWORDS *:,Fungal colonies, Sweet orange.*

INTRODUCTION

It has been known that fruits constitute commercially and nutritionally important value. *Citrus Sinensis*(L) belongs from family Rutaceae, is one of the fruit crops consumed for its high vitamin 'C' content and antioxidant potential(Gorinstein et al 200l) . Citrus crop is mainly cultivated in the tropical &sub tropical regions of the world in over 137 countries (Ismail & Zhang 2004). Sweet oranges are an important fruit crop in international trade. Unfortunately, it is known to be attacked by several pathogens that affect the fruit quality.

The principal of spread of fungal infection in fruits supports that a single infected sweet orange can be the source of infection to other sweet oranges during storage and on transit (Jay 2003). Infection may occur during post harvest handling. Common air molds such as Penicillum Species may gain entry into the susceptible tissue and cause loss during packaging (Ronald 1988). The objective of this study was to isolate and identify fungi associated with post harvest deterioration of sweet orange fruits in different markets of Aurangabad.

MATERIAL AND METHODS

The sweet orange fruits *(Citrus Sinensis)* were collected from different markets of Aurangabad. 10 fruits in each batches were randomly selected & placed for 2 weeks for spoilage.The infected Citrus fruits were taken and then cut out into small segments using sterile knife, the segments of the infected fruits were then plated on Potato Dextrose Agar plates aseptically. Inoculated plates were incubated at 28± 30^{o}cfor 7 days.From the incubated plates the different fungal isolates with different colorations observed Which signified the occurrence of different fungal colonies. The fungal colonies that emerged were continuously sub cultured in order to obtain a pure culture of the fungal isolates.

The identification of isolated fungi was done according to the most documented keys in fungal identification (Domsch et at 1993). The slide was then examined under the microscope Morphological characteristics of the fungi such as types of hyphae (septate or non septate), asexual reproductive structure (Whether borne sporangia or conidia, in chain or single) were observed and recorded.

Result and discussion:-

Fungiisolated fromrotten fruits of *Citrus sinensis* fand their frequencies and occurrence are shown in Table 1.

Table-1.Fungi isolated from rotten fruits of citrus sinensis

Sr.No.	Fungal Isolates	Frequency(%)
1	*Aspergillusniger*	40.0
2	*Aspergillusflavus*	33.0
3	*Penicilliumcitrinum*	12.0
4	*Rhizopusstolonifer*	10.0
5	*FusariumOxysporum*	05.0

This study showed that *Aspergillusniger, A.flavus, Penicillumcitrinum*were found in the spoiled sweet orange fruits. Out of the isolated fungi, A.niger showed the highest frequency of occurrence (40%) followed by A.flavus (33%) then Penicilliumcitrinum (12.0%) , Rhizopusstolonifer (10%) and Fusariumoxysporum with (05%) frequency of occurrence ,it was found that A.niger, A.flavus, penicillumcitrinum, RhizopusstoloniferandFusariumoxysporum are detected in spoil sweet oranges. Therefore, sweet orange fruits should be properly kept in refrigerator and should be discarded if there are any changes notice in the colour or taste of the fruit as will be hazardous to human health.

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Medicinal Plants Used In Household Remedies A-Review

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ABSTRACT *Medicinal plants have been used for thousands of years to flavors and conserve food to treat health disorders and to prevent disease including epidemics. Products derived from plants may potentially controls microbial growth in diverse situation and in the specific case of disease treatments.medicinal plants have been used virtually all cultures as a source of medicine.the widespread use of herbal remedies and healthcare preparation is described in Vedas and bible.*

KEYWORDS---*Medicinal plants, traditional medicine, remedies.*

INTRODUCTION—

Medicinal plants consider as a rich source of ingredients which can be used in drugs development and synthesis.Besides that these plants play an important role in the development of human culrure around the whole word.Medicinal plant frequently used as raw material for the extraction of active ingredients which used in the synthesis of different drugs.Like in case of laxative ,blood thinners ,antibiotics,and anti-malerialmedications,contain ingredients from plants.Medicnal plants are backbone oftraditionalmedicine,whichmeansmore than 3.3 billion peoples in the less developrd countries utilized medicinal plants on regular basis. (1

The use of traditional medicine and medicinal plants in most developing countries as a basis for the maintainance of good heath ,has been widely observed byUNESCO(1962)(2).Furthermore an increasing reliance on the use of medicinal plants in industrial societies has been traced to the extraction and development of several drugs and chemotheraupetics from these plants as well as traditionally rural herbal remedies.(3)

Name of plants	parts used
Abrusprecatoriesroots,seeds.leaves	
Aconitum ferox wall	*roots.*
Adhatodavasicafresh and dried leaves	
Aegelmarmelosfruits,barks,roots,leaf.	
Aloe vera.	*Dried juice of leaf.*
Atropa belladonna	*leaf, roots.*
Azardirectaindica	*seed,leaf,bark*
Bouhinavriegata	*bark root ,leaf,*
Buteamonosperma	*flower,gum,seed,leaf.*
Catharanthusroseus	*roots,leaf.*
Dathurastromonium	*leaf seeds*

3) Characteristics of medicinal plant---

Synergic medicine—The ingredients of all plants interact simaltenously, so their uses can complement or damage others or neutralize their possible negative effects.

Support of official medicine—In the treatments 0f complex cases like cancer diseases the components of the plants to be very effective.

Preventive medicine—It has been proved that the component of the plants a toxicity to characterize by their ability to prevent the appearance of some diseases. This will help to reduce the use of the chemical remedies which will be used when the disease is already present.(4)

Dixit and Sand Humma,Ali.,2010(5) reviewed and researched on the antioxidant potential of some medicinal plant of origin of central India.

4) **Significance of medicinal plants to human beings----**

Medicinal plants are resources of new drugs.Medicinal plants have important role in the development of human culture ,for example,religions and different ceremonies.Many of modern medicine are produced directly from medicinal plants.for example,garlic.

It is estimated that there are more than 250,000 flower species. studying medicinal plants help to understand the plant toxicity and protect human and animal from natural poisons.

Cultivation and preservation of medicinal plants of protect biological diversity.for example,metabolic engineering of plants. The medicinal effect of plants are due to metabolities especially secondary compounds produced by plant species.

Plant metabolites includes,primary metabolites and secondary metabolites.

Phytotherapy—is the use of plants for medicinal purposes.

Phytochemistry- is the study of phytochemicals produced in plants ,describing the isolation ,purification,identification,and structure of the large number of secondary metabolic compound found in plants.

Plant primary metabolites—Organic compounds in the plant kingdom have metabolic functions essential for plants growth and developments produced in every plants include carbohydrates,amino acids,nucleotides, fatty acids,steroids and lipids.

Plant secondary metabolites—organic compounds produced in plant kingdom do not have appearent function involve in plant growth and developments .produced in different plant families, in specific group of plant families or in specific tissues ,cells or developmental stages throughout plant development. it includes, terpenoids, special nitrogen metabolites.

CONCLUSION-

It is very important point for the open acess journals to encourage researches and clinicians to work hard in order to clarify the main active ingredients which can be extracted from medicinal plants. Rescent and renewed interest in medicinal plantscoupled to developments in information has fuelled an explosion in the range and content of electronic information concerning medicinal plants as a emergent heath-aid.(6)Recently,reviewed diverse sourse of such sources as well as in a variety of online electronic databases.

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Organic Manure For Organic Agriculture

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ABSTRACT *Organic manure is the product resulting from controlled biological decomposition of organic matter . Organic manures are natural product used farmers to enhanced sustainable agricultural production. There are many types of organic manures likes farm yard manure, vermicompost , oil cakes, green manures, compost prepared from crop residues and other farm wastes, biological wastes – animal bones, slaughter house byproducts bone compost , concentrated organic manures etc. compost is a rich source of organic matter . It plays an important role in sustaining soil fertility so it improves the agricultural production. Organic manure contains nitrogen, phosphorus,potassium, calcium, iron ,manganese, copper, zinc, sulfur etc. elements which are necessary for best organic agricultural production . any compound of plant or animal origin which is added to the soil enhance plant productivity (Brahim 2015)*

Introduction :-

Indian farmers yet to be realize about ill effect of modern agriculture. Today alternative farming i.e. organic farming is need to get rid of chemical fertilizers, pesticides and growth regulators. To promote organic farming in India govt. of India has launched a national project on Organic farming ,during 1st oct , 2004. A biologically feasible production system can be uneconomical because production costs associated with feed are excessive (Bartholomew w. Green 1992) Indian soils are poor in organic matter and major plant nutrients. Organic soil is the key to soil fertility and productivity. In the absence of Organic matter, the soil is a mixture of sand and clay . Organic compost promotes biological activates.

Types of Organic Manure:- Following are some types of Organic Manure.

1. Crop residues
2. Home compost
3. Farm yard manure (FYM)
4. Concentrated organic manure
5. Green manures
6. Compost

Crop residues :- These are non-Economic, plant parts left after harvesting ,includes straws, stubbles, kadbi and residues of legume and other crops. Cotton , Sugarcane, Sorghum , Maize , Soybean like crop residues are rich in Nitrogen , Phosphorus and Potassium.

Home compost :- Vesitable residues , peels of fruits, wastes of plants, used tea dust after prepared tea, waste papers and left and rejected food these are the best source of compost.

Farm yard manure (FYM) :- The manure formed from cattle excreta mixed with straw and other left crops as well as dairy waste.Any animal or plant material used to fertilize land (Annagi - 2015) especially animal excreta usually with litter material.

Concentrated organic manure :- Edible oil cakes like cotton seed cake, coconut cake , G.N.C. , sunflower seed cake , rape seed cake , sesame cake etc. Non-edible oil cakes like castor , neem , mahua , karanja , safflower cake,cotton seed cake etc. Nutrients present in oil cakes are made available to crops after 10-12 days of application.

Green manure :-

Green manure crops reduce soil compaction. Green manure crops provide a habitual for pollinators and other beneficial insects. The legumes fix nitrogen and contribute to farm nitrogen needs. Also it protect and enhance the soils biological activity by providing nutrition for the soil organism . the crops used are cow pea , black gram , green gram, horse gram etc.

Compost :-

Compost is the decomposed remnants of organic materials. It is usually of plant origin and addition of animal dung and urine. Compost containing turkey manure and wood chips from litter and then applied to pastures for fertilizer (Winterhalder *et.al*1974).

Major sources of organic manure

There are mainly following three sources of organic manure

A) i) Poultry litter
ii) F.Y.M. manure
iii) Livestock and human waste

B) i) Agro industrial by8 products
ii) Sugar factory products
iii) Industries waste material
iv) Oil cakes
v) Gobargas slurry

C) i) Crop residues
ii) Plants waste
iii) Urban and rural waste
iv) Sludge of sewages

cow dung manure is very humus. It is composted by putting it into a bin or pile and letting it decompose. It contains about 3%. Nitrogen, 2% phosphorous and 1% potassium.

Table 1 : Nutrients content in Compost manure

Sr. No.	Type of compost	Nutrient content		
		N %	P_2O_5%	K_2O%
1	Cotton	0.44	0.10	0.66
2	Horse urine	1.2-1.5	Trace	1.3-1.5
3	Cattle dung	0.4-0.5	0.3-0.4	0.3-1.4
4	Poultry manure	1.0-1.8	1.4-1.8	0.8-0.9
5	Cattle urine	0.9-1.2	Trace	0.5-1.0
6	Sheep urine	1.5-1.7	trace	1.8-2.0
7	Ash house hold	0.5-1.9	1.6-4.2	2.3-12.0
8	Rural compost-dry	0.5-1.0	0.4-0.8	0.8-1.2
9	FYM(dry)	0.4-1.5	0.3-0.9	0.3-1.9

Source : Organic farming for sustainable Agriculture by A.K. Dhama,1996 Agro Beneficial Publishers (India).

Advantages of Organic Manures :-

i. Organic manure provides all nutrients to the plants
ii. It minimizes the evaporatation losses at moisture from soil
iii. It increases the fertility and productivity of the soil
iv. It helps in maintaining c:ratio in the soil
v. It increases the biological activity
vi. It improves physical , chemical and microbiological properties of the soil
vii. It improves the texture of soil
viii. It increases the water holding capacity of the soil.

Principle of Organic Manure :-

When decomposing organic materials the most important factors are temperature, soil moisture, rate of gas exchanges, easily availability of nutrients and structure of the colloidal minerals and rate of decomposition (Krishna chndra-2005). Microorganism decompose the organic materials to obtain energy for growth and carbon for the synthesis of new cell material CO_2, CH_4, organic acids alcohol and other oxidized and partly oxidized Form of carbon may be metabolic waste for one group of microorganisms. They may serve as energy and carbon source for other group. To decompose complex compounds, microorganisms are required to liberate more enzymes. Organic compound like cytoplasm blue green alage are decomposed readily in two and half days by 50% while corn stalk required two and half months.

Conclusion :

In India the use of animal waste and agriculture waste as a main source of compost was accepted practice, its use as a organic manure is important aim. But in modern agriculture it have failed to use of large scale.

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Herbal Remedies on Piles & Leprosy used by Tribal's of Satpuda forest region of East Khandesh Jalgaon district, Maharashtra.

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ABSTRACT *Pawara and Barela are the tribes predominantly located in the east west Khandesh of Maharashtra. Burhanpur district of Madhya Pradesh, Belgaum district of Karnataka, and Surat district of Gujarat make the boundaries. River Tapti, Girna and Purna flows along with the middle of the district covers major forest area in which Pawara & Barela primarily depends upon medicinal plants of their surrounding area for the treatment of their ailments. Living in the forest these tribal communities acquired knowledge about these wild flora and fauna. After years of practice, observations and analysis by trial and error methods the innovative members of these communities have selected useful and harmful members of the surrounding forest vegetation. The study aims to prepare an inventory of medicinal plants species used by these tribal peoples to cure various diseases. The present paper highlights some medicinal plant species used traditionally for the treatment of Piles & Leprosy by Pawara and Barela tribes of Jalgaon district of Maharashtra*

***Keywords**: - Ethnomedicine, Pawara, Barela, Piles,Leprocy , Satpuda.*

Introduction:-

Forests are the sources of invaluable medicinal plant wealth since time immemorial. Tribal men's realize the preventive and curative properties of plants and started healthcare system. India's traditional systems of medicine are the part of cultures that attracted the attention of peoples today. Medicinal plants in meetings family's primary healthcare and nutritional needs are traditional which is found popular in all cultures [1-2.] These medicinal plants provide alternative green health and number of ecofriendly domestic and industrial usage [3-4]. These remedies based on herbal medicines often have negligible side effects and due to relatively unaffordable cost of synthetic drugs, traditional medicines now become an affordable choice for the poor people in these areas [5]. Although considerable work has been done on floristic and ethnobotany of various regions and tribes of Maharashtra state [6-10]. The work records novel ethnomedicinal uses of some plant species of Jalgaon district of east Khandesh region of Jalgaon district.

Pawara and Barela are the tribes predominantly located in the east west Khandesh of Maharashtra. Burhanpur district of Madhya Pradesh, Belgaum district of Karnataka, and Surat district of Gujarat make the boundaries. River Tapti, Girna and Purna flows along with the middle of the district covers major forest area in which Pawara & Barela primarily depends upon medicinal plants of their surrounding area for the treatment of their ailments. Living in the forest these tribal communities acquired knowledge about these wild flora and fauna. After years of practice, observations and analysis by trial and error methods the innovative members of these communities have selected useful and harmful members of the surrounding forest vegetation. The study aims to prepare an inventory of medicinal plants species used by these tribal peoples to cure various diseases.

Methodology:-

Extensive and intensive ethnobotanical surveys were conducted in different tribal region localities of Jalgaon district from June 2006- July 2009. The interview method was adopted for gathering knowledge of tribal's, Local medicinemens (Bhagats, Witch doctors, and maharaj) and mouth to mouth discussion about therapeutic uses of local plants in the treatment of various diseases were noted carefully. A questionary was prepared to gather data regarding the medicinal information purpose. Voucher specimens were collected from the field. The collected specimens were identified correctly by using Flora and other pertinent literature [11-14]. The herbarium prepared by standard method[15&16] has been deposited in the department of botany, Arts, Science and com, college, Chopda.

Observations:-

The given plant species are enumerated with their botanical names, family in parenthesis, local names, locality and folklore claims.

1. **Elytaria acaulis (L.f.) Lindau:** Leaves crushed and extract is made with water applied on piles and also on skin in leprosy.
2. **Acacia chundra (Roxb.ex.Rottl.) Willd. :** Bark decoction is given daily 1 -2 teaspoonful for 1 5 days in piles and bark powder of Acacia chundra and Emblica officinalis is boiled in water and applied on leprosy.
3. **Xanthium indicum Koen. :** Leaf extract applied on piles.
4. **Aloe vera:** Daily 1 -2 teaspoonful pulp of the leaves eaten with sugar for 1 5-20 days to treat the piles.
5. **Butea monosperma (L.) Taub. :** Seeds used in piles.
6. **Cullen corylifolia (L.) Medic. :** Seed powder given with warm water for the treatment of piles and in leprosy. Seed paste is applied on skins.
7. **Abutilon indicum (L.) Sweet. :** Root extract applied on skin for the treatment leprosy and in piles ash of seeds given with water daily for 1 -2 months.
8. **Argcmonc mcxicana L. :** Juice of the whole plant applied on skin for leprosy treatment.
9. **Digera muricata (L.) Mart. :** Concentrated juice of the plant is made with water applied on piles externally .
10. **Desmodium triflorum (L.) DC. 100 ml** Root decoction is made with water given thrice a day for week in piles.
11. **Leucaena latisifolia (L.) Gills:** Wood is burnt on fire. The oily substances oozes out is applied on skin in leprosy.
12. **Gmelina arborea Roxb. :** Bark paste made into water & applied on skin in leprosy
13. **Acacia nilotica (L.) Will.ex.Del. subsp. nilotica (Bth.) Brenan:** Fresh wood burnt over fire and the oil oozes out is applied on skin in leprosy.
14. **Solanum nigrum L.:** 100 ml Decoction of the whole plant is made with water & taken orally three times a day for week in the treatment of piles.

Discussion: -

The survey reveals that many of the herbs used by the tribal peoples for the treatment of various diseases are very common and easily available at lowest cost and hence affordable. The mode of preparation and admistration of drugs are very simple and harmless to the patients without any side effects. Surprisingly these local peoples are aware of the continuous and conservative use of medicinal plants.

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Sewage and sewage components influences the growth of *Azotobacter chroococcum* in vitro

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ABSTRACT *Sewage farming is still continued in many towns if the irrigation facilities are not available. Sewage irrigation supported the population of nitrogen fixers such as Azotobacter, Rhizobium and also fungal organisms used for organic matter decomposition. In the present study Azotobacter chroococcum was isolated from the rhizosphere and soil from sewage irrigated fields. Effect of sewage and sewage components on the growth of A.chroococcum was studied. Sewage components consisted of detergents, soaps, antibiotics, spices, oils and fats, tooth pastes , household pesticides, heavy metals and also vegetable extracts. It was found that there was a large variation on the growth of A.chroococcum by the different components of sewage. Detergents were found to be inhibitory. In addition soaps were also found to be inhibitory.*

Key words- *Sewage, sewage components, A.chroococcum, Rhizobium.*

Introduction-

In India there are several cities and towns where they do not have complete underground drainage system. The drainage is discharged into the nearest stream or river throught the year.According to Kanwar (1970) there are nearly 145 cities and towns where sewage farming is practiced and the total area covered under sewage irrigation is nearly 13,000 hectares. Sewage is rich source of plant nutrients and can be utilized for irrigation (Stone,1955,Seep 1971). However use of raw sewage continues to be ' health hazards'. Hence most of the research is carried out in the spread of human pathogens (Dingress,1969) and comparatively very little is known regarding other beneficial soil microorganisms like nitrogen fixing Azotobacter species (Gangavane,1989). Azotobacter is one of the most important non-symbiotic nitrogen fixing bacterium increases fertility of soils. Burns and Hardy (1975) reported that approximately 83% of the nitrogen is fixed annually originates from biological nitrogen fixation while only 14% is from manufacture of fertilizers. Beijernck (1901) first time discovered Azotobacter.

Material and methods--

In order to see the effect of sewage and sewage components on the growth of Azotobacter, standard plate count agar method was used (Greenberg et al., 1985). Fresh sewage filtered through muslin cloth was used in order to see its effect on the growth of Azotobacter. Three concentrations (90%, 50% and 10%) of each raw sewage and sterilised sewage were adjusted in the nitrogen free glucose broth in the test tube.These tubes were inoculated with a selected isolates of Azotobacter and incubated at 30^0c for 72 hrs.Number of Azotobacter colonies were estimated at various intervals. Tube without sewage in the nitrogen free glucose broth served as control. Number of Azotobacter per ml were determined by serial dilution and plate count method. Domestic sewage also consists of soaps and detergents,antibiotics,extracts of spices,oils and fats,tooth pastes ,heavy metals and different chemicals,household pesticides and vegetables extracts etc.Therefore,the effect of the sewage components on the multiplication of *Azotobacter* individually at different concentration was studied.

Table 1: Effect of different soaps on *Azotobacter chroococcum in vivo*

Concentration (µg / ml)	Cfu 10^2 / ml
Chandrika	
100	95 x 10^2
500	65 x 10^2
Cinthol	
100	32 x 10^2

500	21 x 10^2
Lifebuoy	
100	38 x 10^2
500	26 x 10^2
Hamam	
100	48 x 10^2
500	29 x 10^2
Control	200 x 10^2
C.D. (P = 0.05)	48.72

Table 2: Effect of antibiotics on the growth of *Azotobacter chroococcum in vitro*

Concentration (µg / ml)	Cfu 10^2 / ml
Streptomycin	
100	36 x 10^2
500	12 x 10^2
Amoxicillin	
100	36 x 10^2
500	26 x 10^2
Gentamycin	
100	5x 10^2
500	2x 10^2
Oxytetracyclin	
100	00
500	00
Control	200 x 10^2
C.D. P = 0.05	54.41

Table 3: Effect of various spices on the growth of *Azotobacter chroococcum in vitro*

Spices (µg / ml)	Cfu 10^2 / ml
Black pepper (*Piper nigrum* Linn.)	
100	56 x 10^2
500	32 x 10^2
Geera cumin (*Cuminum cyminum* Linn.	
100	102 x 10^2
500	57 x 10^2
Dhania (*Coriandrum sativum* Linn.)	
100	82 x 10^2
500	45 x 10^2
Vilaichi *(Elettaria caradamomum* Linn.	
100	108 x 10^2
500	68 x 10^2
Clove (*Syzylium aromaticum* Linn.)	
100	70x 10^2
500	55 x 10^2
Dalchini (*Cinnamomum zeylanicum* Bereyn)	
100	38 x 10^2
500	31 x 10^2
Chilli (*Capsicum anncuum* L.)	
100	60 x 10
500	58 x 10^2
Turmeric (*Curcuma longat*)	
100	120 x 10^2
500	102 x 10^2
Mustard (*Brassica nigrakoch*)	
100	47 x 10^2
500	40 x 10^2
Ajowan (*Trachyspermum ammi* Linn.)	
100	89 x 10^2
500	56 x 10^2
Control	290 x 10^2
C.D. (P = 0.05)	31

Table 4: Effect of various vegetable extracts on the growth of *Azotobacter chroococcum in vitro*

Vegetable extract (10%)	Cfu 10^3 / ml
Onion (*Allium cepa* Linn.)	75 x 10^3
Garlic (*Allium sativum* Linn.)	88 x 10^3
Ginger (*Zingiber officinale* Rose)	89 x 10^3
Spinach (*Spinacia oleracea* Linn.)	45 x 10^3
Coriander (*Basello rubra*)	29 x 10^3
Tomato (*Lycopersicon esculentum* Mill)	75 x 10^3
Potato (*Solanum tuberosum* Linn.)	54 x 10^3
Methi (*Trigonella foenum gracycyn* Linn.)	52 x 10^3
Control	250 x 10^2
C.D. (P = 0.05)	56.04

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Estimation of total carbohydrates content in different parts of *Cassia tora* Linn.

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ABSTRACT *Cassia tora Linn. (Family: Leguminosae) is one of the well-known herb as well as a common weed in most of the Asian countries. In India, different parts of these plants are known for its meditative value as an antioxidant, antimutagenic, antidiuretic etc. In Ayurveda this plant constitutes as "Dadrughan- vati" which helps in treatment of skin diseases like ring worm, leucoderma, eczema etc. It is an anthroquinone containing plant which also has a certain bioactive compounds such as emodin, rhein, palmatic, isostearic, etc. The present review deals with biochemical perspectives of Cassia tora Linn.*

The continuous two year investigation showed that leaves generally accumulated total carbohydrate ranges from 32.606 mg/g dry wt. to 37.759 mg/g dry wt. In leaves total sugar accumulated high level observed at summer season (i.e. 11.389 mg/g dry wt.) than winter 9.948 mg/g dry wt. and monsoon 8.623 mg/g dry wt. In seeds show higher accumulation of starch 49.017 mg/g dry wt. than leaves, stem and root of all seasons tested. The concentration of starch were found to be increasing order of seeds< leaves < stem < roots

Keywords: *Total carbohydrates, starch, total sugar, protein and Cassia tora*

Introduction

Use of plants for the treatment of many diseases dated back to prehistory and people of all continents have this old tradition. Every culture on earth has relied on the vast variety of natural chemistries' found in plants for their therapeutic properties (Seyyed et.al, 2010). Beyond this pharmaceutical approach to plants, there is a wide tendency to utilize herbal product to supplement the diet, mainly with the intention of improving the quality of life and preventing the diseases of elderly people (Maffei, M., 2003). Despite the remarkable progress in the preparation of synthetic drugs, over 25% of prescribed medicines in industrialized countries are derived directly from plants (Newman et.al, 2000). Plant synthesizes a wide variety of chemical compounds, which can be sorted by their chemical class, biosynthetic origin and functional groups into primary and secondary metabolites.

Plants are an important part of our everyday diet, their constituents and nutritional value has been intensively studied for decades. In addition to essential primary metabolites (*e.g*., carbohydrate, lipid, protein and amino acids), higher plants are also able to synthesize a wide variety of low molecular weight compounds, the secondary metabolites. Plant secondary metabolites can be defined as compounds, that have no recognized role in the maintenance of fundamental life processes in the plants but they do have an important role in the interaction of the plants with its environment (Sirikantaramas *et al*., 2008). The production of these compounds is often low (less than 1% dry weight) and depends mainly on the physiological and developmental stages of plants. Many secondary metabolites have complex and unique structures and their production is often enhanced by both biotic and abiotic stress conditions. They are stored in specific cells and organs of the plant and are often accumulated in vacuoles (Chaudhuri *et al*., 2009).

Cassia tora (sub-family: Caesalpinioideae; Family: Leguminosae / Fabaceae) is a small shrub which grows up in warm moist soil throughout the tropical parts of Asian and African countries, with a height of 30 to 90 cm. It grows as a wild shrub mostly in the tropical regions and is considered as a weed in most places. Its native range is not well known but it is mostly found in South Asia. This plant popularly known as 'Sickle pod' (Maity et.al., 1998). It is mainly found in the states of Uttar Pradesh, Maharashtra and Madhya Pradesh, in India. The leaves and seeds are of use in cardiac disorders, dyspepsia, leprosy, ringworm, colic, constipation, flatulence, cough and bronchitis. Pods are used in dysentery as well as to treat eye diseases. Root is known

to be bitter, tonic, stomachic and is antidote against snake bite (Kapoor LD, CRC Handbook of Ayurvedic Medicinal Plants; Hemadri K and Rao SS, 1984). In Andhra Pradesh, the tribal people had been using the leaves of this plant grounded along with peppers and water into a paste, for the treatment of Jaundice (Dastur J F, 1962). The leaves are alterative, aperient, antiperiodic and given to children suffering from intestinal disorders (Manojlovic et.al, 2006). The leaves, roots, and even the whole *Cassia tora* is used as a natural pesticide in organic farms. The seeds yield yellow, blue and red coloured dyes used in dyeing and tanning therefore *Cassia tora* powder is most popularly used in the pet-food industry. It is mix with guar gum for use in mining and other industrial application (Soni et.al, 2000).

Young and tender leaves and stems are eaten as a vegetable and in soups. The unripe fruits are also cooked and eaten. The seeds can be introduced as a protein rich food for livestock. Other applications of *Cassia tora* Linn. are in abnormal child birth, vermicide, cold, epilepsy, night blindness, scabies, scorpion bite, stomachache and in bone fracture (Jain S K, 1991). The seed extracts of *Cassia tora* have been used in Chinese medicine as an aperients, anti-asthenic and diuretic agent and also to improve visual activity (Asolkar et al., 1992; Maity et al., 1998). The seeds of *Cassia tora* contain several anthraquinone glycosides and naphthopyran glycosides. The seed extract is also reported for its hypertensive activity. Many medicinal properties such as antihepatotoxic, antimicrobial, and antimutagenic activities have been attributed this plant (Wong et al., 1989; Choi et al., 1997; Yen and Chung, 1999; Patil et al., 2004).Many medicinal properties such as antimicrobial, antihepatotoxic and antimutagenic activities have been known to this plant. (Wong et.al, 1989 ; Choi et.al, 1997, Yen GC and Chung DY, 1999). The leaves and seeds are of use in cardiac disorders, dyspepsia, leprosy, ringworm, colic, constipation, flatulence, cough and bronchitis. Pods are used in dysentery as well as to treat eye diseases. Root is known to be bitter, tonic, stomachic and is antidote against snake bite. (Hemadri and Rao, 1984).

Materials and Methods

a) Carbohydrates were estimated by McGreevy (1950) and Nelson (1941) methods.

Reagents: 1) Somogy's reagent- (4 gm. $CuSO_4$ +24 gm. anhydrous Na_2CO_3 +16 gm. Na-K tartrate (Rocheette salt) + 180gm Anhydrous Na_2SO_4.

2) Nelson arsenomolybdate reagent- (24gm $(NH_4)6MO_7O_{24}$, $4H_2O$ Ammonium molybdate) + (3gm Na_2SO_4, $7H_2O$). Both solutions were mixed and incubated at 37 ^{0}C for 24 hours before use and were stored in brown bottle.

3) Standard sugar solution was prepared by dissolving 10 mg glucose in 100 ml distilled water.

Procedure: 1gm of sample was crushed with 10 ml 80% ethanol in mortar and pestle by adding acid free sand and then filtered through Watman filter paper. The filter and residue were collected separately. The alcohol residue was taken in 250 ml in conical flask. 150ml distilled water and 5ml conc. HCL were added in it. Hydrolyzed for 30 minutes and cooled to room temperature. Na_2CO_3 was added bit-by bit until the extract became neutral (pH= 7). The extract was filtered. Residue was discarded .Total volume of filtered was served as a sample for starch. First filtrate was taken in conical flask and condensed on water bath up to 2-3 minutes then distilled water was added to the filtrate, and then filtered, after mixing residue was discarded and the volume of filtrate was served for reducing sugar.

20 ml of this filtrate was taken in 150 ml conical flask; 2ml of conc. HCl was added to it and corked. It was then hydrolyzed for 30 minutes and cooled at room temperature. Na_2CO_3 was added bit-by bit until the extract became neutral (pH=7). Then this extract was filtered and residue was discarded. The final volume of the filtrate was measured. It served as a sample for total sugar. 0.5 ml of aliquot sample was taken in each test tube and 1 ml of Somogy's reagent was added in it. All test tubes were placed in boiling water bath for 30 minutes, cooled the tubes to room temperature and 1ml of arsenomolybdate reagent which is poisonous was added to it. The content was mixed thoroughly. Then the content was diluted to a volume of 10ml and its absorbance measured OD at 560 nm in Spectrophotometer.

Results and Discussion

The increasing demand of traditional herbal medicines day by day in developing and developed countries throughout the world. The demand is due to the increased acceptance of Ayurveda and traditional herbal medicines, because of having their safe therapeutic effect and no side effects , as such modern peoples relies more on drug resources of plant origin. Several chemical compounds such as carbohydrates, protein, alkaloids, glycosides, phenolic compounds, flavonoids etc. have been isolated from *Cassia tora.* These chemical compounds are responsible for pharmacological activities such as anti-inflammatory, antigenotoxic ,

antiproliferative , hypotensive , purgative , antidiabetics , antiulcer , antioxidant , antifungal , anthelmintic , antimutagenic and antibacterial.

The continuous two year investigation showed that leaves generally accumulated total carbohydrate ranges from 32.606 mg/g dry wt. to 37.759 mg/g dry wt. higher level of total carbohydrates observed at summer 37.759 mg/g dry wt. as compared to winter 35.516 mg/g dry wt. and monsoon 32.606 mg/g dry wt. In stem it was observed that at summer 24.262 mg/g dry wt. of total carbohydrates accumulates higher than winter i.e. 22.306 mg/g dry wt. and monsoon 20.809 mg/g dry wt. Summer show highest level of total carbohydrates .While in root total carbohydrates ranges from 13.715 mg/g dry wt. to 17.389 mg/g dry wt., higher level observed in summer 17.389 mg/g dry wt. as compared to winter 15.199 mg/g dry wt. and monsoon 13.715 mg/g dry wt. The total carbohydrates content of seeds was higher (62.171 mg/g dry wt.) as compared to leaves, stem and roots of all seasons. The percentage of total carbohydrates were found to be increasing order of seeds< leaves < stem <root (Table No. 1 and Graph No. 1).

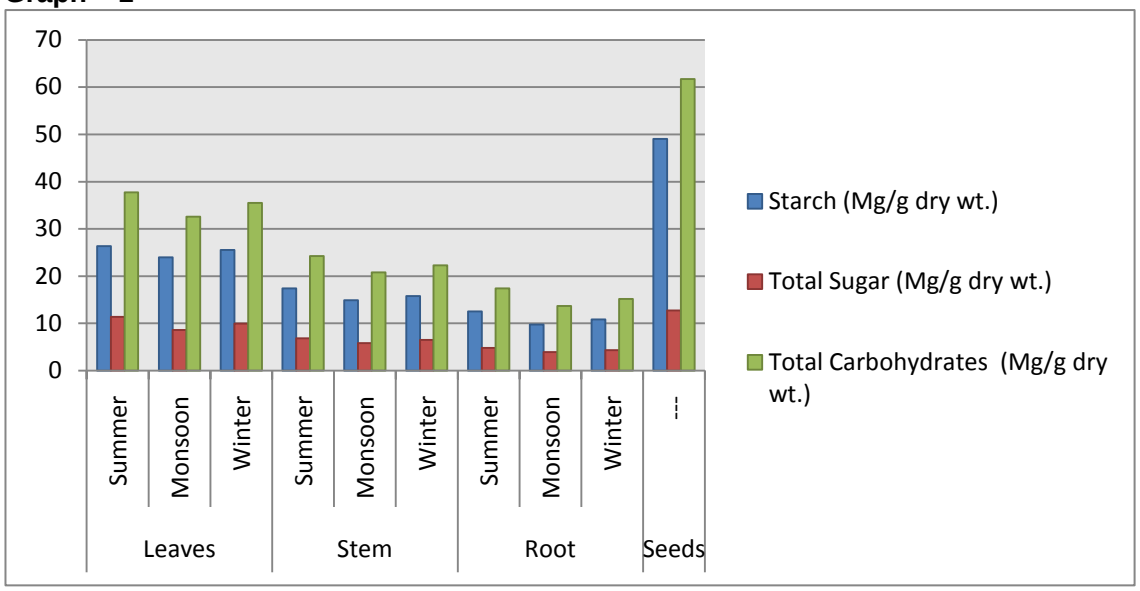
In leaves total sugar accumulated high level observed at summer season (i.e. 11.389 mg/g dry wt.) than winter 9.948 mg/g dry wt. and monsoon 8.623 mg/g dry wt., while in stem range of total sugar is from 5.867 mg/g dry wt. to 6.873 mg/g dry wt., highest level observed at summer 6.873 mg/g dry wt. as compared to monsoon 5.867 mg/g dry wt. and winter 6.526 mg/g dry wt. respectively. The total sugar of root show lower level than leaves, stem and seeds. The range of total sugar content in the roots are 3.931 mg/g dry wt. to 4.853 mg/g dry wt. , higher level observed at summer 4.853 mg/g dry wt. as compared to winter 4.320 mg/g dry wt. and monsoon 3.931 mg/g dry wt. The total sugar of seeds shows higher level (13.843 mg/g dry wt.) than leaves, stem and root of all seasons. The percentage of total sugar were found to be in increasing order of seeds<leaves<stem<roots (Table No. 1 and Graph No. 1).

The range of starch content in leaves show from 23.983 mg/g dry wt. to 26.370 mg/g dry wt., highest level observed at summer season i.e. 26.370 mg/g dry wt. as compared to winter 25.568 mg/g dry wt. and monsoon 23.983 mg/g dry wt. In stem starch accumulation observed high at summer 17.389 mg/g dry wt. as compared to winter 15.780 mg/g dry wt. and monsoon 14.942 mg/g dry wt. The starch accumulation in root show lower (range 9.784 mg/g dry wt. to 12.536 mg/g dry wt.) than leaves, stem and seeds. In seeds show higher accumulation of starch 48.328 mg/g dry wt. than leaves, stem and root of all seasons tested. The concentration of starch were found to be increasing order of seeds< leaves < stem < roots (Table No. 1 and Graph No.

Table No. 1- Seasonal variation of total carbohydrates levels of different plant parts of *Cassia tora* Linn.

Plant part	Season	Starch (Mg/g dry wt.)	Total Sugar (Mg/g dry wt.)	Total Carbohydrates (Mg/g dry wt.)
Leaves	**Summer**	26.370	11.389	37.759
	Monsoon	23.983	08.623	32.606
	Winter	25.568	09.948	35.516
Stem	**Summer**	17.389	06.873	24.262
	Monsoon	14.942	05.867	20.809
	Winter	15.780	06.526	22.306
Root	**Summer**	12.536	04.853	17.389
	Monsoon	09.784	03.931	13.715
	Winter	10.879	04.320	15.199
Seeds	**---**	48.328	13.843	62.171

Graph – 1



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Studies on Growth and Production of Carotenoids in *Anabaena variabilis* in Different Nutrient Media

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ABSTRACT *Anabaena variabilis* was isolated from the collected soil samples from different locations. Identification was carried out using morphological variation and taxonomical approaches according to Desikachary (1959).The axenic culture of *Anabaena variabilis* was obtained in the laboratory .For the biomass production, different culture media were used namely BG-11, Fogg's medium, Allen and Arnon medium, Zarrouk's medium and CFTRI medium. The biomass was harvested by filtration through double layered muslin cloth and dried using air blower.After harvesting, the biomass obtained was subjected to the growth analysis.Carotenoids were estimated by spectrophotometer method according to Gowenlock (1988).Out of the different culture media used, BG-11 medium supported the growth of *Anabaena variabilis* properly as compared to other media used.The carotenoids content was more in *Anabaena variabilis* grown in Fogg's medium followed by the BG-11 medium.

Introduction

Cyanobacteria (blue–green algae, BGA) are morphologically diverse group of phototrophic prokaryotes, which occur in almost every habitat on earth and useful to mankind in various ways (Thajuddin and Subramanian, 2005). They constitute a vast potential resource in varied applications such as food, feed, fuel, fertilizer, medicine, industry and in combating pollution (Thajuddin and Subramanian, 2005). Until past few decades of research, cyanobacteria were of academic interests and were mostly ignored as nuisance but, now are proved as potential organisms for much biotechnological utilization (Richmond, 1990; Sundararaman and Sekar, 2001; Thajuddin and Subramanian, 2005). The interest in these organisms as generators of pharmacologically active and industrially important compounds has been stimulated by recent results (Singh *et al*.,2002). A Variety of carotenoids produced by cyanobacteria have important commercial uses. Since carotenoids are non-toxic, they are desirable and used as coloring agents in the food industry (Bauernfeind, 1981). Carotenoids are frequently used in dietary additives for poultry and aquaculture farming (Hirschberg and Chamoritz, 1994).

Materials and Method

Method of collection-The soil samples from 5-10 cm deep soil layers were collected using the scalpels. Soil samples were collected in polythene bags of size 6 x 4 inches.

Nutrient media-The different culture media namely BG-11 (Rippka *et al*., 1979); Fogg's medium 1949; Jacobson, 1951); Allen and Arnon's medium (Allen and Arnon, 1955); CFTRI medium (Venkataraman and Becker, 1984) and Zarrouk's medium (Zarrouk, 1966) were used for the rich growth of *Anabaena variabilis*. These media were separately used in different sets.

Isolation of cyanobacterial species-The dry soil samples were spread in petri dishes and moistened with sterilized distilled water and cultures were incubated in light. When the visible growth of cyanobacteria begins to appear in the cultures, these cultures were used for the isolation of unialgal cultures of *Anabaena variabilis.*

Identification of the algal samples - Morpohometric studies were carried out by using ocular and stage micrometer. The identification of *Anabaena variabilis* was carried out using monograph and keys of Desikachary (1959).

Biomass production-For production of biomass, glass bottles (300 mL capacity) were used. The bottles were filled with 100 mL medium and autoclaved. The inoculum was ground in the sterile mortar and pestle in laminar air flow. Then the bottles were inoculated with 5 mL of unialgal suspension of *Anabaena variabilis* and labeled properly. All the cultures were maintained in the culture room at temperature 28±2°C under 8-h light/16-h dark photoperiod with a photosynthetic photon flux density of 40 μmoles^{-2}S^{-1}provided by cool white fluorescent tube lights .After harvesting, the biomass obtained was subjected to the growth analysis

Estimation of carotenoids-Carotenoids were estimated by spectrophotometer method according to Gowenlock (1988). Absorbance of carotenoids solution in n- hexane was determined at 440nm and the amount was calculated by comparing with standard. The amount of carotenoids is expressed as % on dry weight basis.

Results and Discussion

Out of the different culture media used, BG-11 medium supported the growth of *Anabaena variabilis* properly as compared to other media used. Allen and Arnon medium also supported growth but after 20 to 25 days, photo bleaching of biomass was observed. Other growth media, such as Fogg's medium and Zarrouk's medium supported the growth of *Anabaena variabilis* but the growth rate was very slow.

Table :Influence of different media on growth and carotenoides in*Anabaena variabilis*.

Sr.no	Medium	Fresh Weight(g)	Dry Weight(g)	Carotenoids %
1	BG-11	3.77 ± 0.15^{a}	0.31 ± 0.02^{a}	1.84 ± 0.00^{b}
2	Allen & Amon	3.12 ± 0.16^{b}	0.29 ± 0.03^{b}	1.54 ± 0.01^{c}
3	Fogg's Medium	2.94 ± 0.19^{c}	0.24 ± 0.05^{c}	2.53 ± 0.00^{a}
4	Zarrouk' Medium	2.62 ± 0.23^{c}	0.22 ± 0.01^{c}	1.44 ± 0.00^{d}
5	CFTRI	2.72 ± 0.21^{d}	0.19 ± 0.01^{c}	1.23 ± 0.01^{e}

Values are mean±SE of three independent experiments.

Yield of biomass is one of the direct measures of quantity of biomass produced per unit area within a specific time. Higher yield indicates higher biomass produced per unit area. Comparison of *Anabaena variabilis* in different media showed that highest biomass per bottle in terms of dry weight was produced in BG-11 medium followed by Allen and Arnon medium.The carotenoids content was more in the *Anabaena variabilis* grown in Fogg's medium followed by the BG-11 medium. CFTRI medium showed poor response for the carotenoids content.

Cyanobacteria are photoautotrophic bacteria and require all the essential major and minor elements. The heterocystous cyanobacteria fix atmospheric nitrogen and they can use atmospheric nitrogen as a source of nitrogen. In bottles, the medium does not come in contact with atmospheric nitrogen and the source needs to be added in the culture medium. If the culture medium is devoid of nitrogen, it results in poor growth of cyanobacteria. Similar results were reported by Olatz (1991); medium lacking nitrogen source, results in yellowish green color of the cells which is a characteristic of nitrogen deficiency. In the culture methods like photo-bioreactors, pure nitrogen is continuously bubbled into culture medium, (Humberto *et al*., 1989; Vonshak, 1993; Roxana *et al*., 2000) so that cultures do not get affected due to nitrogen deficiency.

The growth of *Anabaena variabilis* was more in BG-11 medium than in other media. For optimum growth of cyanobacteria, appropriate Ka^{+}: Na^{+} ratio is required in the cytoplasm. High Na^{+} is required by nitrogen fixing cyanobacteria for conversion of molecular nitrogen into ammonia (Becker, 1994). BG-11 medium consists moderate concentration of Na^{+} and in Allen and Arnon medium, Zarrouk's medium and CFTRI medium there is high concentration of Na^{+} while in Fogg's medium; there is no Na^{+} source. *Anabaena variabilis* is from moist soil habitat, which may not require high concentration of Na^{+} ions in the medium.

Production of pigments depends on composition of medium and its pH. In Fogg's medium composition and pH is moderate which resulted in higher accumulation of carotenoides in the biomass of *Anabaena variabilis.*Cifuentes and co-workers (1996 a,b) demonstrated that low nitrogen content results in higher accumulation of carotenoides in *Dunaliella* sp.This response can be explained by the well-known effect of limitation in this nutrient as an inductive factor of carotenogenesis in *Dunaliella* (Ben-Amotz *et al*., 1982) .Fogg's medium does not contain nitrogen source, therefore the higher production of carotenoides may be due to low nitrogen content of the medium.

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Studies on symptomatology and disease intensity of post harvest fungi causing rot diseases of apple (*Malus domestica* Borkh)

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Introduction

Apple is highly delicious fruit which is very commonly grown in the countries of temperate regions of the world. It is the native of Caucasus. In India apple growing areas are limited. The Himachal Pradesh, Simla, Kashmir are the main regions growing apple in large scale. Besides India it is cultivated at Spain, Yugoslavia, Korea, Chile, Brazil, Poland, Hungary, USA, China, Germany, Italy, It is the best source of energy, minerals, and vitamins. There are many varieties of apple occur in world. Patel, et, al. (1949) reported about 500 varieties of apple occur in the world. The important varieties of apple which occur in India are Golden delicious, Ambri, Lal Ambri, Maharaji, Red delicious, red June, king of pippins, starking delicious, Benonic, Irish, Peach and Sunehari.

Material and Method:

Collection of infected Apple:

The Apple fruits were collected from different fruit store houses of different go downs of Marathwada. The infected fruits of each type of infection collected in separate polythin bag and from the same lot 10 immature healthy fruits were collected in a sterile polythin bag and from the same lot 10 immature healthy Apples brought to the laboratory in an another polythin bag. A separate polythin bag was used for each type of diseases fruit. One infected fruit in one bag (Linskens and Jackson, 1995). A separate bag was used even for healthy immature fruits (Bagwan, 2010).

Isolation of fungi from infected fruit:

The mycoflora responsible for storage rot disease of apple was isolated on PDA (Potato Dextrose Agar) medium by food poisoning technique method. Before inoculation the infected fruit was surface sterilized with the help of 0.1% HgCl2 solution and then rinsed with the solution of sterile distilled water for 3-5 times to remove traces of HgCl2 solution. Then a small piece of infected region of fruit was removed with the help of sterile needle and the infected portion was inoculated on PDA (Potato Dextrose Agar) medium amended petriplate in sterile condition. The inoculated petriplate were incubated at room temperature 22+-^{O} C. The fungus growing from the inoculated infected piece was inoculated on PDA medium.

Purification of culture by single hyphal thread method:

To get pure culture of the each type of isolate, a single hypha was removed from the inoculated petriplate and re-inoculated on freshly prepared PDA medium amended petriplate. The inoculated petriplate were incubated at room temperature 22+-^{O} C. The procedure of inoculation of single hyphal thread was repeated for several times to get pure culture of respective fungus.

Identification of isolated fungi:

The fungi were identified on the basis of morphological features, type of colony growth, colour of colony, size and shape of spores and pigmentation.

Pathogenecity test:

To find out the Pathogenecity of the isolated fungus, a 4mm disc of growing colony was removed by sterile borer in sterile condition and inoculated on respective fruit set. A set of 10 fruits was used to confirm pathogenecity for each type of isolated fungus causing post harvest diseases of apple as listed in table 1. The pathogenecity was confirmed by following Koch's postulates.

Disease Intensity Test:

For the study of intensity tests. 20 healthy fruits were selected for each type of post harvest fungus. The fruit surface was sterilized by dipping into 0.1% hgcl2 solution for second and rinsed with sterile distilled water. The 4mm disc of vigorously growing fungus was removed with the help of sterile borer and inoculated the set of apple, at artificially injured region in sterile

condition. All the inoculated fruits were covered with sterile polythene bag and incubated at room temperature 22±1^{o}c. The same procedure was followed to test pathogenesis of all selected post harvest fungi of table 1. The disease intensity was noted in symbol plus (+). On 10th day of inoculation, the symptoms were described caused by post harvest fungi noted in table no.2. it has observed that, the Aspergillus root of apple was dominant , next to that blue mould rot of apple caused by *Penicillium expansum*; next to the soft rot by *Rhizopus nigricans*, and rot by *Fusarium moniliforme*, *Monilinia fructigena* (fruit rot), *Phytopthora cactorum* were dominant rot diseases observed during study.

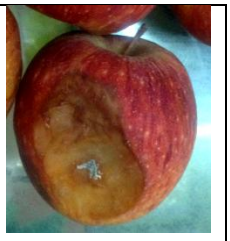
Table 1: The list of post harvest fungi isolated from infected fruits of Apple **(***Malus domestica* Borkh).

Sr.no	Disease	Causal agent	Intensity of rot disease
02	Storage rot	*Pestalotia hartigii*	+
03	Storage rot	*Phoma mali*	++
04	Storage rot	*Phytopthora cactorum*	+++
05	Fruit rot	*Trichothecium roseum*	+
08	Storage decay	*Penicillium expansum*	++++
09	Shallow rot	*Trichoderma harzianum*	++
10	Spur canker	*Alternaria tenuis*	+
11	Fruit rot	*Monilia fructigena*	-
14	Dry eye rot	*Botrytis cinerea*	+++
16	Black rot	*Botryosphaera dothidea*	+
17	Scab	*Venturia inaquilis*	+
18	Bitter rot	*Glomerella cingulata*	+
20	Storage rot	*Fusarium dendritrichum*	++
21	Fruit rot	*Pythium vexans*	+
22	Storage rot	*Alternaria mali*	+
24	Brown rot	*Monilinia laxa*	+
23	Soft rot	*Rhizopus nigricans*	++++
24	Fruit rot	*Aspergillus fumigatus*	+++++
25	Cork rot or Mouldy core	*Alternaria alternata*	-
26	Fruit rot	*Cylindrocarpon mali*	+
27	Fruit rot	*Fusarium lateritum*	+++
28	Black rot	*Nigrospora oryzae*	++
29	Soft rot	*Clostridium corticola*	+
30	Fruit rot	*Phytopthora colocasiae*	+
31	Fruit rot	*Fusarium moniliforme*	++++
32	Bulls eye	*Gloeosporium album*	+

33	Black rot	*Cerotostomella paradoxa*	++
34	Black rot	*Thielaviopsis paradoxa*	++
35	Fruit rot	*Fusarium solani*	+++

Table 2: Symptomatology of infected fruits of apple

Sr.no	Disease	Causal agent	Symptoms
01	Storage rot	*Pestalotia hartigii*	Lesions of brown colour develop on the infected fruit which increase gradually during storage. Shriveling of fruits is common symptoms. Agarwala & Sharma, (1968).
02	Storage rot	*Phoma mali*	Initially small light brown spots appear on the fruit which increase gradually. A mature spot possesses depressed margins and dark brown center. Agarwal & Sharma , (1968). 
03	Storage rot	*Phytopthora cactorum*	Brownish, olivacious, greasy spots are formed on the fruit, which enlarge until the entire fruit is involved. Agarwal & Sharma , (1968). 
04	Fruit rot	*Trichothecium roseum*	Pink coloured spots appear on the fruits which cover large areas within a few days .The rots never extend to the pulp. It remains limited to the peel of the fruit. Anonymous, (1962).
06	Storage decay	*Penicillium expansum*	Yellowish water soaked spots occurs on the fruit during storage .Initially affected areas get covered with white mycelium which later become bluish green due to production of numerous spores, Burton & Dewey, (1981).
07	Shallow rot	*Trichoderma harzianum*	The rot in this case had its infections at the calyx or cores of the fruit .In some cases; almost half of the apple gets rotted, Conway, (1983).
08	Spur canker	*Alternaria tenuis*	Dark brown shallow rotting of fruit starts at the injured areas of the fruit .On fruits with open calyces it may cause rotting in the core region of the fruit. Tweedy & Powell, (1963); Ceponis, et. al, (1969).
09	Fruit rot	*Monilia fructigena*	Infected fruit show firm lesions which are irregular in shape that spread rapidly during humid condition. 
10	Fruit rot	*Neofabraea alba*	The infected fruit possesses slightly sunken, flat circular spots which resemble bull's eye. The mature spots brown in colour. Cremish white coloured fungal growth occurs on spots. The rotted pulp turns brown, Wang, et. al. (2004). 

12	Dry eye rot	*Botrytis cinerea*	Fruits get infected before harvest but the rot develops further in store house and causes normal rot of flesh. Lesions light to mid brown and irregular in shape. Later on abundant surface mycelium with numerous grey conidia occurs on the affected region. Zhanquan Zhang, et. al, (2012). 
13	White rot	*Botryosphaera obtuse*	Circular spots on the fruits expand gradually in cylindrical manner towards the core. In severe cases the core becomes rotted and affects entire fruit. Zhanquan Zhang, et. al, (2012).
14	Black rot	*Botryosphaera dothidea*	Dark brown to black coloured spots develop on the fruits which increase in size and occupy the entire surface of fruit, Wang, (2012).
15	Scab	*Venturia inaqualis*	Rough, black circular lesions of 0.14mm in diameter develops on the infected fruits .in severe cases, sunken areas are developed on which various wet rot causing fungi grow. Gupta , (1992); Wang, (2012). 
16	Bitter rot	*Glomerella cingulata*	The infected fruit the spots which are usually ¼ to 5/8 in diameter. The spots are brown, firm and slightly sunken. Later on the spots get covered with pinkish spores which are more or less arranged in concentric rings. Jones, (1990).
17	Scab	*Spilotia pomi*	Brown lesions with irregular margin appear on the injured fruits. The affected tissue of the fruit becomes watery. Wan, Y. K. & Tian, S. P. ,(2005).
18	Storage rot	*Fusarium dendritrichum*	Small rounded lesions develop on the injured fruits during storage which increase gradually. The affected tissue turns brown. Wan, Y. K. & Tian, S. P. ,(2005).
19	Fruit rot	*Pythium vexans*	Water soaked patches appear near the stem end region of the fruit .Patches enlarge rapidly causing rot of fruit pulp which turns dark brown to black in colour. Ramakrishnan,(1949a).
20	Storage rot	*Alternaria mali*	Brown circular lesions occur on the fruits. Lesions show concentric rings. Wan, Y. K. & Tian, S. P. ,(2005).
21	Brown rot	*Monilinia fructigena*	Small brown circular spots appear first on the fruit which increase rapidly to form large, dark patches .later on entire skin of fruit becomes black. **Wan, Y. K. & Tian, S. P.** ,(2005).
22	Brown rot	*Monilinia laxa*	Brown spots about 5 mm in diameter occur on fruit. The spots are soft, superficial and circular which increase rapidly in size covering about half of the fruit surface in 4 days .Skin of fruit burst opens. **Sharma, N. and M. Mashkoor Alam,** (1998).
23	Soft rot	*Rhizopus nigricans*	Irregular water soaked lesions occur on fruit which increase gradually .In severe cases; affected areas get covered by mycelial mat and sporangiophore. Pulp turns brown. **Sharma, N. and M. Mashkoor Alam,** (1998).
24	Fruit rot	*Aspergillus fumigatus*	Water soaked spots on fruit increase rapidly and cover – up the whole fruit within 5 -6 days. Li, B. Q., & Tian, S. P. ,(2006).
25	Cork rot or Mouldy core	*Alternaria alternata*	Round, brown to black, dry firm shallow lesion appears on the skin of the fruit. In advanced cases, pulp becomes spongy which is streaked with black colour. Rot develops slowly. **Saxena, S.K.,** (2002).

26	Fruit rot	*Cylindrocarpon mali*	Spots circular, mid brown soft appears on the fruit during storage which causes soft rot disease of fruits. **Sharma Rohini and Sumbali Gaeta,** (2009).
28	Black rot	*Nigrospora oryzae*	Initially, lesions with irregular margin occur on the fruit which later get covered black coloured conidial mass of the fungus. Tandon &Verma, (1964).
29	Soft rot	*Clathridium corticola*	The rotted regions on the fruit become soft and watery. Such fruits are unfit for consumption. Thind, et. al, (1975).
30	Fruit rot	*Phytopthora colocasiae*	Infection starts at the stem region of the fruit. With the progress of rot the fruit shrivel up and turn dark brown. Later on fruit becomes mummified. **Singh, D., Thakur, A.K., (**2005).
31	Fruit rot	*Fusarium moniliforme*	Circular depressed water soaked lesions develop on the infected fruit which increase rapidly and fruit get rotted. Wan &Tian, (2001). **Singh, D., Thakur, A.K.,(**2005).
32	Target rot or Bulls eye	*Gloeosporium album*	Slow growing, circular, brown rots, frequently with a yellow center, occur during storage of fruits. Ziller& Childs, (1925); Qin,(2004).
33	Black rot	*Cerotostomella paradoxa*	Many water soaked spots occur on the infected fruit. The spots are soft which increase slowly until the entire fruit is involved. Qin,(2003).
34	Black rot	*Thielaviopsis paradoxa*	Circular water soaked areas with white mycelial growth in the center appear on the fruit. Later on fruit loses its shape and turns black. Fruit emit foul odour. **Choubey, S.,** (2007).
35	Fruit rot	*Fusarium solani*	Water soaked spots appear on the infected fruit .Softening of t place. Affected tissue becomes dark brown in colour. Srivastava, et. al,(1964); Droby, et. al, (2002).

RESULTS

The major fungal pathogens isolated from infected fruits of apple were *Pestalotia hartigii, Phoma mali , Phytopthora cactorum, Trichothecium roseum, Phomopsis mali, Penicillium expansum, Trichoderma harzianum, Alternaria tenuis, Monilia fructigena, Neofabraea alba, Botrytis cinerea, Botryosphaera obtuse, Venturia inaquilis, Glomerella cingulata, Fusarium dendritrichum, Pythium vexans, Alternaria mali, Monilinia laxa, Rhizopus nigricans, Aspergillus fumigatus, Alternaria alternata, Fusarium avenaceum, Nigrospora oryzae, Clostridium corticola, Phytopthora colocasiae, Fusarium moniliforme, Gloeosporium album, Cerotostomella paradoxa, Thielaviopsis paradoxa, Fusarium solani and Botryodiploidia ananassae* as shown in table 1. The losses of fruits caused by fungal pathogens during storage are poorly investigated in India. Therefore, a study was initiated to estimate losses due to postharvest diseases of fruits and to determine causal agents of fungal diseases during storage. Present investigation was carried out to study the type of mycopopulation responsible for post-harvest diseases of fruits in India.

A great variation in the symptoms of harvest disease of apple has been observed during study of symptoms caused by various post harvest fungi.

The pathogenecity test of fungi such as *Gloeosporium album* (Bulls eye rot), *Phytopthora colocasiae* (fruit rot), *Clostridium corticola* (Soft rot) *Cylindrocarpon mali* (fruit rot) *Monilinia laxa* (Brown rot) *Pythium vexans* (fruit rot), *Venturia inaquilis* (Scab), *Botryosphaerea dothidia* (Black rot) , *Alternaria tenuis* (spur canker), *Trichothecium roseum* (fruit rot) *Pestalotia hartigii* (storage rot) post harvest fungi shown very poor growth during pathogenecity test; The post harvest fungi

such as *Alternaria alternata* (cork rot) were failed to develop rot, there was no rot development during pathogenecity test.

DISCUSSION

The apple fruits are a soft skinned fruit; it can be easily getting injured if proper care is not taken. Mostly the apples are harvested by hand. In India, the apples are kept on filed soil up to collection of all fruits from the field. There are possibilities to get infected by soil borne mycoflora. The injured fruits get injured by saprophytic fungi which causes fruit rot disease during transportation. Sometimes, the pathogenic fungi remain inside fruit tissue and develop into rot of fruit during storage periods, Fawzi, E.M., Khalil, A.A. and Afifi, A.F.,(2009). Such a latent infection is also responsible to post-harvest disease of fruit. The microflora causes different types of symptoms which are described according to specific pathogenic organism, disease and its symptoms.

CONCLUSION

One of the very important point note during the study was that the intensity of post harvest disease due to latent infection was poor, even during study of pathogenecity test, the fungi like *Alternaria* sp. do not develop rot, but the saprophyte causing post harvest diseases of apple were dominant throughout the study of symptomatology of respective saprophytic post harvest fungus. Secondly it has observed that the injured fruits were highly susceptible for the post harvest fungi, hence hard packing material and rough roads of our country responsible for injuries to apple.

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"Studies on biocontrol of collar rot disease of groundnut caused by *Aspergillus niger* with the help of *Trichoderma viride*"

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ABSTRACT *Groundnut (Arachis hypogaea L.) is an important oil seed crop. Biotic factors particularly diseases play a major role in limiting the yield of groundnut. In the present study, Trichoderma viride is used against Aspergillus niger which causes collar rot disease of groundnut. Both greenhouse studies and field trials conducted revealed that, Trichoderma viride reduces the disease by 30%.*

Keywords: *Aspergillus niger, collar rot disease of groundnut, green house, field trials, biological control, Trichodrema viride.*

INTRODUCTION

Groundnut (*Arachis hypogaea L*.) is a major legume and an important oil seed crop in India, covering nearly half of the area under oilseeds. It is grown in over 100 countries with a total estimated area of 21.8 million ha and with production of 28.5 million tons. In India, it is grown over an area of 4 lakh ha, with an annual production of 5.5 million tons and productivity of 1007 kg ha in the year 2009-10 (Economic Survey, 2010-11).

Groundnut (*Arachis hypogaea L*.) is an important oil seed crop. The low productivity in groundnut is attributed to many production constraints. Among these, biotic factors particularly diseases play a major role in limiting the yield of groundnut. The crop is known to be attacked by a number of fungal and bacterial diseases. Most of the soil borne diseases like stem rot, root rot, collar rot and pod rot (Deepthi and Reddy, 2013).

The collar rot or crown rot disease of groundnut caused by *Aspergillus niger* van. Teighem. is a very common and destructive disease in India and causes considerable loss in pod yield upto 50% (Dasgupta, Raj and Das, 2000). Though application of fungicides like penta chloronitrobenzene (PCB) (Aulakhand Chohan, 1974) and carbendazim (Bavistin) (Reddyand Rso, 1991) have been recommended for managing this pathogen, their threat to the environment, crop ecology, soil biology and human health are of concern (Papavizas, 1985).

Hence, it is important to find out an ecofriendly method of disease control. Biocontrol involves the use of naturally occurring non-pathogenic micro-organisms that are able to reduce the activity of plant pathogens and thereby suppres disease. Antagonistic micro-organisms can compete with the pathogen for the nutrients, inhibits pathogen multiplication by secreting antibiotics or toxins or reduce pathogen population by hyper parasitism (Svetlana Zivcovic, 2010).

Trichoderma sp. possesses innate resistance to most agricultural chemicals, including fungicides, although individual strains differ in their resistance. Some strains are either selected or modified to be resistant to specific agricultural chemicals. Most manufactures of *Trichoderma* strains for biological control have extensive lists of susceptibilities or resistance to a range of pesticides (Pal and Brain Gardenar, 2006). *Trichoderma* spp., and *Gliocladium virens* which was recently named as *Trichoderma virens* are well known antagonistic fungi useful in controlling soil borne diseases.

Trichoderma species have shown biocontrol potential against many plant pathogens including diseases caused by *Sclerotinia minor*(Jones and Stewart, 1997; Dolatabadiet al., 2011), *Botryosphaeria berengeriana* f. spp. piricola, *Cladosporium herbarum* (Barbosa et al., 2001), *Dioscorea*spp. (Okigbo and Ikediugwu, 2000) and *Pythium ultimum* (Naseby et al., 2000). Besides, *Trichoderma* species have also shown efficacy against diseases caused by *Rhizoctonia solani, Pythium aphanidermatium, Fusarium oxysporum, Fusarium culmorum, Gaeumannomyces graminis var.tritici, Sclerotium rolfsii, Phytophthora cactorum, Botrytis cinerea*and by *Alternaria spp*. (Kucuk and Kivanc, 2003).

MATERIAL AND METHODS

Isolation and Identification of *Trichoderma viride*

Fungal species *Trichoderma viride* was isolated from soil samples by using potato dextrose agar (PDA) medium. Samples were inoculated over plates by multiple tube dilution technique (MTDT) and the plates were incubated at 26°C for 4 days. The fungal colonies which were picked up and purified by streaking and incubated at 26°C for 7-8 days. Green conidia forming fungal bodies were selected and microscopic observation was identified to be *Trichoderma viride*. The culture was maintained on PDA slants.

For identification of fungi the colonies were picked up and transferred to the PDA medium for isolation of fungal strains. The isolated mycelium was transferred to a drop of lactophenol cotton blue and mounted on a glass slide. Finally, the slide was examined under microscope and the photomicrograph collected using MIPS. From this photomicrograph of slide identification done with the help of reference (Rane and Gandhe,2011) and comparing with pure cultures obtained from MTCC Chandigadh.

A loopful of inoculum from sub cultured plates of fungi were transferred to Potato Dextrose Agar (PDA) slants and maintained as pure culture. The plates were then incubated at room temperature (26±2°C) for ten days. After complete sporulation, conidia from the medium were harvested. Spores were harvested with the help of a small sterile metal spatula.

Harvested conidia were air dried under laminar air flow and stored in a small air tight screw cap vials (10 cm with 2.5 cm diameter) in refrigerator at 4°C before using for further studies. Suspension of spores was made using distilled water with Tween-20 (0.2%) and filtered through a double layered muslin cloth. From the stock solution, further dilutions were made to obtain the required concentrations for further studies.

Isolation of *Aspergillus niger* from diseased plant

Diseased plants are collected from various villages from Taloda Taluka into a sterile polythene bag. Three replicates of each sample were kept in sterile polythene bag.

The infected plant parts were cut into pieces and their surfaces were sterilized by dipping in surface sterilant solution. The treated pieces were washed in three changes of sterile water and dried on clean, sterile paper towels to remove the sterilant. Aseptically transferred later on nutrient medium and incubated the inoculated plates, in an inverted position, at 25^0C for 3-5 days. The identification of fungi was done as per standard procedure described earlier.

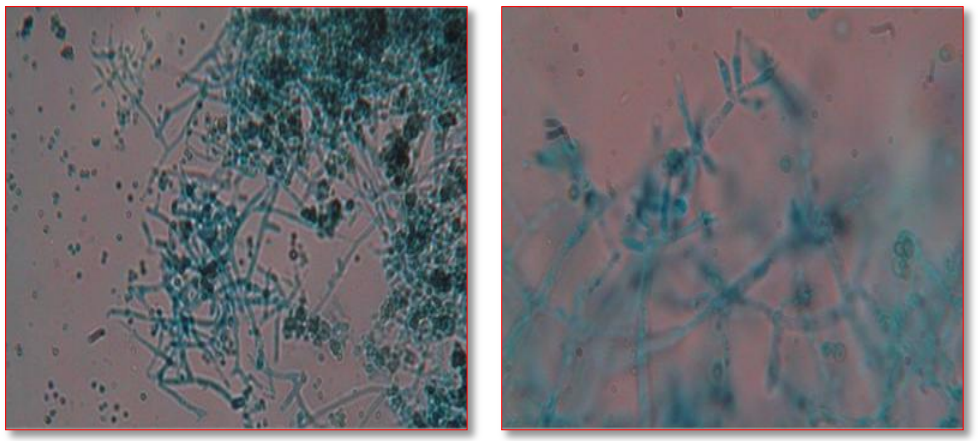
Antagonistic study

The pathogen and the *Trichoderma viride* allowed interacting in a petridish under optimum conditions for both the pathogen and the biocontrol agent. From sub culture of each isolate mycelium with help of inoculating needle and placed at a distance of 1.5 cm from the edge of petriplate. A 5 mm disc of the test pathogens taken from the leading edge of the culture grown on medium was oppositely placed. Plates were then incubated at 28^0 C for 8 days and / or until the leading edge of the test fungus reached the edge of the plate. Finally, beyond the zone of inhibition, the growth that developed was recorded (Varshney and Chaube, 1999).

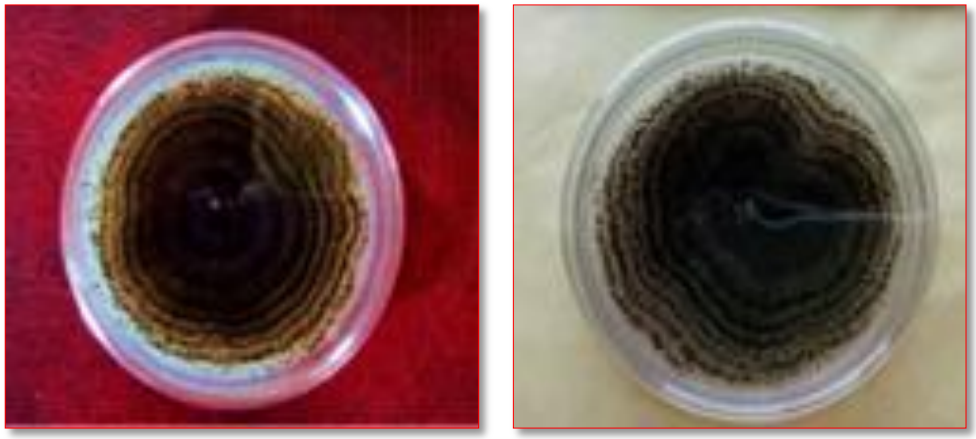
Trichoderma viride was applied as seed coating; conidia were collected from cultures grown in Erlenmeyer flasks, each containing 200-ml of solidified potato dextrose agar. The conidial suspension was adjusted to 5×10^9 conidia per milliliter and supplemented with 0.015% (v/v) of Nu-film 17, (Miller chemicals) which served as an adhesive. 100 seeds of crop were treated with 3 ml of the conidial suspension and immediately dried by the ventilation. The density of *Trichoderma viride* conidia on the seed coat surface was determined by serial dilutions of suspension from treated and untreated seeds, using *Trichoderma*-selective, medium (TSM).

Field experiments were carried out during the 2014 and 2015. For field experiments, in one region treated seeds with *Trichoderma viride* are planted and in another region seeds which are treated with pathogen are planted. During the growing season, disease incidence was recorded.

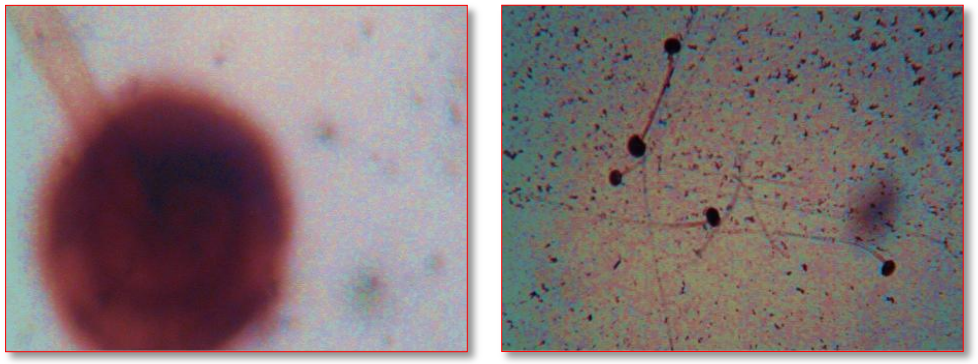
Subculture of *Trichoderma viride*



Mycelium of *Trichoderma viride*

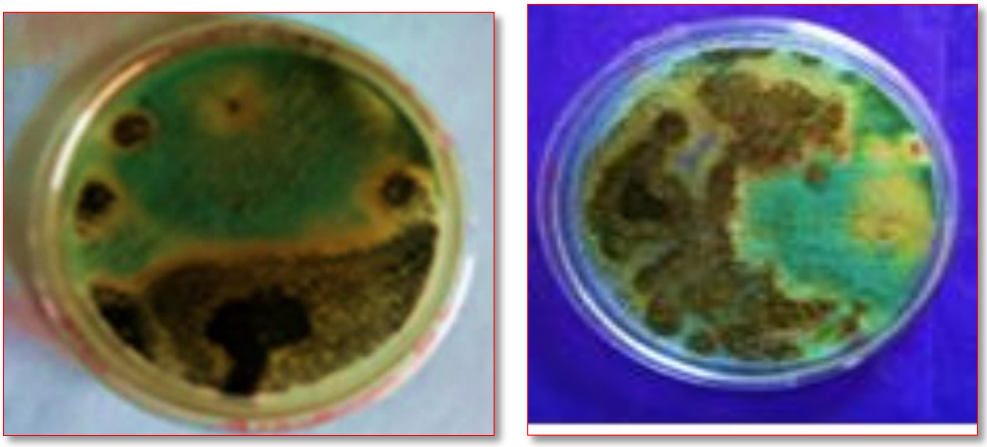


Subculture of *Aspergillus niger*



Mycelium of *Aspergillus niger*

- **Dual culture- *Trichoderma viride* and *Aspergillus niger***



RESULTS AND CONCLUSION

In the present study, the results showed that, *Trichoderma viride* is useful as biocontrol agent. *Trichoderma viride* was effective in reducing the disease incidence throughout the growing seasons, in green house experiment as well as in the field experiment. It exhibited notable effectiveness to control the pathogenic fungi, viz, *Aspergillus niger*, on groundnut. The results indicate that, *Trichoderma viride* when applied in green house experiment with artificially infested soil; the disease incidence was reduced by nearly 30 percent.

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Marine Fungi From Mangrove Ecosystem Of Rose Island -Andaman (India)

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ABSTRACT *The present study deals with marine fungi fromRose Island-Andaman. The dead, decaying, intertidal and submerged mangrove wood samples were collected from Rose Island. These samples examined for colonization of marine fungi. Total 14 species of marine fungi were encountered, nine species belonging to Ascomycetes (Aigialusgrandis, Aigialusmangrovei, Corollosporacinnamomea,Haloroselliniaoceanica,Leptosphaeriaavicenniae,Savoryellapaucispora,Trematosphaerialineolatispora,Trematosphaeriamangroveiand Verruculinaenalia) and fivespecies belonging to Mitosporic fungi (Alternariasp.,Halenospora varia, Hydeapygmea, Periconiaprolifica, andZalerion maritium).Out of these fungi Haloroselliniaoceanicaand Alternariasp.is very common fungi reported from most of the wood samples in Rose Island.*

Keywords: *Mangrove, Marine, Fungi, Ascomycetes, Mitosporic fungi, RoseIsland and Andaman.*

INTRODUCTION

Mangrove forests are the 'hot spots' of biodiversity and also for marine fungi. Number of species of marine fungi from mangroves have been reported in recent years [Borse and Borse (2005), Kohlmeyer and Kohlmeyer(1979), Kohlmeyer (1984), Kohlmeyer (1985), Kohlmeyer and Volkmann- Kohlmeyer (1987), Hyde, (1988), Hyde and Mouzouras (1988), Hyde and Jones (1989), Kohlmeyer and Volkmann- Kohlmeyer (1990), Scott (1988), Hyde and Lee (1995), Sridhar and Prasannaraj(2001), Borse and Borse (2005) andBorse et. al (2012)].To some extent Chinnaraj (1993) reported some marine Fungi from different coastal area of Andaman and Nicobar Islands. Ten species of marine fungi from RoseIsland -Andaman were isolated and illustrated in this paper.

There are about 472 islands in the Andaman and Nicobar Group (6°-14° N 92°-94°E). Out of these Rose Island is anIsland and it enjoys Tropical wet and dry climate. Marine ecosystem is one of the richest and most productive areas of organic detritus and form the base of the food chain. Marine fungi play an important role in nutrient generation cycles as decomposers of dead and decaying organic matter. Although mangroves are the dominant features of Indian coastline and provide niches and habitats for many marine organisms.

MATERIALS AND METHODS

The samples of dead and decaying mangrove substrates were collected from different localities from Rose Island-Andaman coast- India. All the collected samples were observed directly for the fungal fructification under microscope and incubated in plastic boxes. Incubated material was periodically examined for the occurrence of fungi. The permanent slides were prepared as per suggested by (Volkmann- Kohlmeyer and Kohlmeyer, 1996; Kohlmeyer and Kohlmeyer 1972). The measurements of various parts of fungi were taken with the help of ocular micrometer and stage micrometer. The photomicrographs were taken. The identification of the fungi were made with the help of Kohlmeyer and Kohlmeyer, 1979; Kohlmeyer and Volkmann-Kohlmeyer, 1991; Hyde and Sarma 2000; Hyde et al., 2000 and other relevant literature.

RESULTS AND DISCUSSION

During the present work Total 14 species of marine fungi wereisolated and encountered, nine species belonging to Ascomycetes (*Aigialusgrandis, Aigialusmangrovei, Corollosporacinnamomea,Haloroselliniaoceanica,Leptosphaeriaavicenniae,Savoryellapaucispora ,Trematosphaerialineolatispora,Trematosphaeriamangrovei*and *Verruculinaenalia*) and five species belonging to Mitosporic fungi (*Alternaria*sp.*,Halenospora varia, Hydeapygmea, Periconiaprolifica,* and*Zalerion maritium*). Out of these fungi *Haloroselliniaoceanica*and *Alternaria*sp.is very common fungi reported from most of the wood samples in Rose Island of Andaman. Chinnaraj(1993) isolated 63 marine fungi from mangroves of Andaman and Nicobar Islands.

TAXONOMIC ACCOUNT

1. ***Aigialusgrandis***Kohlm. and S. Schatz (Fig. 1)
Trans. Br. Mycol. Soc., **85:** 699, 1985.

Ascomata: 950-1215 µm high, 945-1500 µm wide, 241-476 µm thick, globose in frontal view, fusiform in sagittal section, laterally compressed, ostiolate, carbonaceous to coriaceous, black, gregarious, often close together. Peridium: two-layered; outer stratum clypeoid near the ostiole, composed of elongate, more or less irregular cells. Ostioles: 30-90 µm diam., depressed or slightly projecting in the center of the apical furrow, circular, ostiolar canal subglobose.Pseudoparaphyses: 1.5-2 µm diam., trabeculate, unbranched at the base, Asci: 280-390 µm x 29-36 µm, eight-spored, cylindrical, long-pedunculate, thick-walled, fissitunicate. Ascospores: 84-98 µm long, 18-26 µm broad, 12-17 µm thick, biseriate, with 13-16 trans-septa and 1-3 longisepta in all but the end cells, yellow-brown except for the hyaline or light brown apical cells, glabrous, 2-3 µm thick, with a gelatinous cap, around the apical and sub-apical cells.
Material examined: - On intertidal stem of *Avicennia marina and Rhizophora apiculata*.
Distribution in India:- East coast: Tamilnadu (Ravikumar and Vittal, 1996); Andhra Pradesh (Sarma and Vittal, 1998-99 and 2004, Sarma et.al 2001, Vittal and Sarma 2005); West Bengal (Pawar *et al*., 2005); Andaman and Nicobar Islands Chinnaraj (1993); West coast:Maharashtra (Borse, 1987 and 1988, Srivastava, 1989); Goa (Borse *et al.,* 1999a); Gujrat (Borse *et al.,* 2000) and Kerala (Raveendran and Manimohan, 2007).

2. ***Aigialusmangrovei***Borse (Fig. 2)
Trans. Br. Mycol. Soc., **88:** 424, 1987c.

Ascomata: 600-850 µm high, 600-800 µm wide, 150-200 µm thick. Ostioles: 40-50 µm diam. Pseudoparaphyses**:** 1.5-2 µm diam. Asci: 300-425 x 20-30 µm. Ascospores: 35-55µm long, 10-16 µm broad, muriform, with 6-7 tranverse septa and 1-2 longitudinal septa in all but the end cells, slightly constricted at the septa, yellow-brown except for the hyaline or light brown apical cells, with a gelatinous cap, around the apical and sub-apical cells may present.
Material examined: - On intertidal stem of *Rhizophora mucronata*.
Distribution in India: East coast: -Tamilnadu (Ravikumar and Vittal, 1996); Andhra Pradesh (Sarma and Vittal, 1998-99 and 2001); West Bengal (Pawar *et al*., 2005). West coast: Maharashtra (Borse, 1987 and 1988); Kerala (Raveendran and Manimohan, 2007) and Andaman and Nicobar Islands Chinnaraj (1993).

3. ***Corollosporacinnamomea*** Koch (Fig.3)
*Nordiac J. Bot.***, 6:** 498, 1986.

Ascomata: 68-104 µm in diameter, globose or subglobose, black, smooth, brilliant, with subicula on grains of sand, solitary or gregarious, carbonaceous, ostiole not seen. Peridium: outer cell layer composed of flat, thick-walled angular cells with diameter 10-12 µm. Asci: 58-108 x 16-24 µm, eight-spored, fusiform or subclavate, thin-walled, without apical apparatus, deliquescing early. Ascospores: 22-34 x 6-12 µm (without polar spines), fusiform, one-septate, not or slightly constricted at septum, asymmetric, brown, appendaged; appendages of two kinds a) polar spines 10-16 µm long, slender , 1 µm thick, slightly curved, hyaline, b) sheet like, soft, polar appendages up to 12 µm long, from apical part of polar spine and equatorial appendages forming a double frill of thread-like spines, 8.5-12 µm long.
Material examined: - On intertidal wood of *Avicennia marina*.
Distribution in India: - East coast: Orissa (Borse *et al.,* 2001 and 2002). West coast: Karnataka (Ananda *et al.,* 1998); Gujrat (Patil and Borse, 2001);Maharashtra (Borse, 2000b) and Mahe Pondicherry (Borse and Pawar, 2005).

4. ***Haloroselliniaoceanica*** (Schatz) Whalley, Jones, Hyde and Laessoe. (Fig. 4)
Mycol. Res., **104:** 368, 2000.
Hypoxylonoceanicum Schatz, *Mycotaxon,***33:** 413, 1988.

Pseudostromata: seated on decorticated wood, occasionally embedded at the base, pulviante to hemispherical, 0.4-0.8 mm diam., single, or in clusters, linear to suborbicular, surface leathery in fresh material.Ascomata: 614-785 µm x 724-980 µm, immersed in pseudostroma, subglobose to hemispherical, soft to leathery, black, ostiolespapillate. Peridium: 25-32 µm wide. Paraphyses: 2-3 µm wide at the base, abundant, persistent, remotely septate. Asci: eight-spored, 168-214 µm long, spore-bearing part 132-140 µm long, stipe 36-78 µm long, cylindrical, unitunicate. Ascospores:uniseriate to obliquely uniseriate or partially biseriate at the upper end of the ascus, dark grey-olive to opaque brown, more or less inequilaterally ellipsoid, ventral side varying in degree of convex curvature, upper end broadly rounded, lower end slightly pointed,

one-celled, 16-18 μm x 6-8 μm, biguttulate, wall smooth and relatively thick, without appendages.
Material examined: - on intertidal stem and root of *Acanthusilicifolius, Aegicerascorniculaum,Avicennia alba,Avicennia marina,*Avicenniaofficinalis, *Rhizophora apiculata, Rhizophora mucronata* and*Sonneratia alba.*

Distrbution along Indian coast: -East coast: Andhra Pradesh (Sarma and Vittal, 2000); Tamilnadu (Prasannarai and Sridhar, 2001, Nambiar *et al*., 2008). West coast: Karnataka and Goa (Chinnaraj and Untawale, 1992); Gujrat (Borse *et al.,* 2000 and Patil and Borse, 2001); Maharashtra (Borse, 2000b); Kerala (Prasannarai and Sridhar, 2001 and Raveendran and Manimohan, 2007) and Andaman and Nicobar Islands (Chinnaraj and Untawale 1992)

5. ***Leptosphaeriaavicenniae***Kohlm. and E. Kohlm. (Fig.5)
Nava Hedwigia, **9:**98, 1965.

Ascomata: 340-420 μm high, 260-300 μm in diam., pyriform, half immersed, ostiolate, papillate, carbonaceous, black, gregarious, developing in light coloured spots on pneumatophores. Peridium: 28-36 μm thick. Necks: conical, short, ostiolar canal 70 μm in diam., periphysate. Pseudoparaphyses: septate, simple or ramose. Asci: 112-158 μm x 7.5-10 μm, 8 spored, cylindrical, short, pedunculate, bitunicate, thick walled, without apical apparatus, developing at the base of the ascomata venter. Ascomata: 17.5-25 μm x 5.5- 8 μm, uniseriate, ellipsoidal, 3 septate, slightly constricted at the septa, hyaline and covered by a gelatinous sheath 2.5-5 μm thick.

Material examined: - On intertidal stem of *Avicennia marina*.
Distribution in India: -East coast: West Bengal (Shini et.al, 2009-10).

6. ***Savoryellapaucispora*** (Cribb and Cribb) Koch (Fig. 6)
Nordic. J. Bot., **2:** 169, 1982.
*Leptosphaeriapaucispora*Cribb&Cribb, *Univ. Queensl. Pap.Bot*. **4:** 41, 1960.

Ascomata: 86-122 μm diameter, solitary or gregarious, flask shaped immersed or partly immersed, ostiolate, papillate, 68-96 μm long, 40-52 μm in diameter, simple or racemose, periphysateparaphyses not observed. Asci: 82–102 μm x 18-22 μm, two-spored, cylindrical or clavate, with a short foot, thin walled at maturity, persistent. Ascospores: 44-52 μm x 14-16 μm, fusicoid, ellipsoidal, three - septate.

Material examined: -on intertidal wood of *Rhizophora apiculata*.
Distribution in India: -East coast: Orissa and West Bengal (Borse, 2000 a); Tamil Nadu (Nambiar *et al*., 2008). West coast: Maharashtra (Borse, 2000a); Kerala (Raveendran and Manimohan, 2007; Nambiar and Raveendran; 2006); Pondichery and Mahe (Nambiar and Raveendran, 2008); Lakshadweep Islands (Chinnaraj 1992) and Andaman and Nicobar Islands (Chinnaraj 1993).

7. ***Trematosphaerialineolatispora***K.D. Hyde.(Fig.7)
Mycol. Res. **96:** 28, 1992c.

Ascomata: 90-180 μm high, 210-360 μm in diam., conoid to subglobose, immersed, with a flattened base, ostiolate, coriaceous, papillate, as darkened sppts on wood surface, clypeate, solitary gregarious. Necks: upto 150 μm long, 75-100 μm diam. periphysate, brown. Peridium: upto 25 μm thick.Pseudoparaphyses: upto 2-4 μm wide. Asci: 120-204 μm x 14-18 μm, 8 spored, cylindrical subclavatebitunicate, thick walled, pedunculate, Ascospores: 34-48 μm x 7-10 μm, 1-2 seriate, fusiform mostly 5- septate, third cell from the top the largest, cinnamon brown in center with lighter end cells, hyaline when young, surface covered in striation and surrounded by a mucilaginous sheath.

Material examined: - On intertidal stem of Avicenniaofficinalis andSonneratiaalba.
Distribution in India: - East coast: West Bengal (Pawar et al., 2005); West coast: Karnataka (Prasannarai and Sridhar, 1997) and Kerala (Shini et al., 2009-2010).

8. ***Trematosphaeriamangrovei***Kohlm.(Fig.8)
*Mycopathologia and MycolgiaApplicata***34:**1-2, 1968.

Ascomata: 360-440 μm high, 520-610 μm in diameter, ovoid, partially immersed in substratum,solitoary or gregarious, black carbonaceous, ostiolate, periphysate. Hamethecium: filamentous, numerous. Asci: 174-210 μm long, 18-26 μm in diametereihgt-spored, cylinderical, pedunculate, bitunicate and thick-walled. Ascospores: 42-48 μm x 9-12 μmuniserate to biserate with overlapping end cells, dark brown, three-septate, slightly constricted at the septa.
Material examined: - On intertidal wood *Avicenniaalba*.
Distribution in India: -West coast: Mangalore (Sridhar and Prasannarai 1993).

9. *Verruculinaenalia*(Kohlm.) Kohlm. and Volkmann-Kohlm. (Fig.9)
*Mycol. Res.***94:** 689, 1990.
*Didymosphaeriaenalia*Kohlm, *Ber. Destch, Bot. Ges.,***79:** 28, 1966.
Ascomata: 286–494 μm high (including papilla), 265–474 μm in diameter, subglobose, ampulliform or depressed, ellipsoidal, partly or completely immersed, ostiolate, papillate, clypeate, carbonaceous, black, solitary. Peridium: 8–14 μm thick. Papillae: 72-144 μm long, 135-310 μm in diameter (including clypeus), conical, surrounded by blackish brown clypeus, ostiolar canal obturbinate, filled with long delicate, hyaline periphyses; the pore is closed by somewhat thicker, shorter, hyaline hyphae. Pseudoparaphyses: 1.5–2 μm in diameter, septate, rarely branched. Asci: 118–134 μm x 11–14 μm, eight-spored, cylindrical, pedunculate, bitunicate, thick-walled, physoclastic, without apical apparatuses; developes at the base of the ascomata venter. Ascospores: 16-24 μm x 6.5-10 μm, obliquely uniseriate, ellipsoidal, one-septate, constricted at the septum, dark brown, verrucose to verruculose.
Material examined: - on intertidal wood of *Avicennia marina*and*Sonneratiaalba.*
Distribution in India: - East coast: Tamilnadu (Ravikumar and Vittal, 1996 and Nambiar *et al*., 2008); Andhra Pradesh (Sarma and Vittal, 2000). West coast: Maharashtra (Borse, 2000b); Karnataka (Prasannarai and Sridhar, 1997); Kerale (Raveendran and Manimohan, 2007, Nambiar and Raveendran 2006,); Diu (Borse *et al.,* 1999b); Goa (Borse *et al*., 1999a); Daman (Borse *et al.,* 2000); Gujrat (Borse *etal.,* 2000 and Patil and Borse, 2001); Pondichery and Mahe (Nambiar and Raveendran, 2008); Lakshadweep Islands (Chinnaraj 1992) and Andaman and NicobarIslands (Chinnaraj1993).
10. *Alternaria* sp. (Fig.10)
Conidiophores: cylindrical, septate, simple or irregularly branched, straight or curved, basal cell occasionally swollen, smooth, bearing conidia at the unperforated apex, yellowish to brown, singly. Conidia: enteroblastic- tretic, ovoid, obclavate, obpyriform or ellipsoidal, with a basal pore, tapering or not into an apical beak, muriform, constricted at the septa, smooth or rough, olivaceous to brown.
Material examined: - on intertidal stem and root of *Acanthusilicifolius, Aegicerascorniculaum,Avicennia alba,Avicennia marina,*Avicenniaofficinalis, *Rhizophora apiculata, Rhizophora mucronata* and*Sonneratia alba.*
Distribution in India: - East coast: Orissa (Borse and Borse, 2005);West Bengal (Pawar and Borse, 2005). West coast: Karnataka (Prasannarai and Sridhar, 2001; Maria and Sridhar, 2004, Anand and Sridhar, 2003). Kerala (Maria and Sridhar, 2002).
11. *Halenospora varia*(Anastasiou) E.B. G. Jones (Fig.11)
Fungal Diversity, **35:**154, 2009.
*Zalerionvarium*Anastasiou
Can. J. Bot., **41:**1136, 1963 (as *Z. Varia*).
Hyphae: septate, branched, immersed, hyaline, Conidiophores: up to 30 μm long, 2-3 μm in diameter, micronematous, simple, cylindrical, septate, sometimes absent, superficial, hyaline to light olive colored. Conidia: 14-62 μm x 13-44 μm, solitary, irregularly helicoid or coiled in three planes, forming a knot or ball of about 10 to 28 cells.Conidial filament lateral, rarely branched or subtending an additional conidium, thick–walled, smooth, brown to dark brown, appearing black in mass. Cells 6-13 μm x 4-11μm.
Material examined: - on intertidal stem of *Avicenniaofficinalis*and *Acanthusilicifolius.*
Distribution in India: -East coast: Tamilnadu (Raghukumar, 1973 and Nambiar *et al*., 2008); Andhra Pradesh (Sarma and Vittal, 2000); Orissa (Borse and Borse, 2005); West Bengal (Pawar and Borse, 2005). West coast: Maharashtra (Borse, 1984; Shrivastava, 1994); Karnataka (Sridhar and Kaveriappa, 1991); Daman (Borse *et al.,* 2000); Gujarat (Patil and Borse, 2001); Goa (Nandan *et al.,* 1993); Kerala (Prasannarai and Sridhar, 2001, and Nambiar *et al.,* 2006); Lakshadweep Islands (Chinnaraj 1992) and Andaman and Nicobar islands (Chinnaraj 1993).
12. *Hydeapygmea*(Kohlmeyer) Pang and Jones(Fig.12)
*Ber. Disch. Bot. Ges.,***79:** 35, 1966.
Hyphae: 2-4 μm in diameter, septate, ramose, fuscous. Conidiophores: obsolete. Conidia: acrogenous, solitary, helicoid, contorted ½ or 1 time, three or four septate, not or slightly constricted at the septa, fish-shaped or reniform, black or fuscous, fulgent (upper three cells dark, lower two or three cells light-colored); cells increasing in diameter from base to apex distinctly dissimilar, spirals 25-30 μm x 26-32 μm, terminal cell 14-20 μm in diameter, subglobose to reniform, basally flattened basal cells 3-5.5 μm in diameter and central cells irregularly conical

or almost wedge-shaped.
Material examined: on intertidal stem of *Avicennia marina* and*Rhizophora apiculata.*
Distribution in India: East coast: Andhra Pradesh (Sarma and Vittal, 98-99, 2000 and 2001); Tamilnadu (Ravikumar and Vittal, 1996); Orissa (Borse and Borse, 2005); West Bengal (Pawar and Borse, 2005). West coast: Gujarat (Patil and Borse, 2001); Pirotan Islands (Borse, *et al*., 2000); Maharashtra (Borse, 1984; Patil and Borse, 1986); Kerala (Nambiar and Raveendran 2007); Goa (Nandan, *et al.*, 1993), Pondichery and Mahe (Nambiarand Raveendran, 2008); Lakshadweep Islands (Chinnaraj 1992) and Andaman and Nicobar Islands Chinnaraj (1993).

13. *Periconiaprolifica*Anastasiou (Fig.13)
*Nova Headwigia***, 6:** 260, 1963.
Conidiophores: 5-180 µm x 3 µm; cylindrical, septate, simple or branched, hyaline, often forming pustules on the surface of the substrates. Conidiogenous cell: ellipsoidal or ovoid, hyaline, produced acrogenously. Conidia: 6.5-8.5 µm in diameter, one-celled, subglobose or ovoid, smooth, thick-walled, light brown with a reddish or dark brown.
Material examined: -on intertidal stem of*Avicennia marina*and*Rhizophora mucronata.*
Distribution in India: -East coast: Tamilnadu (Raghukumar, 1973); Andhra Pradesh (Sarma and Vittal, 2000); Orissa (Borse and Borse, 2005); West Bengal (Pawar and Borse, 2005). West coast: Maharashtra (Borse, 1984); Goa (Nandan *et al.,* 1993); Karnataka (Prasannarai and Sridhar, 1997); Diu (Borse *et al.,* 1999b); Daman (Borse *et al.,* 2000); Gujarat (Borse *et al.,* 2000 and Patil and Borse, 2001); Kerala (Raveendran and Manimohan, 2007); Pondicherry and Mahe (Nambiar andRaveendran*,* 2008); Lakshadweep Islands (Chinnaraj 1992) and Andaman and Nicobar Islands (Chinnaraj 1993).

14. *Zalerion maritium* (Linder) Anastasiou (Fig. 14)
Can. J. Bot., **41:** 1136, 1963. (as Z*. maritima*)
There are five synonyms to the species (Kohlm. and Kohlm., 1979). Hyphae: 2-4 µm in diameter, septate, branched, hyaline to fuscous. Conidiophores: 10-112 µm x 3-6 µm. macronematous or semimacronematous, slightly increasing in diameter from base to apex, simple or rarely ramose, straight or curved, cylindrical, septate, rarely absent, superficial, light to dark fuscous. Conidia: 19-66 µm in diameter, acrogenous, solitary, blastic, coiled in two or three dimensions, forming 1-5 more or less irregular coils; conidial filament 6-12 µm in diameter and 4–27 septate.
Material examined: - on intertidal wood *Aegiceras corniculaum*.
Distribution in India: -East coast: Tamilnadu (Raghukumar, 1973); Orissa (Borse and Borse, 2005); West Bengal (Pawar and Borse, 2005). West coast: Maharashtra (Borse, 1984, 2000b); Karnataka (Sridhar and Kaveriappa, 1991); Goa (Nandan *et al.,* 1993); Diu (Borse *et al.,* 1999b); Daman (Borse *et al*., 2000); Gujarat (Patil and Borse 2001); Kerala (Prasannarai and Sridhar, 2001) and Lakshadweep Islands (Chinnaraj 1992).

SUMMARY AND CONCLUSION

The results of our investigation 14 species of marine fungi were encountered from Rose Island of Andaman. Out of these nine species belonging to Ascomycetes and five species belonging to Mitosporic fungi.*Halorosellinia**oceanica*and *Alternaria*sp.is very common fungi reported from most of the wood samples in Rose Island of Andaman.

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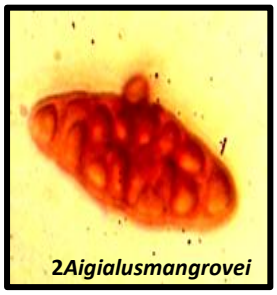
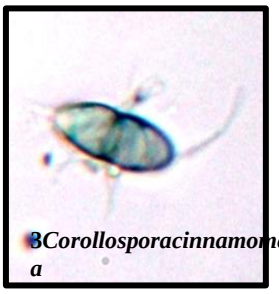
Marine fungi from Rose Island-Andaman


1*Aigialusgrandis*

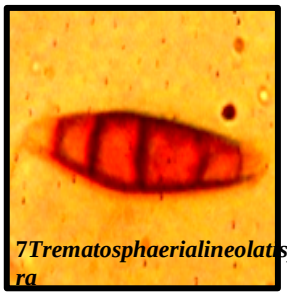

2*Aigialusmangrovei*


3*Corollosporacinnamomea*

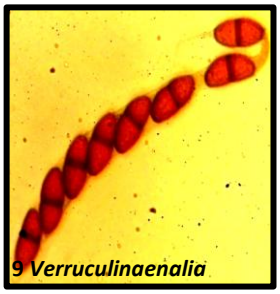

4 *Halorosellinia oceanica*


5*Leptosphaeriaavicenniae*

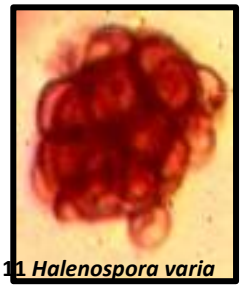

6*Savoryellapaucispora*


7*Trematosphaerialineolatispora*


8*Trematosphaeriamangrovei*


9 *Verruculinaenalia*


10*Alternaria*sp.,


11 *Halenospora varia*


12*Hydeapygmea*


13 *Periconiaprolifica*


14 *Zalerionmaritium*

Detection, isolation and characterisation of etiological agent of yellow sigatoka from Banana field

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ABSTRACT *Banana is one of the commercial crop plants in India. Production and area wise it rank third in Maharashtra. Present study focus on yellow sigatoka caused by Mycosphaerella musicola. Banana leaf samples showing disease symptoms of yellow sigatoka (yellow spots) were collected from villages Balad and Savada district Jalgaon. Results of thin section studies showed infection of fungus. Symptoms of the disease varied in their area, size and intensity of spread among different cultivars.*

Key words: *Banana Field, Mycosphaerella musicola, Etiological agent*

Introduction

Banana is one of the commercial crop plants in India. In the list of top 10 countries of banana production in the world, the rank of India is first next to Mango in both area and production. In India, Maharashtra is ranked in third position. (Database of horticulture board, ministry of agriculture Govt. of India (2013). Banana is one of the leading tropical fruit crops. The nutritional as well as medicinal value of banana is very high and it is affordable fruits to all people.

Leaf spot disease of banana commonly referred as sigatoka diseases, which have caused by three species of *Mycosphaerella.*All species caused necrosis of leaf tissues that lead to defoliation and results in yield loss and premature ripening of the fruits.

In Jalgaon district all the favourable condition are available for the growth and development of banana varieties. Dwarf Cavendish, Basrai, Mahalaxmi, Ambemohor etc**.** are taken for cultivation. It occupies 9% area for cultivation and it contributes near about 26.95%production of the country. Present study focus on yellow sigatoka caused by *Mycosphaerella musicola* (anamorph pseudocercospora musa) belongs to ascomycetous fungus. This fungus was describe as a pathogen of banana in Java in 1902 (Sigatoka Leaf Spot Disease on Banana Laboratory Diagnostics Manual dec 2006).The first major disease epidemic of yellow sigatoka was reported in Fiji in 1913.Diseases symptoms observed on banana leaf at villages Balad and Savada district**.** Jalgaon.

Yellow sigatoka leaf spot occurs throughout the world and is one of the most destructive diseases of banana. The symptoms first appear as small, high yellow spot or streaks parallel to the side vein the leaf, later the spots elongate and turn brown with light gray centres. Such spots soon enlarge further and the tissue around them turns yellow and dies. The adjacent spots coalesce to form large lesions. The pathogen survives in the infected banana leaves and spreads through airborne conidia.

The pathogen continuously produces its reproductive structure because of this reproductive strategy, the disease progress curve in a susceptible host shows exponential growth within a given time interval, provided that the climatic conditions are suitable. These climatic conditions are also affecting or influence the aerobiology of the fungus and the epidemiology of the disease.

Two types of spores are involved in the propagation of yellow Sigatoka, namely, ascospores and conidia (Ambawade 2015),(Herminio souza Rocha et.al 2012). Conidia (asexual spores) are usually produced continuously in environments of high relative humidity. They are disseminated by the washing of the leaf surface by rain or dew, which explains the severe infections sometimes observed in the tiller under more mature plants. However, ascospores (sexual spores), although produced at the same lesions from which conidia were released previously, appear later and are forcibly ejected from pseudothecia, also owing to high relative humidity, and even in dry climates, but owing to greater leaf wetness periods (Simmonds1966). Thus, the density of conidia in the air is related to the intensity of yellow Sigatoka, the decrease

in the incubation periods and symptom generation always associated with variable temperature and relative humidity (Herminio Souza Rocha et.al. 2012)

M. *musicola* attack almost all the commercially cultivated varieties such as Mahalaxmi, Ambemohor, Basrai, Dwarf Cavendish, Red banana, Rasthali. etc. Heavy infestations of this leaf spot disease can leads to a considerable reduction in the photosynthetic leaf areas of the plant and ultimately limiting factor for the production of banana in all over the world.

Materials and Methods:

Banana leaf samples showing disease symptoms of yellow sigatoka (yellow spots) were randomly collected from villages (Balad) and (Savada) of Jalgaon district, Maharashtra (India).

Leaf pieces (approximately 20 to 30 cm) with symptoms of Sigatoka disease were collected, packed in plastic bags, and taken to the laboratory. After arriving at the laboratory, the samples were kept in the refrigerator until examination and pathogen isolation. Leaves with different symptoms (specks, streak, and spot) were collected from plants of different ages, but no adjacent plants were sampled in a field. Leaves from a minimum of 10 symptomatic plants were collected per field.

Sections were done by scalpel blade of Infected lesion of leaves was observed under microscope with lacto phenol cotton blue staining method.

To produce cultures directly from leaf material, three different methods were used. Banana leaves were surface sterilized with 70 % ethanol and lesions were cut from the leaves and lesions were inoculated on PDA media. Leaf impression another method was used. And also the leaf spot were scrubbed and inoculated on PDA media.

Results and discussion

Total 80samples of leaf tissue were examined, and most had typical symptoms of the yellow Sigatoka Elongated streaks, elliptical in shape, and chlorotic areas around the necrotic spots with dark brown borders, gray colour center where regular lines of sporodochia could be seen (Fig. 1.1) During the sample collection from banana field, it was observed that lots of brown to grey coloured spots developed on leaf. Spots can easily recognised by naked eyes. The severity of symptoms among the cultivars indicated their level of susceptibility to the fungal attack.

T.S study showed intensity of infection inside the leaves were totally depends on size, varieties and physical conditions (soil texture, types of irrigation, distance between crops etc.).

Morphological characterization of fungus as follows:

Profuse production of sporodochia on lesions of the infected leaf samples. Sporodochia develops in the substomatal air chamber.Conidiophore grows through the stoma pore in a tuft-like fashion. Number of conidiophores emerges predominantly on the upper surface .Sporodochia become erumpent, guard cells become disrupted and the adjacent epidermis is pushed back. Brown coloured, paler towards the apex, without conidial scars, bottle-shaped with rounded apices conidiophores were observed.

Fungus isolated from samples inoculated on potato dextrose agar plates and incubates at 27^0C. After 72hr. Yellowish, circular with irregular margin and consistency moist colonies were observed. (Ambawade2015)(**Fig.1.2**).Microscopic study of fungus *Mycosphaerella musicola* with cotton blue stain showed Sporodochia and Conidia developed in leaves with conidiophores. (**Fig.1.3)**

Conclusion:

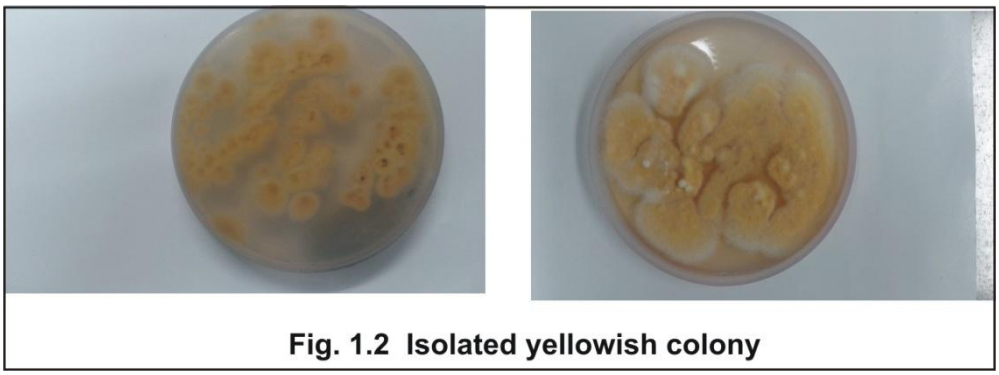

Fig. 1.2 Isolated yellowish colony

In Maharashtra, district Jalgaon is one of the major bananas cultivating area*;* *Mycosphaerella musicola* was successfully isolated from infected leaf spot of banana varieties like Mahalaxmi, Ambemohor, Dwarf Cavendish, and Basrai which is highly susceptible to yellow sigatoka disease. Heavy infections of this leaf spot disease can lead to a considerable reduction in the photosynthetic leaf area of the plant and ultimately it affects the yield of banana production.

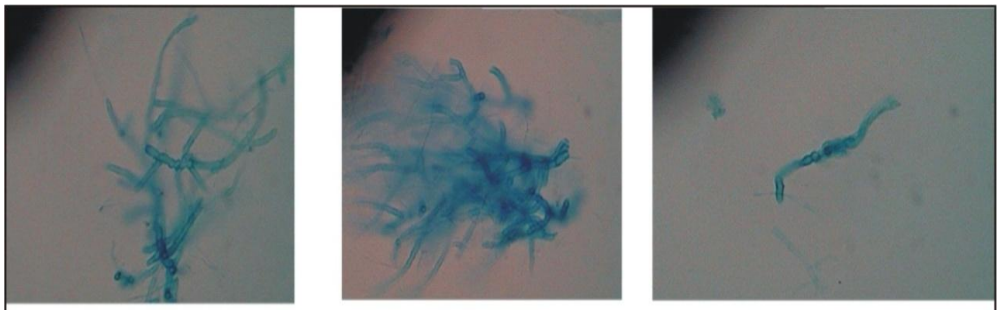

Fig. 1.3 : Microscopic Structure of *Mycosphaerella musicola*

Present investigation is useful to suggest control pathogensity of yellow sigatoka and help the cultivator to increase the banana yield.

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Isolation of Metal Reducing Bacteria

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ABSTRACT *Since, the discovery of the first microbe capable of reducing Cr (VI) in the 1970s) the search for chromate reducing aerobic and anaerobic microorganisms has been enthusiastically pursued with numerous strains being isolated. In the present study P.aeruginosa 4442 was used to exploit metal accumulation and various Cr (VI)detoxification mechanisms involved that includes growth dependent accumulation, growth independent sorption, chromate reduction by P.aeruginosa 4442 under study, localization of enzyme, its quantization, demonstration of plasmid responsible for chromate detoxification, etc.*

The present study focuses on isolation of metal reducing microorganisms from soil.

Introduction

Bioremediation has developed from the laboratory to a fully commercialized technology over the last 30 years in many industrialized countries. Microbial population has often been proposed to be an easy and sensitive indicator of anthropogenic effects on soil ecology. Numerous studies have identified a number of potential bacterial species capable of accumulating metals from aqueous environment. Biological removal processes has been attracting considerable attention for removing heavy metal ions from aqueous wastes and screening for microorganisms having higher potential for removing them from waste-waters. Microbial removal of heavy metal ions offers the advantages of low operating costs, minimizing secondary problems with metal bearing sludge and high efficiency in detoxifying very dilute effluents.

Biosorption, bioprecipitation and metal uptake by purified biopolymers derived from microbial cells provide alternative and additive processes for conventional physical and chemical methods. Intact microbial cells live or dead and their metabolic products can be highly efficient accumulators of both soluble and particulate forms of metals. The cell surfaces of all microorganisms are negatively charged owing to the presence of various anionic structures. This gives the bacteria the ability to bind metal cations.

Since, the discovery of the first microbe capable of reducing Cr (VI) in the 1970s (Romanenko and Korenkov, 1977) the search for chromate reducing aerobic and anaerobic microorganisms has been enthusiastically pursued with numerous strains being isolated. In the present study *P.aeruginosa 4442* was used to exploit metal accumulation and various Cr (VI)detoxification mechanisms involved that includes growth dependent accumulation, growth independent sorption, chromate reduction by *P.aeruginosa 4442* under study, localization of enzyme, its quantization, demonstration of plasmid responsible for chromate detoxification, etc.

Sampling

For isolation of bacterial cultures that can tolerate heavy metals, soil samples (contaminated with effluent) and effluent samples werecollected from effluent contaminated sites from various metals processing, electroplating and automobile industries situated at Chikalthana and Waluj area surrounding Aurangabad city. The soil samples were obtained by collecting the top 2-3 mm superficial sludge with a sterile spatula in sterilized petri dish. These soil samples were then processed by sieving to remove stones and other small particles; it is then ground to obtain fine powder and dried in an oven at 40^0C so as to obtain fine dust of soil. Five different

samples from different industrial sources were collected with acidic and alkaline pH. Effluent samples were collected by submerging sterile glass bottles in effluent tanks /outlets. These samples were then used to isolate microorganisms. For obtaining metal tolerating bacteria these samples served as a good source from where such bacteria can be isolated.

Enrichement

Material and Methods

- Soil sample (1:100) diluted
- Effluent samples
- Luria-Bertani broth

Sterile Luria-Bertani (L. B.) broth with pH 7.0 was inoculated with 1 % (v/v) effluent and soil samples (1:100 diluted). The flasks were incubated on a rotary shaker at 30^0 C at 120 rpm for 48 hrs and growth was observed in terms of turbidity. Three successive cycles of enrichment were carried out.

Isolation of bacteria from soil and effluent samples

Material and Methods

- Enriched soil and effluent samples
- Nutrient agar plates containing nystatin 0.5% (from1% w/v stock solution)

The enriched samples from the third cycle were used for isolation purpose. Isolation was carried out by streaking a loopfull of enriched sample on sterilized nutrient agar plates containing nystatin. Plates were incubated at 30^0 C for 24 hours. After incubation different colonies formed on nutrient agar were studied.

Results and Discussion

Screening of bacterial cultures for metal tolerance

Primary screening

Qualitative screening of bacterial cultures for tolerance to Cr (VI)

Material and Methods

- Isolated 25 bacterial cultures
- Nutrient agar plates containing 5-25ppm of Cr (VI)

All the 25 selected bacterial cultures were used for this analysis. Sterilized nutrient agar plates containing 5, 10, 15, 20 and 25ppm of Cr (VI) were streaked making 4cm streak line of isolated bacterial culture suspension. The plates were incubated for 48 hours at 30^0 C. After incubation growth on streak line was measured.

Results and Discussion

Table1: Bacterial Growth response studies in the presence of Cr (VI)

Bacterial culture number	Concentration of Cr (VI) in ppm				
	5	10	15	20	25
RP-1	+	+	+	+	+
RP-2	+	+	+	+	+
RP-3	+	+	+	+	-
RP-4	+	+	+	+	+
RP-5	+	+	+	+	+
RP-6	+	+	+	+	+
RP-7	+	+	+	-	-
RP-8	+	+	+	+	-
RP-9	+	+	-	-	-
R-P-10	+	-	-	-	-
RP—11	+	+	+	+	-
RP-12	+	+	-	-	-
RP-13	+	+	+	+	-

RP-14	+	+	+	-	-
RP-15	+	+	-	-	-
RP-16	+	+	+	+	-
RP-17	+	+	+	+	+
RP-18	+	-	-	-	-
RP-19	+	+	+	+	-
RP-20	+	+	+	-	-
RP-21	+	+	+	+	-
RP-22	+	-	-	-	-
RP-23	+	+	+	+	-
RP-24	+	-	-	-	-
RP-25	+	+	+	+	-

+ = Good growth - = No growth

From the Table 1 it was observed that after 48 hrs of incubation 21 bacterial cultures showed growth on nutrient agar plates and 4 bacterial cultures RPB-10, RPB-18, RPB-22 and RPB-24 showed no growth on plates containing Cr (VI) above 5ppm. All the 21 cultures showing growth were further used for secondary screening.

Quantitative screening

Material and Methods

- Suspension of selected bacterial cultures
- Nutrient broth containing 25 ppm of Cr (VI)
- Nutrient broth containing 25 ppm of Cr (VI) with pH 3, 5,7,9,11

A) Growth in the presence of Cr (VI) using turbidometric assay at various pH values

To study the ability of bacterial isolates to grow in the presence of Cr (VI), 0.1ml of 24 hrs grown culture of selected bacterial cultures were inoculated in sterile nutrient broth containing 25ppm of Cr (VI) whose pH was adjusted to 3,5,7,9 and 11. After 24 hrs of incubation, bacterial growth in terms of absorbance was studied at 600 nm using spectrophotometer.

B) Growth in presence of Cr (VI) using turbidometric assay at various temperatures

For this experiment selected bacterial culture suspension in the concentration of 0.1% (v/v) were inoculated in sterile nutrient broth and incubated at various incubation temperatures (10,20,30, 40 and 50^0C) and growth in terms of turbidity was recorded at 600 nm.

Results and Discussion

Growth in terms of turbidity by selected 21 bacterial cultures in nutrient broth containing 25ppm of Cr (VI) with 3,5,7,9 and 11pHwere studied. From the arithmetic mean of 3 repilicatescultures RPB-2, 3,4,13,16,17,19,20,21 and 23showed maximum growthat one or both extreme pH. The metal containing effluents generally have extreme acidic or alkaline pH so they are screened for further analysis (Table 3).

These bacterial cultures also showed good growth in terms of turbidity in 25 ppm Cr(VI) at 20 and 30^0C. This optimum temperature range was used for bioremedial work so these 10 bacterial cultures were screened primarily and used further for secondary screening.

Table 2:Effect of pH on growth response in presence of Cr (VI)

Bacterial culture number	Growth in terms of absorbance (600nm)				
	pH values				
	3.0	5.0	7.0	9.0	11.0
RP-1	0.00	1.78	1.11	0.56	0.23
RP-2	0.56	1.66	1.32	0.79	0.98
RP-3	1.58	1.92	1.22	0.99	1.52
RP-4	1.42	1.32	0.98	1.23	1.32
RP-5	0.10	0.40	1.20	0.90	0.12
RP-6	0.11	0.25	1.11	0.56	0.23
RP-7	0.08	0.67	1.45	0.76	0.21
RP-8	0.09	0.93	1.43	0.22	0.32
RP-9	0.08	0.90	1.54	0.56	0.25
RP-11	0.07	0.67	1.32	0.45	0.44
RP-12	0.09	0.89	0.98	0.67	0.25
RP-13	0.07	0.52	0.00	0.89	0.32
RP-14	0.40	0.92	1.23	0.65	0.92
RP-15	0.13	0.54	0.78	0.34	0.10
RP-16	0.10	0.33	0.45	0.79	0.00
RP-17	0.56	1.02	1.11	0.88	0.89
RP-19	0.79	0.98	1.34	1.02	0.98
RP-20	0.48	0.87	1.23	1.23	0.87
RP-21	0.17	0.77	1.45	1.12	0.65
RP-23	0.32	1.34	1.33	1.43	0.87
RP-25	0.34	1.67	1.23	1.07	0.45

Table 3: Effect of temperature (^{0} C) on growth response in presence of Cr (VI)

Bacterial culture number	Growth in terms of absorbance (600nm)				
	Incubation temperature (^{0}C)				
	10	20	30	40	50
RP-1	0.08	0.10	1.11	-	-
RP-2	0.23	0.33	1.23	0.98	0.78
RP-3	0.43	0.87	1.46	0.89	0.99
RP-4	0.21	0.79	0.98	0.98	0.90
RP-5	0.34	0.95	0.99	0.96	0.55
RP-6	0.11	0.32	0.96	0.88	0.23
RP-7	0.21	0.45	0.89	0.89	0.32
RP-8	0.10	0.65	0.96	0.78	0.22
RP-9	0.11	0.32	0.67	0.76	0.41
RP-11	0.12	0.54	0.78	0.80	0.34
RP-12	0.13	0.34	0.67	0.34	0.11
RP-13	0.22	0.67	1.11	1.11	0.98
RP-14	0.15	0.32	1.00	1.00	0.86
RP-15	0.04	0.21	1.70	1.09	0.75
RP-16	0.31	0.45	1.11	1.23	0.98
RP-17	0.12	0.67	1.23	1.00	0.99
RP-19	0.10	0.88	1.43	1.20	0.78
RP-20	0.15	0.78	1.34	1.34	0.96
RP-21	0.21	0.93	1.09	1.11	0.87
RP-23	0.12	0.89	1.20	1.70	0.89
RP-25	0.10	0.98	1.11	1.30	0.90

Secondary screening (Secondary screening)

Material and Methods

- Suspension of 10 selected bacterial cultures (absorbance=0.1at 600nm)
- Stock solution of Cr (VI) -100ppm
- Sterile nutrient broth tubes
- Reagents for estimation of Cr (VI)- Diphenylcarbazide (DPC) method.

For the secondary screening,10 selected bacterial cultures were further analyzed for dry weight, turbidometric growth in presence of 25, 50, 75 and 100 ppm of Cr (VI) and percent sorption of Cr (VI) when grown in presence of 100 ppm of Cr by performing DPC. Flasks containing 100ml of nutrient broth with 25, 50, 75 and 100 ppm of Cr (VI) were inoculated with 1%(v/v absorbance0.1at 600nm) of screened bacterial suspension. Flasks were incubated on a rotary shaker at 100 rpm at 30^{0}C for 72 hrs. After incubation, growth of screened bacteria in the presence of various concentrations of Cr (VI) was observed in terms of turbidity, dry weight and the metabolism dependent accumulation of Cr (VI) was studied in terms of residual Cr (VI) concentration and from it percent Cr (VI) accumulation was calculated.

Results and Discussion

Secondary screening of isolated bacterial cultures indicated that bacterial culture no. RPB-20 showed maximum growth in terms of dry weight in 50ppm Cr (VI) containing medium, it also showed maximum growth in terms of absorbance in nutrient broth containing upto 100ppm of Cr (VI). At the same time, percent sorption of Cr (VI) from theflasks containing 100ppm Cr (VI) as estimated by DPC was found to be 65%. So this bacterial culture was selected for further studies (Table 4)

Table 4: Secondary screening

Bacterial culture number	Growth in terms of absorbance at various Cr (VI) concentrations (ppm)				Dry weight (gm/100ml)	Percent Cr (VI) Sorption
	25	50	75	100		
RPB-2	1.23	0.98	0.68	0.34	0.012	30
RPB-3	1.01	0.67	0.55	0.20	0.010	39
RPB-4	1.13	0.96	0.65	0.11	0.010	45
RPB-13	1.09	0.57	0.34	0.09	0.010	52
RPB-16	1.22	0.91	0.79	0.41	0.014	34
RPB-17	1.07	0.89	0.77	0.12	0.030	46
RPB-19	1.34	0.68	0.51	0.22	0.012	37
RPB-20	1.09	1.05	0.88	**0.43**	**0.033**	**65**
RPB-21	1.55	1.23	1.02	0.28	0.031	55
RPB-23	1.23	1.11	0.99	0.38	0.014	54

From the above results the bacterial culture RPB-20 grown in the presence of 100ppm of Cr (VI) showed maximum growth in terms of turbidity and dry weight showed maximum accumulation ofCr (VI)-65%. This culture was selected for further cultural and biochemical characterization (Table 2.05). **Identification of isolated bacterial cultures**

Introduction

The methods that a microbiologist uses to identify the bacteria to the level of Genus and Species fall into the main categories of morphology (microscopic and macroscopic), bacterial physiology or biochemistry, serological analysis and genetic techniques. Data from a cross section of such tests can produce a unique profile of each bacterium. Final differentiation of any unknown species is accomplished by comparing its profile with characteristic of known bacteria in tables, charts and keys. Many of the identification systems are automated and incorporate computers to process the data and provide a best fit identification. In the present study the screened bacterial cultures were identified using traditional Bergey's Manual and subsequently with BDBBL computerized identification system.

Material and Methods

- Suspension of screened bacteria
- Sterile nutrient agar plates
- Sterile *Pseudomonas* isolation agar M406 plates (Hi-media)
- Standard biochemical media for identification of bacteria as per Bergey's Manual of Determinative Bacteriology

For isolation, the selected bacterial culture were first streaked on sterile nutrient agar plates and then on *Pseudomonas* isolation agar. The plates were incubated at 30^0 C for 48 hrs and the cultural characteristic of isolated bacterial culture wasstudied.

Biochemical characters and BDBBL system

The isolated bacterial cultures werefurther studied by performing standard biochemical tests and physiological tests as described in Bergey's Manual of Determinative Bacteriology. For these tests standard biochemical media to test capacity of bacteria to use proteins, lipids, carbohydrates and different miscellaneous tests were performed. The isolated bacterial culture was further confirmed by BDBBL computerized analysis system.

Results and Discussion

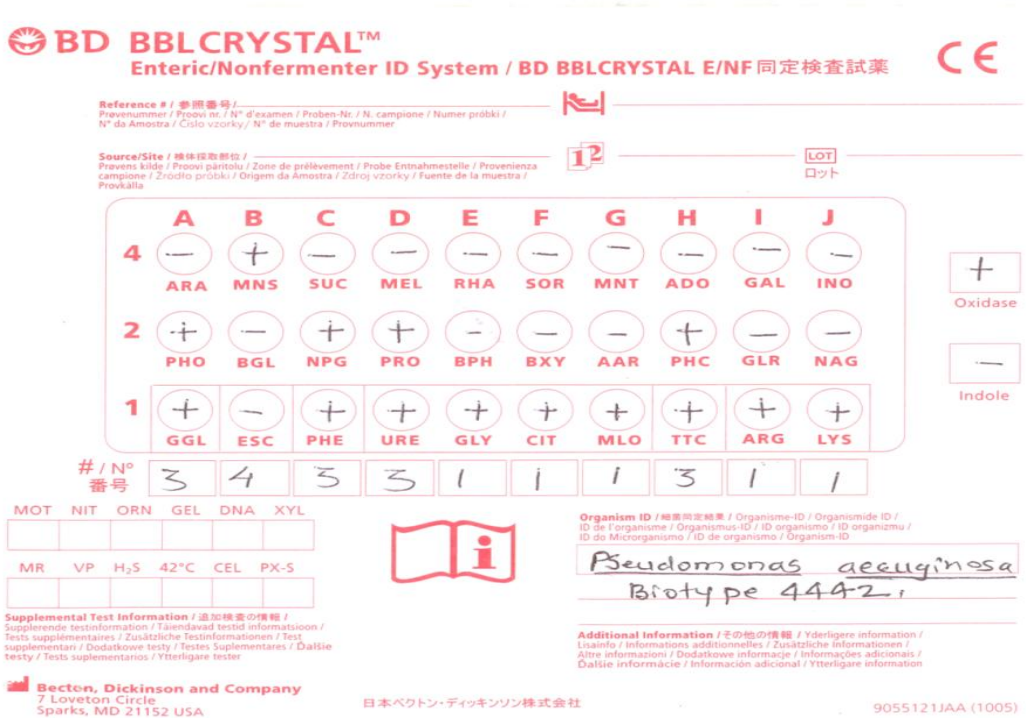
The selected bacterial culture was streaked on sterile nutrient agar and on *Pseudomonas* isolation agar plates showed typical *Pseudomonas* colonies. Biochemical characters (Table 5) indicated that the screened metal tolerant bacterial culture belongs to *Pseudomonas aeruginosa*.

Table 5: Biochemical tests of screened bacterial culture

Biochemical tests	Result	Biochemical tests	Result
Indole	-	Gelatin liquification	-
Methyl Red	+ve	Phenylamine deamination	-
Voges-Proskeur	-ve	Arabinose	+ve
Citrate utilization	+ve	Glucose	+ve
Casein hydrolysis	-	Galactose	-
Starch hydrolysis	-	Lactose	-
Urea hydrolysis	+ve	Maltose	V
Nitrate reduction	+ve	Mannose	V
Nitrite reduction	+ve	Rhamnose	-
H_2S production	+ve	Sucrose	+ve
Catalase test	+ve	Sorbiol	V
Oxidase test	+ve		

+ ve = Positive -ve = Negative V = Variable

Fig 1: BDBBL analysis



The isolated bacterial cultural was analyzed using BDBBL crystal analysis. The results confirmed that the cultural is *P. aeruginosa* 4442

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Medicinal Uses of The Family Euphorbiaceae In Marathwada

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ABSTRACT *The ethnobotanical data obtained from the survey of Marathwada Region of two districts Latur and Beed districts.The present paper reveals some important information regarding the medicinal use of different plant parts belonging to the family Euphorbiaceae. In this study 21 plant species of Euphorbiaceae were found effective in curing some common human diseases. Mode of application of these has been provided in most of the cases. The study highlights how the local practitioners developed the art of treatment through the use of different parts of different plants as drugs and they still use them to cure their diseases.*
KEYWORDS: *Ethnobotanical, Eubhorbiaceae, local practitioners, Marathwada*

The use of plant and plant parts to cure the disease is very old concept in our country, but its execution in our country is new. The ethnobotany expresses the interrelationship between man and the plants in the past and present human societies. The term ethnobotany was first coined by Harshberger (1895) for such studies, he conceptualized ethnobotany as a science. It is an offspring of economic botanist on one hand and anthropologist on the other hand. The present survey highlight, how the biological resources found in the nature are utilized by the primitive people. The tribal people are integral part of the complex web of the plants and animals, as they exploit many plants and animals for their survival. Living close to nature they have developed close relationship with the living organism of their locality. The plants / plant community play an important role in the economic social and cultural life of the tribal. With a view to record a rich knowledge on plant drugs, the present study was undertaken to record the data regarding the drugs of plant origin as used by certain tribal, common people and the medicine men of this area.

MATERIALS AND METHODS

The survey of the area was conducted repeatedly and interviews of the experienced senior local practitioners called vaidhu, common men and medicine men were arranged to know the medicinal use of the plant for their daily requirements. Repeated inquiries on medicinal application of the same plant were made to different persons of Marathwada to ascertain the correctness of the information. The vaidhus studied of different areas are well known to make the different drugs derived from the plants / plant parts to cure the various human diseases. The information regarding the preparation and their application in each case was carefully recorded. Beed district has an area of 10,693Sq.km and forest area is 261Sq.km. and lies between Latitude N 18°28'-19 and Longitude E 74°54;-76°57'while Latur has an area of 7,372 Sq.km with forest area 66 Sq.km. and lies between Latitude 18°05' to 18°07' N and 73° 25' to 77° 25' E longitudes. Its climatic condition is tropical with hot summer followed by heavy rains and dry winter. The winter extends from middle of October to end of March. The coldest month is January in which temperature falls below 70C. The summer is hot, the average temperature ranges from 06-43 C. The average total annual rainfall is about 900 mm out of which nearly 80 per cent is received during rainy season (June to September). The collected plants were identified with the help of local Flora - by Naik(1998); Naik (1980) as far as possible. The doubtful specimens were further verified and their identity are confirmed at ARI, Pune and western Circle of BSI at Pune. Scattered information in the literature were also scrutinized and incorporated in our account of the taxa. Properly mounted specimens are deposited at the Herbarium of the department of Botany Deogiri College, Aurangabad.

RESULTS AND DISCUSSION

Information regarding the medicinal applications of different parts of 24 plant species belonging to family Euphorbiaceae was obtained through the information collected from local practitioners from villages of Marathwada, common people and medicine men belonging to districts Latur and Beed. The information of plant resources has been explored earlier by Naik 1979 & 1998 in his floras. The information are tabulated and confirmed on the basis of personal inquiries made from time to time for the last three years. In most of the cases the medicinal applications of the plants have not been recorded earlier. It is suggested to screen out the medicinal plants recorded to study their active principle and to ascertain their usefulness and application given by the local people, as the information may not be always very authentic. Well known taxonomist of this area Dr V.N.Naik(1998) has published Maharashtratil samanya Vanaushadi was also very much useful during this exploration.. However, it is right time to pay more attention to the plant treasure and to make systematic studies into this almost unexplored territory.

Much emphasis should also be given to the *in-situ* conservation of these medicinal plants. Due to over exploitation, habitat modification and environmental stress, a perceptible change is sometimes noticed in the growth patterns and regeneration strategies of plants. *In-situ* conservation of medicinal plants is highly desired along with their habitats. It is hoped that the information recorded will be helpful to the plant chemists and pharmacologists. The present investigation also covers the medicinal plants distribution and the actual frequency of occurance.

Table 1: Some medicinal plants of the family Euphorbiaceae employed by Local practitioners of Marathwada region.

Sr. No.	Name of Taxa	Local Names	Medicinal application
	***Acalypha indica* Linn.**	Khokali	The paste of the whole plant is applied externally on ulcers, cuts and burns. The decoction of the plant mixed with jaggery is used for cold and cough and also in rheumatic complaints
	Acalypha malabarica Muell.Arg		Purgative property
	Acalypha wilkesiana Muell.Arg		Purgative property
	***Baliospermum montanum*(Willd.) Muell.-Arg.**	Danti, Nakli Jamal Ghota	The decoction of leaves is given at bedtime in the treatment of whooping cough and asthma. The seeds are purgative.
	***Bridelia airyshawli*P.T.Li**	Asan, Katka	Khaja • Bark is useful in rheumatism. The decoction of tender leaves and twigs is administered along with cow milk for rapid calcification of fractured bone.
	***Chrozophora rotleri(Geis)* A. Juss.ex Spreng**	Suryakanti,Pathar phod	Root ashes-is given to children in cold and cough. Seeds are used in Constipation. The plant is used in the treatment of paralysis. Roots used in Tooth ache.
	***Croton bonplandianum* Baill**		Latex is used to cure nail diseases. Leaves are used for sprain in the form of poultice.
	***Emblica officinalis* Gaertn.**	Avla, Amla	The dried fruit is useful in the treatment of diarrhoea, dysentery, jaundice, haemorrhage, asthma, rheumatism, bronchitis and tuberculosis
	***Euphorbia antiquorum* L.**		Latex of the branches is purgative,used in rheumatism, toothache, dropsy and deafness
	***Euphorbia dracunculoides* Lanmk.**	Pisola	Fruits paste applied externally to cure warts. • The seed oil is used externally in the treatment of gout, rheumatism, opthalmea. • The seed oil is externally used for opthalmea and internally for digestive disorder.
	***Euphorbia hirta* Linn.**	Dudhani, Dudhnali	The root is considered as an anti-dote to snake venom. • Whole plant is used for the treatment of jaundice. • The latex of the plant is regarded anti-cancerous.
	***Euphorbia neriifolia* Linn.**		Latex is useful in the treatment of asthma.
	***Euphorbia thymifolia* Linn.**	Chhoti Dudhi	The paste of the leaves is bandaged on wounds for quick healing. The powder of entire plant is an effective medicine in the treatment of gonorrhoea.

			Root and leaves are also antidysentric.
	***Euphorbia pulcherrima* Willd**	Lall Patta	Latex is used as Purgative.
	***Euphorbia tirucalli* L.**	Sher	Latex used in injuries.
	***Jatropha curcas* Linn.**	Mogali erand	Seed oil is a good laxative. The seed oil is also used externally in the treatment of rheumatism.
	***Jatropha gossypifolia* Linn.**		Juice of the leaves is used to cure sores on the tongue of babies. Leaves powder is used as purgative. Latex is beneficially applied externally on burns.
	Jatropha multifida L.	Chini erand	Treatment of Mice and wounds
	***Mallotus philippinensis* Muell-Arg.**	Shendri, Kapila	Powder found on the fruit is used for drying wounds. Fruit Juice along with goat milk is given once daily for three days to lessen the sugar content in urine.
	***Mallotus nudiflorus* (**L.) Kulju & Welzen (*Trewia nudiflora* L.)	Petari	Poultice in gout and rheumatism.
	***Phylanthus maderaspatensis* Linn.**		Leaves are used in headache. Seeds are carminative, diuretic and laxative.
	Phyllanthus acidus(L)Skeels	Rai Awala	Roots purgative Fruits astringent
	Phyllanthus amarus Schumach. & Thonn.	Bhui Awla	Anti-septic,diuretic, treatment of jaundice, diarrhoea, dysentery, wound and ulcers
	***Ricinus communis* Linn.**	Arand, Rendi.	The leaves are used in the treatment of jaundice. A poultice of the root is applied externally in tonsillitis. A poultice of seeds is applied with beneficial result to gouty and rheumatic swellings. Castor oil is highly purgative. Root - externally applied for memory abscesses

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Seasonal Variation of Algae from Bendusara Dam in Beed District of Maharashtra (India)

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ABSTRACT *Bendusara dam is one of the important dam in Beed district of Maharashtra (India), situated 10 Km away from Beed City. The water body of this dam supporting the growth of different species of aquatic fauna and flora including algae. The present study deals with the seasonal variation of algae which conducted for the period of two year during June 2013 to May 2015 .The present investigation reveals that the dam are rich in algal abundance with Chlorophyceae , Charophyceae , Bacilariophyceae , Euglinophyceae and Cyanophyceae. Seasonal Fluctuation in growth of algal flora is quite interesting in decreasing order of seasons like summer, winter and monsoon.*

Key words: *Bendusara dam, seasonal variation and flora*

INTRODUCTION

Bendusara dam is one of the important dam in Beed district of Maharashtra (India) situated 10 Km away from Beed City. It is constructed on Bendusara river originated from Bensur village located at Patoda Tahsil of Beed District. Water of Bendusara dam is used as a drinking and agricultural purpose of Beed city and surrounding villages. Algae are the most widespread and abundant photosynthetic life in aquatic as well as terrestrial ecosystem. It is a diverse group of plant kingdom, comprising large heterogeneous assemblage of autographs. As water is life supporting system each type of water body has their own communities. Fresh water bodies are the habitats where an algae grows abundantly and found in diverse form. Except few reports (Kamat 1962, Ashtekar and Kamat 1978. Ashtekar 1980, Andhale 2009) verey rare attention has been paid towards algal diversity and seasonal variation of fresh water habitats in Marathwada resion. To full fill this lacuna it has been decided to work on seasonal variation of algae form Bendusara dam in Beed district of Maharashtra (India).

MATERIALS AND MATHODS

The present investigation for seasonal variation was carried out form June 2013 to May 2015 on Bendusara dam in Beed district of Maharashtra (India). To study the seasonal variation of algae five sites were selected for the collection of algal samples. Algal samples were collected at monthly intervals in acid washed collection bottles. Floating planktonic, submerged and attached epiphytic algal samples were collected separately in collection bottles. After collection, algal samples were brought immediately in the Laboratory. The fresh as well as preserved algal forms were observed under microscope and indentified with the help of standard literature on algae (Smith 1950, Prescott 1951, Desikachary 1959, Randhawa 1959, Pal *et. al.,* 1962, Ramanathan 1962, Krieger and Gerloff 1965, Philipose 1967, Gonzalves 1981, Inyengar and Desikachary 1981, Sarode and Kamat 1984).

RESULTS AND DISSCUSSION

Algal biodiversity study of Bendusara dam in Beed district of Maharashtra (India). showed interesting seasonal variations throughout the period of investigations. It shows dominance of Chlorophyceae in winter season,whereas Cyanophyceae, Bacillariophyceae, and Euglenophyceae were maximum in summer season. Charophyceae members were recorded in monsoon and summer season (Table 1). Seasonal percentage of algal groups shown in (Fig.1). In present investigation algal flora was found maximum during summer season flowed by winter and monsoon seasons. Philipose (1960) stated that in certain seasons phytoplankton usually tide over the adverse conditions of weather by remaining in the bottom soil, either in the form of resting spores or in some other, when the conditions become favourable, it revert to active vegetative state. Result of present study agreed with the results of Roy (1955). Chakraborty *et. al.,* (1959), Venketswarlu (1969c) Nandan and Patel (1984a), Patil (1995), Jain (2002) and Magar (2008). Kapoczynska (1980) noticed the enhanced growth of algal flora during pre monsoon period.

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Effect of ethyl methane sulphonate and sodium azide mutagens in chlorophyll sectors in M2 generation in chickpea (*Cicer arietinum* L.)

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ABSTRACT *In the present investigation different chlorophyll deficient sectors like xantha, chloroxantha, chlorina, viridis and albino could be detected in the leaflets, totally, partially and at the margins. Both chemical mutagens EMS and SA effectively induced chlorophyll deficient sectors in cultivar BDN 9-3 and PG-5. The frequency of such chimera carrying plants was maximum at the higher concentrations of the two mutagens in both the cultivars of chickpea.*
***Keywords**: chlorophyll chimeras, chemical mutagen, chickpea.*

Introduction:

Chickpea (*Cicer arietinum* L.) is one of important crops of India, because they require relatively low water for their cultivation which is crucial factor for increasing agricultural production in India's dry lands which constitute more than 75% of the total cropped area of the country.

The chickpea has great nutritional value its seeds and leaves have assumed a good amount of importance. The seeds of chickpea are mostly used as a main dish, side dish or mixed with various vegetables. Seed can roast or fried and are used whole as snack foods. In India, such roasted seeds are best known as "time pass" chana. The green seeds are starchier and are mostly used for eating.

Chickpea contains about 361 calories/100gm; 20.6% crude protein, 2.2% fat; 61.2 % carbohydrates; 190 mg/100gm ca; 9.8 mg/100gm Fe; 280mg/100gm P; 0.30 mg/100gm vitamin B1; 0.51mg/100gm vitamin B2 and 2.6mg/100gm niacin (Aykroyd and Doughty, 1964). These are the substances which have the ability to inhibit the proteolytic activity of certain enzymes. They have been found throughout the plant kingdom, particularly among pulses (Liencer and Kakade, 1980; Gupta, 1987).

Material and methods:

In present investigation two different chickpea has practiced for mutation breeding programme. The seed material of chickpea namely, BDN9-3 and PG-5 obtained from Agricultural Research Station Badnapur, Dist: Jalna (Maharashtra) and MPKV, Rahuri, Dist: A. Nagar (Maharashtra) India, respectively.

The two chemical mutagens namely Ethyl methane sulphonate (EMS) and Sodium Azide (SA) were employed in the present investigation. The chemical mutagenic treatments carried out room temperature of 25± 2o C. the fresh aqueous solutions of mutagens were prepared prior to their treatments. The concentration of solutions was 0.05%, 0.10% and 0.15% for EMS and 0.01%, 0.02% and 0.03% for SA. For each treatment, 200 seeds were used among them 150 seeds of each treatment were sown in field following randomized block design (RBD) with three replications of 15 cm between the plants and 45 cm between the rows. Different type of chlorophyll chimeras were recorded till the plants attained maturity.

Result:

Chlorophyll chimeras were observed in majority of the mutagenic treatments in both the cultivars. The different types of chlorophyll deficient sectors observed were yellow, light green, and yellowish green. All these sectors were found to be affecting the leaflets totally, partially and at the margins.

Both EMS and SA effectively induced chlorophyll deficient sectors in the cultivar BDN 9-3 and Pg-5 treatment showed 4%, 8% and 11% sectorial plants in the BDN 9-3 at 0.05%, 0.10% and 0.15% concentration, respectively, and 3%, 9% and 10% frequency of sectorial plants could be noted in PG-5 at 0.05, 0.10% and 0.15% concentration, respectively.

SA mutagenic treatments in BDN 9-3 showed 3%, 6% and 9% frequency values at 0.01%, 0.02% and 0.03% concentrations, respectively; while in PG-5 the values were 2%, 8% and 11% at 0.01%, 0.02% and 0.03% concentration, respectively.

Discussion:

The EMS and SA mutagenic treatments induced chlorophyll chimeras in both the cultivars of chickpea. The frequency of such chlorophyll chimeras was maximum at higher concentrations of all the mutagens in both the cultivars of chickpea.

Stadler (1930) was the first to observe that mutations induced by seed irradiation appeared in the form of sectors in the M1 plants. Anderson *et.al,* (1949) demonstrated that the analysis of mutated sectors can greatly help in tracing the ontogeny of organs in the M1 plants. Caldecott and Smith (1952) and Gaul (1961) reported the occurrence of mutated sectors in barley. The occurrence of chlorophyll deficient leaf spots in leguminous plants was reported by Kaplan (1954) and Zacharias (1956) in Glycine, Rayyan (1995) in blackgram, Gaikwad (2002) in lentil and Kulthe (2003) in winged bean.

According to Gaul (1958), the chlorophyll chimeras arise due to differential response of the embryonic cells. As a consequence, the induced changes are not exhibited in the entire plant but would acquire the form of chimeric structure. This view was further supported by Goud (1967) based on his studies in bread wheat.

It was believed that the chlorophyll chimeric plants could be produced by mutated multicellular embryo. The chlorophyll chimeric nature is believed to be non heritable (Mackey 1954, Sjodin 1962, Swaminathan 1963 and Rammana and Natarajan 1965). The chimeric plants did not breed true in the M2 generation. This suggests that the chimeric areas occur due to alteration in the DNA of the chloroplast as proposed by Ehrenberg and Nybom (1954) and Swaminathan (1962). According to Freese (1963) there is a possibility that the M1 chloroplast streaks may be due to alkylation of the chloroplast DNA.

Madhava Rao (1982) reported maximum number of chlorophyll deficient sectors from alternate and sequential treatments in green gram. He observed that mutagenic treatments and alternate generations' treatments were most effective as regards chlorophyll deficient sectors. Chary (1983) recorded higher frequency of chlorophyll deficient sectors after chemical mutagenic treatments than gamma rays and magnetic field treatments. He stated that among all chemical mutagens, EMS was most effective mutagen.

Table 1: Effects of mutagens on frequency of chlorophyll chimeras in M1 generation of chickpea. **Variety: BDN 9-3.**

Treatment	Concentration %	chlorophyll chimeras %	±SE
Control	-	-	-
EMS	0.05	04	0.63
	0.10	08	0.57
	0.15	11	0.66
SA	0.01	03	0.72
	0.02	06	0.69
	0.03	09	0.77

Table 2: Effects of mutagens on frequency of chlorophyll chimeras in M1 generation of chickpea. **Variety: PG-5.**

Treatment	Concentration %	chlorophyll chimeras %	±SE
Control	-	-	-
EMS	0.05	03	0.37
	0.10	09	0.49
	0.15	10	0.54
SA	0.01	02	0.51
	0.02	08	0.60
	0.03	11	0.57

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The relation between pH andradial growth &sclerotia formation of *Sclerotiumrolfsii* causing root rot in chilli

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ABSTRACT *The chilli rot is one of the most destructivediseases caused by Sclerotiumrolfsii in fields. The pathogen is well known. The mycelial growth and sclerotia production of Sclerotiumrolfsii is influenced by many factors including pH. The influence of different pH levels on growth and production of sclerotia was studied by poisoning food technique.In the present studied citrate-phosphate buffer solution with pH values ranging from 3.0, 3.5, 4.0, 4.5, 5.0, .5.5, 6.0, 6.5 and 7.0 were used. The total and average radial growth observed after every 24 hours interval and recorded. The lowest radial growth 55.00mm was at recorded at 7.0 pH. Among all pH levels the highest radial growth were found as 88.33mm on both 4.5 & 5.0 pH levels.*

Key words-*Sclerotiumrolfsii, pH, Scleroia, Radial mycelial growth.*

Introduction:

Vegetables crop can be infected by more than many pathogens and among all these the soil borne pathogen *Sclerotoiumrolfsii* causing root rot in thatchilli are gaining more importance as they responsible for heavy yield losses. The *Sclerotiumrolfsii*is a soil borne plant pathogen causing root rot, stem rot, collar rot, wilt and foot rot diseases on more than 500 plant species of agriculture and horticultural crops throughout the world (Aycock, 1966).Thepathogen is one of the most destructive and common pathogens of chilli crop causing root rot disease in fields, the local growers suffered a lot every year.The environmental factor such as incubation periods, temperature and pH etc not only influences the growth and sporulation of pathogens (Mishra and Hoque, 1962; Mathur and Sorbhoy, 1976; Sharma and Kaushal, 1979; Khan and quazi, 2010). The sclerotia can germinate mycolo-genically forming mycelial which again form sclerotiadepending upon the environmental and nutritional status of the substratum (Aycock, 1966).The disease caused by *Sclerotiumrolfsii* commonly known as seedling blight, foot rot, collar rot, root rot and southern blight of many crops (Talukder, 1974, Chowdhury, 1946; Ahmed, 1986).The mycelial growth and sclerotia production of this fungus is influence by many factors including pH.On this back ground the present work was undertaken to study the influence of culture pH (hydrogen ion concentration) on the mycelial growth and sclerotia production of *Sclerotiumrolfsii*sacc.

Material and Methods:

The influence of different pH levels on growth and production of sclerotia was studied by poisoning food technique (Dhingra and Sinclair 1985). Growth variation at different pH levels / the influence of different pH levels on the growth of the pathogenic fungus *Sclerotiumrolfsii* was studied. The nine different pH levels studied from 3.0 to 7.0 were adjusted to the pH potato dextrose agar medium. This was done before autoclaving with help of buffers i.e. Citrate-Phosphate buffer by using the pH paper. These pH adjusted medium were poured into petriplates, inoculated and incubated for 72 hours for growth variation studies and fifteen days for sclerotia production/ formation studies. The growth of mycelium recorded after every 24 hours till 72 hours.

In the present Citrate-Phosphate buffer solution with pH values ranging from 3.0, 3.5, 4.0, 4.5, 5.0, 5.5, 6.0, 6.5 and 7.0 were taken in 100ml conical flask. The 4-5 days old culture grown in potato dextrose agar medium was cut by (flame) sterilized 4mm cork borer. The inoculated pertiplates were kept in the incubator for 72 hours for observe radial growth and sclerotia formation till fifteen days.

Result and Discussion:

In the present result an attempt for study has been made to understand the influence of pH revealed gave detailed information about radial growth and formation of scerotia of *Sclerotiumrolfsii*. The *Scerotiumrolfsii* growth was measured over a pH range 3.0 to 7.0 (at 0.5 intervals distance) levels. The low radial growth of pathogen recorded at 7.0 pH level 55mm

(average value) followed by at 3.0 pH level and 3.5 pH level with 70.4mm and 71.33mm (average values) respectively. The radial growth was found at 7.0, which was statically different from all pH levels (Sarker, B.C & et al. 2013). Radial growth at pH level 3.0, 3.5, 6.0, 6.5 was statically similar with little radial growth differencesthat are 70.4, 71.33, 78.00 & 78.25 values are (average of total three replicates). In all the pH levels the highest radial growth were found at pH 4.5 & 5.0 about same 88.33mm (values are average of triplicates). The wide range of pH with optimum near 6.0 for the growth of various isolates of *Sclerotiumrolfsii* have been reported by Aycock, (1966), Narasimhan (1969), Sharma and Kaushal (1979) &Punja (1985).

(Decreasing pH levels) →7.0<6.5<5.5<5.0=4.5>4.0>3.5>3.0 ←(increasing pH levels)

(Increasing growth) → 55<78.00<78.25<80.71 <88.33=88.33> 80.60>71.33>72.02 ← (increasing growth)

The intensity of sclerotial was slowly affected by increases or decreases the pH level (Ansari and Agnihotri, 2000; Misra and Haque 1962).

These result of mycelial growth in present study, agree with the findings of Richharia (1984), who has reported that pH at 5.0 was the optimum for myceilal growth of *Scerotiumrolfsii*. The mycelium growth of *Sclerotiumrolfsii* was highest at pH range 4.7. In the present experiment the optimum pH range for radial growth were 4.5 to 5.0.

Conclusion:

The influence of pH onmycelial growth and production of sclerotia of *Sclerotiumrolfsii* of *Sclerotiumrolfsii* causing root rot in vegetables has been show from results. The *Sclerotiumrolfsii* is a soil born plant pathogen of worldwide importance with avery extensive host range including more than 500 plant species that is why the physical factor like pH studies helps us to improve control management. The result gave conclusion that maximum radial growth of *Sclerotiumrolfsii* were found at 4.5 and 5.0 pH with 88.33mm mycelia growth. The least radial growth founded 7.0 pH with 55mm and 3.0 with 70.2mm after 72 hours of incubation periods.

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Ethanobotanical Study Of Ocimum Sanctum

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ABSTRACT *Ethano words refer to people, culture, aesthetic, language, knowledge and practice. Botany refers for study of plants. These two words collectively known as ethanobotany. Herbal medicine being used by about 80% people of world population. In India 4, 86548 registered practitioners, 7843 incensed manufactures, 9380 pharmacies, 23028 dispensaries and 482 colleges supports the traditional system of medicine. In ancient India ayurveda, siddha, and unani physicians were also pharmacist. They prepared drugs from collecting plants forest and local area. Ayurveda systematically documented 700 species sidha 500 and unani 400 plant species.*

Ocimum sanctum plant commonly known as tulsi. It is most sacred plant in India. These plant used as medicine from ancient period Charak samhita, Rigveda record gives its medicinal values. Tulsi plant recommended for hundred of serious disorders. These plant considered highly sacred, worth, worshiping and hence it given name sacred tulsi or holy basil in India. It consist essential oil, phenolic constituent like eugeno, thymol. It used in fever, cold respiratory disorder, mouth infection, insect bite, tooth problem, headache, eye disorder and many other diseases.
Key words- ethano, ayurveda, siddha,unani, rigveda, charak samitha etc.

INTRODUCTION-

The term ethanobotany first coined by Harshberger in 1895. It defined as total natural or traditional relationship and interaction between man and his surrounding plant wealth. The history of development of ethanobotany is as old as human civilization but the scientific evaluation of the subject is very recent. Ethano refer to people, culture, aesthetic, language, knowledge and practice Botany refer to study of plants.

Herbal medicines being used by 805 people of world's population. The chemical constituent's presents in part of physiological function of living flora believed to better compatibility with human body. In Africa upto 805 population used traditional medicine, China 40%, Australia 70%, Canada 42% and USA 38%. In India over 4, 86548 registered practitioners, 7843 incensed manufactures, 9380 pharmacies, 23028 dispensaries and 482 colleges supports the traditional system of medicine. In ancient India ayurveda siddha, and unani physicians were also pharmacist. They prepared drugs from collecting plants forest and local area. Ayurveda systematically documented 700 species sidha 500 and unani 400 plant species.

Botanical data shows 45000 vascular plants in India about 90% plants used in medicine. We see tremendous development in the field of allopathy during 20th century still traditional plant medicine is one major source during modern as well as traditional system of medicine throughout the world. India has over 3000 year old medicinal heritage based on herbs. India is sitting on gold mine of recorded and traditionally well practiced. Knowledge of herbal medicine ayurveda literally means the science of life. In presumed that fundamental and applied principles of ayurveda got organized and enunciated around 1500B.C. Indian medicine the number of botanical named enlisted from each medicinal system is like as Ayurveda(2559), Siddha (2267),Unani(1049), Homeopathy(460),Folk(6403) and Sowa-Riga (671).

After India gained independence from the British rule in 1947 the movement for reveal of traditional system of medicine gained momentum and it got official recognition and become a part of nation health care network system. Tulsi is most sacred plant in India Hindus grows tulsi and have at least one living tulsi plant. Tulsi has long history of medicinal useoldest ancient ayurvedic text Charak samhita (6000 BC) and Rigveda (5000BC). Tulsi is Indian's greatest healing herb. It used hundreds of serious disorders and recommended as daily prophylactic to prevent diseases. It is also holy plant belong to labiateae family. Due to its many fold curative uses the plant is considered as highly sacred, worth, worshipping and hence it was known as sacred tulsi or hoily basil in India. Tulsi leaves contains eugenol, eugenal, methyl chavicol,

limatrol, It also contains benzaldehyde, cubenol, linalool, vatiamin A,C, calcium phospers, zinic, iorn, chlergeni acid, linoelic acid, oleic acid like many chemical substances.

COLLECTION OF DATA-

Plant medicinal properties and uses of tulsi plant collected from Jalna district of Maharashtra state. For collection of data questionnaires, face to face visiting of traditional practitioners and common peoples taken. Jalna district is situated at the centre of Maharashtra state and north direction of Marathwada region. District lays 19.1N to21.3N latitudes and 75.4 E to 76.4E longitude. Jalna district was Nizam state part after Marathwada Mukti Sangram became part of India as tahsil of Aurangabad. On 01st May 1981 it became separate district of Maharashtra state. Jalna district consist Jalna, Jafrabad, Bhokardan, Mantha, Partur, Badnapur, Ambad and Ghansawangi tashil. Jalna district adjust east Parbhani and Buldhana on west Aurangabad district. Jalgaon district on north and Beed district on south side. District covers 7,612 sq.kms total geographical areas which is 2.47% of total state area.

Botanically tulsi plant having two types green type Sri Tulsi or Rama tulsi and other purple type Krishna tulsi Shayam tulsi. Tulsi plant is erect, hairy, branched, annual or biannual found in all over India. Plant is herb or shrub leaves are simple opposite stem is square flowers are whorled show spiked inflorescences. Following table shows medicinal uses of tulsi plant.

SR. NO.	DISORDER	PART USED	METHOD
01	Fever and Cold	leaves	In malaria, dengue fever tea used also cardamom power used.
02	Sore throat	leaves	Boiled water with leaves used
03	Respiratory	leaves	In bronchitis, asthma, influenza cough and cold leaves extract with honey and ginger used. In influenza decoction of leaves, clove and salt used
04	Healing power	leaves	For boost memory power and strength of stomach used.
05	Teeth disorder	Dried leaves	It used in pyorrhea like disorder powder used brushing tooth.
06	Kidney stone	leaves	Juice of leaves and honey taken 5-6 months.
07	Heart disorder	leaves	For disease level of blood cholesterol
08	Stress	leaves	Prevent tress by chewing leaves twice in day it also purify blood.
09	Children aliments	leaves	Leaves with saffron taken in chicken pox Juice used in diarrhea and vomiting.
10	Mouth infection	leaves	Leaves used in mouth ulcer.
11	Insects bite	Leaves, roots	Leaves juice taken and fresh roots pest effective in insects and leeches bites.
12	Skin disorder	leaves	Treatment of ringworm and other skin problem juice taken
13	Headaches	Dried leaves	Powered leaves with sandal wood paste applied on head
14	Eye disorder	leaves	Leaves juice drops used in night blindness.
15	Post delivery pain relief	seeds	Seeds soaked overnight and crushed well administered with sugar used
16	Urinary system abnormalities	leaves	Power with lemon juice cures it.
17	Immunomodulatory activity	leaves	Aqueous extract help RBC,WBC and hemoglobin production and also enhanced production of activity
18	Hepatic protective activity	leaves	Alcoholic leaves extract used.
19	Chronic inflammation	seed	Seed oil inhibits acute as well as chronic inflammation.
20	Pains relive of stress	seed	Seed ground with cumin seed and sugar taken with milk help relive pains caused by stone in bladder and burning sensation while passing urine.

OBJECTIVES-

- To focus the medicinal properties of ocimum sanctum.
- To give knowledge of ethanobotanical study.
- To increase the herbal medicine value by these information.
- To preserve the traditional and cultural knowledge.

CONCULSION-

Tulsi used for treatment of various diseases throughout of world since binging of civilization. Plant also shows antibacterial prosperities. It reduces radiation damage. It is also antiviral and antifungal prosperities. It helps for human in physical, emotional, chemical and infectious, stresses function to normal healthy state. Extract of plant used as anti diabetic, antioxidant, anti stress. So future it used significant remedy regarding nuro psychological problems for the welfare and service of human kind. It not recognized as religious plant but recognized as human server plant.

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Soil Algal Flora Of Sugarcane Field

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ABSTRACT *Soil algae constitute an important group of soil microflora. Ecologically soil algae are significant and plays a crucial role in soil fertility. To study algal flora of cultivated field, sugarcane (Saccharum officinarum L.) field located in Khultabad tehsil area of Aurangabad district of Maharashtra has been selected. Algal samples from moist places of sugarcane field were collected at regular interval from November 2012 to December2013.Bold`s basal medium was also used to culture algae from soil of sugarcane field. Algal samples were observed thoroughly under research microscope and identified with the help of standard literature on algae. A total of 57 species under 31genera belonged to Chlorophyceae, Xanthophyceae, Bacillariophyceae and Cyanophyceae were identified and recorded.Cyanophyceae algae were found dominant .Algal forms Gloeocystis, Trebouxia, Chlorella, Nitzschia, Chroococcus, Gloeothece, Aphanothece, Myxosarcina, Oscillatoria, Phormodium,Lyngbya,Microcoleus,Nostoc,Plectonema and Scytonema were found dominant. Physicochemical analysis of sugarcane field soil was performed by selecting important physicochemical parameters such as pH, electrical conductivity, organic carbon, available nitrogen, available phosphorus and available potassium. Soil of sugarcane field was found to harbor algal flora.*

***Key words**: Algal flora, sugarcane field and physicochemical parameters.*

INTRODUCTION

Soil algae are important group of soil microflora. Certaain soil algae, especially heterocystous Cyanophycean algae fixes atmospheric nitrogen and increases fertility of soil. Distribution and diversity of soil algae in different crop fields such as paddey, banana, wheat and brinjal has been well studied(Bongale and Bharati 1980,Santra 1983,Chaporkar and Gangawane 1984, Kolte and Goyal 1985,Kottawar and Pachpande1986,Nayak *et.al*. 2001,Patil and Chaugule 2004,Auti and Pingle 2006 and Nimbhore and Jadhav 2014). A rare attention has been paid towards algal flora of sugarcane field. Therefore it has been decided to work systematically on algal flora of sugarcane (*Saccharum officinarum L.)* field soil.

MATERIALS AND METHODS

A sugarcane field located in Khultabad tehsil area of Aurangabad district of Maharashra has been selected to study soil algal flora. Algal samples from moist places of selected sugarcane field were collected at regular intervals from November 2012 to December2013. Algal samples were collected in sterilized collection bottles. The sun dried soil samples collected from same sugarcane field were examined for their algal components by petriplate culture method by using agarized Bold`s basal medium (Bold 1942).Collected and culture algal samples were observed thoroughly under research microscope and identified with the help of literature on algae. In order to know the fertility status of selected wheat field, analysis of soil was performed for certain selected physicochemical parameters such as, pH, electrical conductivity, organic carbon, available nitrogen, available phosphorus and available potassium (Trivedy *et.al*. 1998).

RESULTS AND DISCUSSION

A total of 57 species under 31 genera of algae belonged to Chlorophyceae, Xanthophyceae, Bacillariophyceae and Cyanophyceae were identified and recorded from collected and cultured algal samples of sugarcane field. Of these 10 species under 9 genera belonged to Chlorophyceae, 2 species under 2 genera belonged to Xanthophyceae, 4 species under 4 genera belonged to Bacillariophyceae and 41 species under 16 genera belonged to Cyanophyceae (Table - 1) Cyanophyceaen algae were found dominant. Dominance of Cyanophycean algae from soil of different crop fields have been observed by Bongale and Bharati(1994), Kottawar and Pachpande(1986), Auti and Pingle (2006), Jadhav (2010) and Nimbhore and Jadhav 2014).

Algal taxa of *Gloeocystis, Trebouxia, Chlorella, Nitzschia, Chroococcus, Aphanothece, Oscillatoria, Phormodium,Lyngbya,Microcoleus,Nostoc,Plectonema* and *Scytonema* were found abundant. One of the important feature of present study is that occurrence of Xanthophyceae members i.e. *Protosiphon botryoids* and *Vaucharia geminata*, These algal members are unique in soil algal flora.Prasad(2005) reported *Vaucheria sissilis* from wheat field of Nepal. Unicellular, colonial and filamentous algae were recorded. Filamentous algal taxa were found in maximum number.

Physicochemical analysis of soil reveals fertility status of soil. The overall fertility status of selected sugarcane field was moderate alkali(8.17), normal electrical conductivity (0.53 m mhos/cm), moderate organic carbon (0.56%), moderate available nitrogen (420.00 kg/hectare),moderate available phosphorus (36.14kg/hectare) and very high available potassium (415.64 kg/hectare) (Table 2). Moderate alkaline nature of soil favours growth of Cyanophycean algae. Normal electrical conductivity is good for algal growth. Moderate organic carbon also supports growth of algae. Soil rich in nitrogen, phosphorus and potassium encourages growth of algal flora. Similar kinds of observation were made by Nimbhore and Jadhav 2014.

Hence, it is concluded that algal flora of sugarcane field is rich and is found in diverse form. Occurence of Xanthophyceae members such as *Protosiphon botryoids* and *Vaucheria geminata* is a unique feature. Cyanophyceae algal taxa are found dominant. A positive correlation among algal flora composition and physicochemical analysis of soil were observed.

Table 1: Algal taxa recorded from soil of Sugarcane field.

Chlorophyceae

Gloeocystis gigas, Gloeocystis major, Stichococcus subtilis, Oedogonium sp.*, Chlorococcum humicola, Trebouxia humicola, Characium debaryanum, Tetrahedron minimum, Chlorella vulgaris, Selenastrum westii.*

Xanthophyceae

Protosiphon botryoides, Vaucheria geminata.

Bacillariophyceae

Achanthes sp.*, Navicula hustedtii, Pinnulara* sp. *Nitzshia palea.*

Cyanophyceae

Chroococcus minor, Chroococcus minutus, Chroococcus turgidus, Gloeocapsa rupestris, Gloeothece palea, Aphanothece nidulans, Aphanothece saxicola, Synechococcus aeruginosus, Chlorogloea fritschii, Myxosarcina burmensis, Arthrospira platentensis, Spirulina giganta, Oscillatoria acuta, Oscillateria acuminata, Oscillatoria animalis, Oscillatoria obscura, Oscillatoria subbrevis, Phormidium abronema, Phormidium africanum, Phormidium bohneri, Phormidium molle, Phormidium subincrustatum, Phormidium usterii, Lyngabya balcum, Lyngbya hieronymussi, Lyngbya major, Lyngbya majuscula, Microcoleus acutissimus, Microcoleus lacustris, Microcoleus sociatus, Microcoleus subtoralosus, Nostoc linckia, Nostoc muscorum, Nostoc piscinale, Nostoc punctiformae, Plectonema gracillimum, Plectonema radiosum, Scytonema bohneri, Scytonema schmidtii

Table 2: Physicochemical analysis of Sugarcane field Soil.

Sr. No.	Physicochemical paramter	Observation	Fertility status
1	pH	8.17	Moderate alkali
2	Electrical conductivity	0.53	Normal
3	Oganic Carbon (%)	0.56	Moderate
4	Avilable Nitrogen (Kg/ hectare)	420.00	Moderate
5	Avilable Phosphorous (Kg/ hectare)	36.14	Moderate
6	Avilable Potassium (Kg/ hectare)	415.64	Very high

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Diversity of Fungal Endophytes On *Ocimum Sanctum*l

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ABSTRACT *Endophytes found ubiquitous in all plant species and helps host plant in survival. They are source of development of many natural potential products. During present study altogether 30 samples of O. Sanctum were collected from different locations of Aurangabad City. total 15 fungal species were isolated and Aspergillus, Alternaria, Cladosporium, Fusarium species are dominated. The aim of study is recognize the role and quantitative Biodiversity of Endophytes.*
Keywords: *Endophytes, Ocimum Sanctum L., Diversity.*

INTRODUCTION

Endophytes are important group of fungi that colonise in living internal tissue of plant without any discrinible features of their presence.Endophytes show mutualistic association with host plant. Infected plant is benefited by exhibiting increased resistance to other pathogens and improve growth and competitive ability.

O. sanctum is medicinal herbknown for its medicinal uses. Hence based on prior literature that endophytes of medicinal plants are the potential source of bio active molecules. It was demmed worth while to isolated endophytes from O. sanctum. It is also reported that O. sanctum exhibited antibacterial and antifugal activity against various pathogens. This study was undertaken to throw a light on the diversity and abundance of fungal endophytic species to reveal the characteristics distribution with reference to host plant.

Materials and method

A preliminary survey of habitat of O. sanctum in local and wild habitat was made to arise the availability of different types of tulsi and sample was collected from each habitat. Leaf ,stem and roots are throughly washed after which plant parts were sterelized and placed on PDA and streptomycin was used to suppress bacterial growth. Mass culture and fungal isolates were identified on the basis of morphological features like Colour of colony, texture of colony and sporalation phase. Standard identification mannuals were used for proper identification of endosymbiont.

NAME OF PLANT	LOCATION	PLANT PART	NO. OF SAMPLES INOCULATED	NO. OF POSITIVE SAMPLES	NAME OF ENDOPHYTE	FREQUENCY
O. sanctum	Mahada colony	leaf	06	02	Aspergillus Aspergillus	33%
		Root	12	03	Fusarium Fusarium fusarium	25%
		stem	12	04	Aspergillus Fusarium Aspergillus fusarium	33%
	Bhagya nagar	Leaf	06	01	Aspergillus	16%
		Root	12	03	Aspergillus Fusarium Aspergillus	25%
		stem	12	02	Aspergillus Aspergillus	16%
	Shakti nagar	Leaf	06	01	Aspergillus	16%

		Root	12	03	Aspergillus Aspergillus Cladosporium	25%
		stem	12	03	Aspergillus Fusarium cladosporium	25%
	Ladgaon	Leaf	12	01	Aspergillus	8.3%
		Root	12	02	Aspergillus aspergillus	16%
		Stem	12	02	Cladosporium Cladosporium	16%

Result

Healthy plant of O. sanctum was chosen for sampling from 4 different locations. Leaf ,stem and root tissue of plant were evaluated for isolation of endophytes. More number of endophytes were found on root and stem as compared to leaf tissue.these results were correlated with previous findings of Robin sharma and B. S. Vijay kumar (A .P. INDIA) (YEAR) On this study there was fine occurrence of different type of endophytic fungus on PDA media Gurupavithra and Jaychitra (2013)

DISCUSSION

In the present study O. sanctum species were taken for isolation of endophytes. It was found that a total (27) endophytes were isolated from leaf (5) , root (11) and stem (11) respectively. On the basis of cultural characteristics on PDA , 3 species of fungi were most dominant there results were correlated with previous work and findings.Thus we conclude that medicinal plants provide positive environment for many endophytes. Many previous researchers reported endophytic fungi help the host plant and develop mutualistic relationship and having level of high biodiversity and produce novel natural compounds which is currently attracting scientific investigation worldwide. This study is also helpful to understand the host- endophyte relationship at macro and micro level and also helps to optimize the plant growth.

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Anatomical and Pharmacognostic studies of *Oxalis corniculata* L. and *Oxalis rechardiana* Babu. (Oxalidaceae)

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ABSTRACT *The present study has been carried out on two medicinally important species of Oxalis viz. O. corniculata L. and O. rechardiana Babu.(family Oxalidaceae). O.corniculata is a small, appressed at nodes, stem creeping and rooting at nodes, leaves are rich in oxalic acid and are used as an Ayurvedic medicine, It is commonly called as Ambushi. Where as O. rechardiana is a glabrous Perennial herb with underground scaly bulb, leaves on 10-20 cm long petioles.*

To standardize and differentiate the species anatomical features such as root and stem vessels, anatomy of nodes, petioles and leaves and dermatological parameters were screened. In addition to these parameters the species were screened phytochemically for major chemical groups such as volatile oil, starch ,proteins tannin, saponins, fats, glucosides and alkaloids.

By compairing the above parameters both the species have unique combination of charaters. They can be standardised easily on the basis of combination of above characters.

Keywords *– Phytochemical analysis, Anatomy, Oxalidaceae, Oxalis*

Introduction :

Oxalis conriculata L. and *Oxalis richardiana* Babu are medicinal plants belonging to the family oxalidaceae. *O. coraiculata* is commonly called as Indian sorrel (Ambushi) is rich in oxalic acid, both the plats are anthelmintic, inflammatory, astringent, diuretic, stomachic, it is used in the treatment of influenza, fever, urinary tract infections, diarrhea and poisonous snake bites. The *O. corniculata* plant is a good source of vitamin c and the juice is applied to insect bites burns and skin eruption. It has an antibacterial activity.

The role of anatomical and phytochemical analysis is very much important for identification and diagnostic feature of drug.

The present study has been carried out to standardize the anatomical features of root and stem vessels, nodal anatomy, petiole anatomy, leaf anatomy and leaf epidermis and phytochemical analysis to serve as a possible tool for identification of *oxalis corniculata* and *oxalis richardiana*.

Materials and Methods :

Anatomical studies :

For the present study fresh plants were collected and authenticated using flora of Marathwada. The fresh samples of leaf, petiole, node were preserved in 70% alcohol.

For the study of vessels, fragments of plant organs especially stem at nodal region and root were macerated using a mixture of 10% nitric and (HNO_3) and 10% potassium dichromate ($K_2Cr_20_7$) solution in equal proportion vessel elements were in stained in 1% aqueous safranin and 1% light green dehydrated and mounted in canada balsam, some vessel members were also examined in glycerin.

Transections of nodes, petioles and leaf lamina were taken by free land method fresh material were used for nodal anatomy the peels for epidermal studies were taken from fresh material, epidermal peels were stained in 1% safranin and mounted in glycerin and made semi permanent slides.

The microphotographs were taken by using microscope and digital camera.

Phytochemical Studies :

For phytochemical analysis plants are subjected to various test according to Johanson (1940) and Gurr (1965).

Observation table of Anatomical studies :

Oxalis coraiculata	*Oxalis richardiana*
1**) Root and stem vessels** a) Lateral wall thickening simple pitled b) perforation plate simple	1**) Root and stem vessels** a) lateral wall thickening scaleriform and simple pitted b) Perforation plated simple
2) **Node** – Unilacunar one traced	2) **Node** - absent
3**) Petiole** – flat	3**) Petiole** – circular with median groove
4) **Leaf-** Leaves are dorsiventral and amphistomatic vasacular bundle is solitary xylem facing upwards.	4) **Leaf** – Leaves are dorsiventral and hypostomatic vascular bundle is solitary xylem facing upwards.
5) **Epidermal studies** - i) Upper epidermal cells are some what wavy in outline stomata are anomocytic type. ii) Lower epidermis – The cells of lower epidermis are more sinuous than upper epidermis stomata are anomocytic type more in number than upper epidermis.	5) **Epidermal studies**- i) Upper epidermal the cells of upper epidermis are straight in outline, stomata absent ii) Lower epidermis The cells of lower epidermis are wavy in outline stomata are anomocytic type.

Observation Table of Physiochemical analysis:

Test	Root		Stem	Petiole	Leaf	
	Oxalis corniculata	***Oxalis richardiana***	***Oxalis corniculata***	***Oxalis richardiana***	***Oxalis corniculata***	***Oxalis richardiana***
Starch	absent	absent	absent	absent	absent	absent
Proteins	present	present	present	absent	absent	absent
Tannins	Absent	absent	absent	absent	absent	absent
Saponin	Absent	absent	absent	absent	absent	absent
Fats	Absent	absent	absent	absent	present	present
Glycosides	Absent	absent	absent	absent	absent	absent
Alkaloids	Present	present	present	present	present	present

Conclusion :

In the traditional system of medicine Ayurveda and unani uses majority of the crude drugs that are of plant origin, its is necessary that standards have to be laid down to control and check the identify of the plant and its quality before use.

Oxalis cornicalata and *Oxalis rechardiana* were used as traditional medicines. From the present study it is concluded that both the plants show same phytochemical content but are quite different in their anatomical characters.

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Application of Root Zone Technology : Alternative Approach for Traditional Wastewater Treatment Technology.

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ABSTRACT *Root zone technology for domestic sewage treatment has been proven to be effective and sustainable alternative for conventional wastewater treatment technology. Increasing urbanization and human activities exploit and affect the quality and quantity of the water resources which has been resulted in to pollution of the precious fresh water bodies. On one hand consumption of water has increased tremendously and another hand the matter of sewage treatment become difficult. Due to high cost of infrastructure, investment, continual replacement and ongoing operation cost of conventional wastewater treatment plants (Sewage treatment Plant i.e. S.T.P. and Common Effluent Treatment Plant i.e. C.E.T.P). Thus there is a critical global need for alternative, environment friendly, cost-effective, long-term wastewater treatment technology and which also approaches to deliver public health and environmental protection.*

The Root Zone Treatment System (RZTS) also known as the Reed Bed System or Constructed Wetland System is a sealed filter bed consisting of a sand / gravel/ soil system, occasionally with a cohesive element, planted with vegetation that can grow in wetlands. After removal of coarse and floating material, the wastewater passes through the filter bed where biodegradation of the wastewater takes place. The functional mechanisms in the soil matrix that are responsible for the mineralization of biodegradable matter are characterized by complex physical, chemical and biological processes, which result from the combined effects of the filter bed material, wetland plants, micro-organisms and wastewater. Root zone technology is a solution to the modern world's water pollution problem. Present study is a review article based on the research carried over the said topic. Case study of Aurangabad domastic sewage is giong on by using Phragmites australis plant species.

Key words: *Root Zone Treatment System, wastewater treatment, reed bed, micro-organisms, biodegradation, Urbanization.*

Introduction:

Now a day's most of the water bodies are extremely polluted by anthropogenic activities as well as discharge of untreated sewage. Major water bodies are polluted by direct discharge of domestic sewage. The domestic sewage contains a large variety of organic and inorganic impurities and also includes of bacteria, pathogens, and viruses which can cause waterborne diseases. Every community produces both liquid and solid wastes in day to day life. The water supply of the community results into wastewater after it has been fouled by a variety of uses (Metcalf and Eddy, 1991). "Root Zone" is a scientific term used to cover all the biological activities among different types of microbes, the roots of plants, water, soil and the sun. It consists planted filter-beds containing gravel, sand and soil. The Root Zone Treatment System utilizes nature's way of biologically processing domestic and industrial effluents. The Root Zone wastewater treatment system makes use of biological and physical-treatment processes to remove pollutants from wastewater. Due to its natural process, there is no need to add any input such as chemicals, mechanical pumps or external energy.

Constructed wetland (CW) is a biological wastewater treatment technology designed to imitate processes found in natural wetland ecosystems. The basic mechanism of organic matter degradation in constructed wetlands is plant bacterial symbiotic reactions, in which gaseous oxygen photosynthetically produced or taken up for respiration by the plant is used by aerobic and facultative bacteria (Polprasert et al., 1998).

Types of Root Zone Treatment System /Constructed Wetland System.

Surface Flow System: Surface flow wetlands consist of shallow basins partially filled with soil, peat or any other media that will support plant roots. Surface Flow Wetlands generally have a soil bottom, emergent vegetation, and a water surface above the substrate. Surface flow

systems with such flows are considered based on constructing of long narrow and shallow canal with planted wetland plants. The waste water inlet is at one end of the canals and the effluent outlet is at the opposite end. The wastewater treatment is carried out by both aerobic and anaerobic microorganisms present as epiphytes on the above ground part of the shoot and dead plants. The water which enters the wetland contains particulate and dissolved pollutants and spreads out over the large area of shallow water with emergent or submerged vegetation. Settlable organics are rapidly removed through the deposition and filtration process. Suspended microbial growth and their attachments are responsible for the removal of soluble organics. Surface wetlands are very effective in removing suspended solids through filtration and sedimentation (Kadlec and Knight, 1996).

Subsurface Horizontal Flow System:

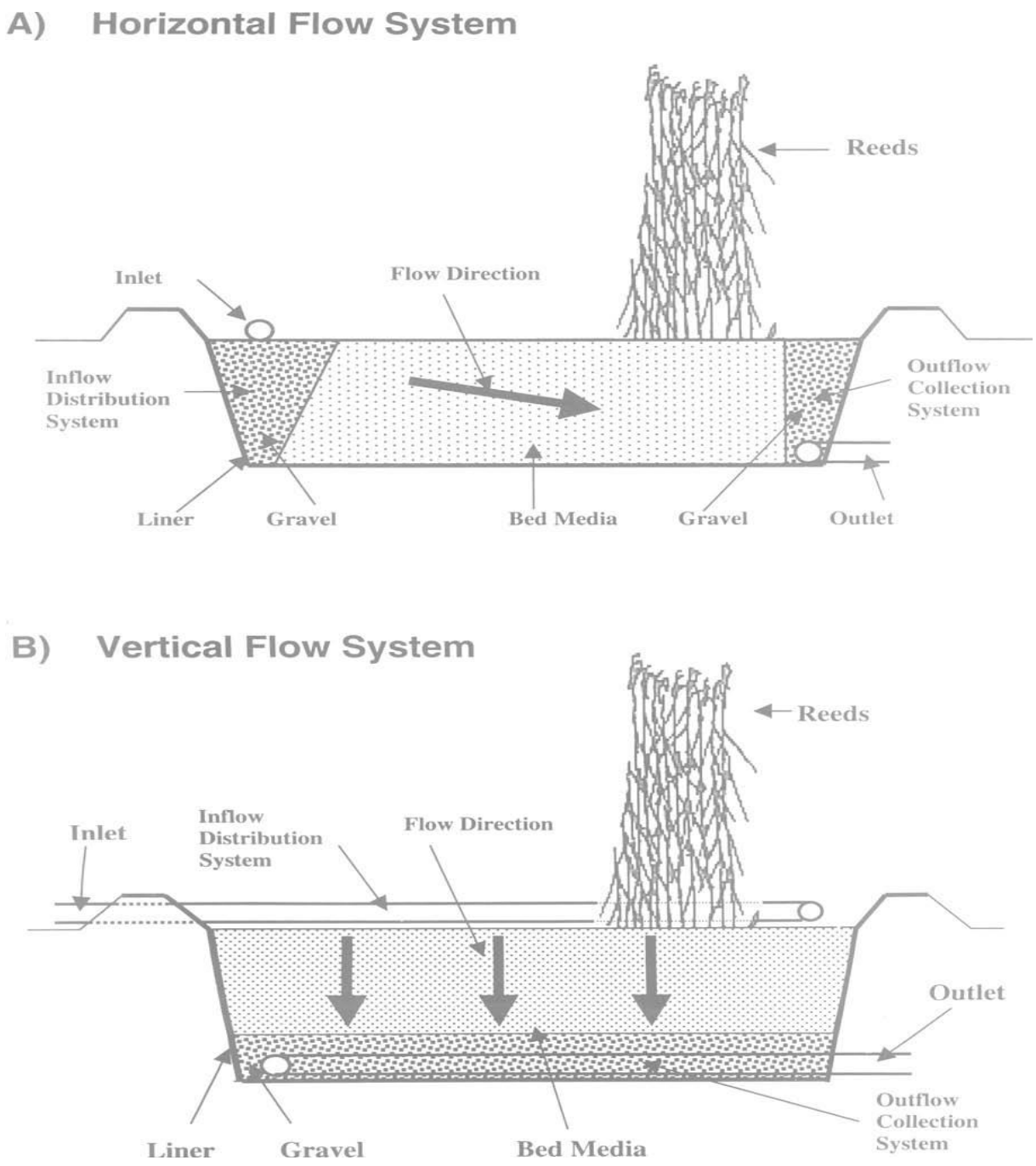
These systems are constructed in the form of rectangular lagoons, planted mostly with reeds (Phragmites australis), with the walls covered with some impermeable membrane. The role of reed plant in wastewater treatment is to support the process by its underground part of the root zone. Oxygen from atmosphere is transported through the hollow reed stem to the root zone, from where it partly penetrates to the microzone around the root (the rhisosphere) populated with aerobic microorganisms that decompose organic matter. Also the root and the rhizome by their growth create macropores in the soil and thus maintain its hydraulic conductivity (H. Brix 1994).

Following list of plant species can be use for treatment of various types of wastewater :

Phragmites australis (Reed)
Phragmites karka (Reed)
Arundo donax (Mediteranean reed),
Typha latifolia (Cattail)
Typha angustifolia (Cattail)
Juncus (Bulrush), Iris pseudacorus
Schoenoplectus lacustris (Bulrush) (CPCB 2003).

Plant selection Phragmites australis :

The selection of plant species on the basis of their pollutant absorption and removal capacity from the wastewater. Csilla T., et al (2005) reported that the constructed wetland is a near-natural wastewater treatment technique, where reed (*Phragmites australis*) is an important component. The high rate of small residential settlements (less than 2000 Population Equivalent (PE) Hungary suggests the consideration of cost-effective, locally operating wastewater treating methods. Vegetation is the principal component of a wetland system. The common plants in wetlands are common reed (*Phragmites* spp.), cattail (*Typha* spp.), rush (*Juncus* spp.), and bulrush (*Scirpus* spp.). However, the most common plant species used worldwide for treatment of wastewater is *Phagmites australis* (Cav.) Trin. ex Steud. (IWA, 2000; Scholz, 2006).



Conceptual diagrams of Root zone Treatment Systems (CPCB 2003)

Variety of wastewater treatment by Root Zone Treatment System /Constructed Wetland System:

Constructed wetlands (CWs) can be used for primary, secondary and tertiary treatment of municipal or domestic wastewaters, storm water, agricultural and industrial wastewaters such as landfill leachate, petrochemicals, food wastes, pulp and paper and mining, usually combined with an adequate pre-treatment (Kadlec et al., 2000). Although they are widely used for municipal wastewater, the application to industrial wastewater has to be carefully analyzed since its composition is frequently highly variable and the treatment needs are not the same. However, the use of CWs for the treatment of industrial wastewaters has increased over the past ten years (Korkusuz, 2005). Constructed wetlands (CWs) are a low–cost technology which has been used to treat various types of wastewaters for more than thirty years (Vymazal, 2010 Hunt et al., 2003).

Pollutant and nutrients removal mechanism:

Aquatic plants or macrophytes of wetlands require nutrients for their growth and reproduction and they can uptake nutrients (macro or micro-nutrients) through roots during their

active growing stage, and these nutrients are translocated to the rhizomes (Mitsch and Gosselink, 1993).

Volatilization, adsorption and plant uptake play much less important role in nitrogen removal in HF CWs (Cooper et al., 1996; Vymazal et al., 1998; Vymazal,1999). Anaerobic degradation of organic compounds is much slower than aerobic degradation. However, when oxygen is limiting at high organic loadings, anaerobic degradation will predominate (Cooper et al., 1996). The major removal mechanism of nitrogen in constructed wetlands is nitrification/ denitrification (Vymazal, 1999). Cooper et al. (1996) pointed out that ammonifying bacteria also degrade organic compounds containing nitrogen under aerobic conditions. Both bacterial groups consume organics but the faster metabolic rate of the heterotrophs means that they are mainly responsible for the reduction in the BOD_5 of the system.

Conclusion:

The ultimate goal of wastewater management is the protection of the environment**.** Root zone technology / Constructed wetland system are reliable treatment alternative which can be applied to all types of wastewater including sewage, industrial, agricultural wastewater and storm water runoff. There are many advantages for the Root zone treatment/ Constructed wetland technology having high removal capacity, simple construction, low investment costs, low maintenance and operation costs, and simple operation and maintenance. Root zone treatment/Constructed wetlands with horizontal sub-surface flow are a viable alternative for wastewater treatment for small sources of pollution especially when organics and suspended solids are the treatment target.

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A Preliminary Study On Airborne Algae Of Lonar Crater

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ABSTRACT *For the first time, by using petriplate exposure method, aerophycological experiments were carried out in order to study airborne algae from the atmosphere of World famous Lonar crater. The experiments were conducted for six months from December 2015 to May 2016. A total of 15 samples were obtained during study tenure. 16 airborne algal taxa under 11 genera belonging to Chlorophyceae, Bacillariophyceae and Cyanophyceae were cultured, identified and recorded. Cyanophycean algal taxa dominated the algal flora of Lonar crater. Among Cyanophyceae, Phormidium and Plectonema were dominant. Gloeocystis gigas and Gloeocystis major were dominant among Chlorophyceae. Bacillariophyceae was represented by Pinnularia and Nitzschia palea.*

***Key words**: Air borne algae, Lonar crater*

INTRODUCTION

Lonar crater lake is a natural water body, situated in Buldana district of Maharashtra. It is the biggest meteorite impact crater in the World with natural alkaline water habitat. For the first time, by using agarized petriplate exposure method, aerophycological experiments were carried out in order to study airborne algae from the atmosphere of Lonar crater lake. Airborne algae is one of the important biocomponent of atmosphere, which remains viable in the form of spores and filaments.

MATERIALS AND METHODS

In order to study the presence of airborne algae in the atmosphere of Lonar crater lake, agarized petriplates were exposed on the top of Lonar crater. The air samples were collected by using petriplates containing agarized Bold`s basal medium. The duration of exposure was normally of two hours. The experiments were conducted for six months from December 2015 to May 2016. A total of 15 samples were obtained during study period.

RESULTS AND DISCUSSION

Presence of algal spores and filaments in the atmosphere has been known since long time (Overeem,1937; Ramalingam, 1971 and Ramalingam and parshwanath 1979). During present investigation 15 air samples were obtained. Algal taxa belonging to Chlorophyceae, Bacillariophyceae and Cyanophyceae were cultured, identified and recorded. 16 species of airborne algae under 11 genera were isolated and cultured from the atmosphere of Lonar crater, of these 5 species under 4 genera belonged to Chlorophyceae, 2 species under 2 genera belonged to Bacillariophyceae and 9 species under 6 genera belonged to Cyanophyceae (Table 1). Cyanophycean algal taxa were found in the atmosphere of Lonar crater, it is an conformity with the earlier reports (Balkrishnan and Gunale,1980; Jadhav and Chavan, 2007, Jadhav and Quazi, 2010 and Patil and Patil, 2014).

Air borne algal taxa which were found dominant during present study are *Gloeocystis gigas, Gloeocystis major, Chlorella vulgaris, Nitzschia palea, Aphanothece nidulans, Phormidium jenkelianum*, *Phormidium molle* and *Plectonema gracillimum*. Hence it is concluded that atmosphere of Lonar crater contains variety of airborne algal spores and filament.The present work is significant in environmental biology.

Table 1: Airborne algae cultured from the atmosphere of Lonar crater.

Chlorophyceae *Gloeocystis gigas*, *Gloeocystis major,Tetraspora gelatinosa, Chlorella vulgaris, Ankistrodesmus falcatus.* **Bacillariophyceae** *Pinnularia* sp., *Nitzschia palea.* **Cyanophyceae** *Chroococcus minor, Aphanothece nidulans, Aphanothece saxicola, Oscillatoria sp. Phormidium angustissimum,Phormidium jenkelianum, Phormidium Molle, Nostoc muscorum, Plectonema gracillimum*

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Green remedies for the treatment of Kidney stones in Aurangabad (M.S).

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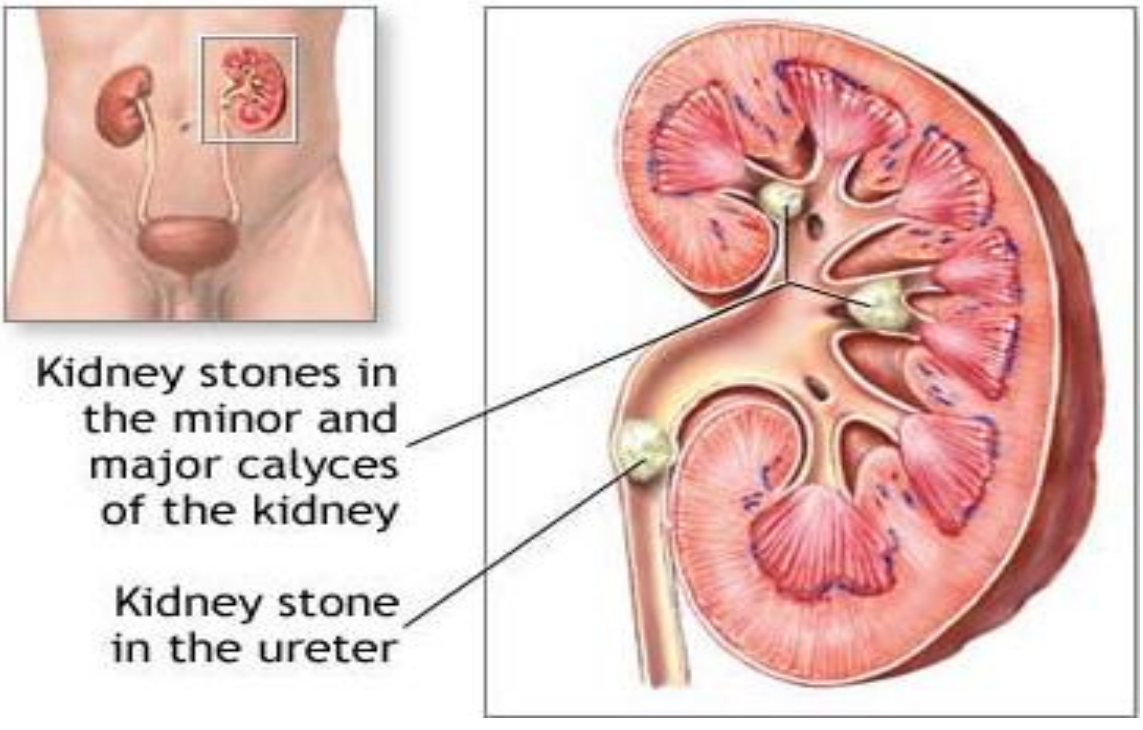
ABSTRACT *Plants have been the major source of therapeutic agents for curing the human diseases. Tribals as well as the rural people depend for all their medicinal and other necessities on the surrounding plant wealth. The urinary bladder or kidney stone has posed a challenge to the medicinal world. The disease is found occurring in both young and old persons. Even the advanced method and technology for the treatment of urinary calculi is available in the Allopathic system of medicine, it has own limitation as in some cases, several side effects as even periodical reoccurrence of stones in a few. The alternative system of medicine which usually employs natural sources-green medicine with a minimum or no side effects. During the ethnobotanical survey of plants from Aurangabad region, a few medicinal plants used in the treatment of kidney stones have been recorded which are discussed in this paper.*

Key words :- *Therapeutic agents, kidney stones, Allopathic system, Aurangabad region.*

Introduction:-

Kidney acts as a filter for blood, removing waste products from the body and helping to regulate the levels of chemicals which are important for body functions. The urine drains from the kidney into the bladder through a narrow tube called the ureter. When the bladder fills and there is an urge to urinate, the bladder empties through the urethra, a much wider tube than the ureter.

In some people, the urine chemicals crystallize and form the beginning, or a nidus of a kidney stone. These stones are very tiny when they form, smaller than a grain of sand but gradually they can grow to a quarter inch or larger. The size of the stone doesn't matter as much as where it is located.



When the stone sits in the kidney, it rarely causes problems, but when it fall into the ureter, it acts like a dam. Kidney continues to function and make urine, which backs up behind the stone, stretching the kidney. This pressure build up causes the pain of a kidney stone but it also helps to push the stone along the course of the ureter. When the stone enters the bladder, the obstruction in the ureter is relieved and the symptoms of kidney stone are resolved.

Perusal of literature revealed that though a lot of work has been done on the medicinal plants (Chopra *et al.,* 1956, 1965; Dastur, 1962, Dey, 1980, Jain, 1996; Kirtikar and Basu, 1935, Natesh and Mohan Ram, 1999 Sivarajan and Indira Balachandran, 1994). Naik (1998) has attempted the study of medicinal plants of Marathwada. Naser (2002), Naser and Vaikos(2005) has described some plants for human diseases. No account on this aspect pertaining to Aurangabad is available. The present study has been undertaken with the aim of recording of various plants used for treatment of kidney stones by the tribals and non tribals.

Study area:-

Aurangabad district, a soul of Marathwada region, from the part of Maharashtra state. It is situated in the upper Godavari basin to the extreme north west of the Marathwada. In general, the district slops down towards the south and southeast. The district lies, between the parallels of 19^{o} 20' and 20^{o} 40' 10'' north and between 70^{o} 40' and 75^{o} 50' east. The general elevation above the sea level varies between 665 and 735 meters on the north and between 565 and 635 metres towards south. Aurangabad a major district of Marathwada on Deccan plateau, has 440 sq. km forest cover, that is almost 4.35 percentage of the districts total area. The agriculture occupies considerable land. Inhabitants in these areas particularly the rural and tribal people still dwell in and depend on the agricultural and remaining piece of surrounding forests for their needs like shelter, food, fuel, fodder, medicine, animal treatment and farm implements.

The tribal people and ethnic races have developed their own cultures customs, religions rites, legends and myth, folk tales, songs, food and medicinal practices. Many wild and cultivated plants play a very important and vital role among these cultures and these relationships have evolved over generations of experience and practices. The modern civilization which is penetrating into most of the region of the district still holds primitive societies. The consequent divorcement of aboriginal people from dependence upon their vegetal environment for the necessities of life has been set in motion resulting in the disintegration of knowledge of plants and their properties. There appears a steady decline in human expertise capable of recognizing the medicinal plants.

During the study period from December 2008 to July, 2009 several botanical tours have been conducted in various areas of the district in different seasons. Emphasis has been given to visit the area where more and diverse tribal belts and rural people inhabiting different villages are studied.

(MAPS OF INDIA, MAHARAHTRA, AURANGABAD)

Materials and methods:-

The methodology of collection of voucher specimens, their preservation in herbaria and technique for the collection of ethnomedicinal information is adopted for the study as recommended by Jain (1989).

During this investigation, ethano-medico botanical data was gathered by interviewing tribals, Bhagats (Tribal vaidyas) Vaidyas, Hakims, village men, even farmers, milkman, senior citizens, knowledgeable man and practitioners. The information was verified by repeated enquiries in different areas of the district. The plants were identified with the help of related literature. The voucher specimen are collected. These specimens are preserved and made into

herbarium specimens by conventional method, giving suitable voucher specimen numbers and deposited in the herbaria of Department of Botany, Maulana Azad College, Aurangabad.

The data collected on a particular ailment or species were verified by discussing about these aspects with other tribal facilities. This helped to document quite reliable information not only on the species but also dosages. During the dialogues, care was taken not to contradict with the informants on any point.

Preservation of data:-

While writing the text, plants were mentioned alphabetically followed by family within parenthesis and vernacular name or local name, voucher specimen number. Followed by the utility of plants for kidney treatment and method of administered doses are narrated.

Biophytum sensitivum. (L.)Dc. (Oxalidaceae), Lajalu, Jharera MACH0057

- Decoction of root is given 3 times a day for removal of kidney stone (Lithiasis).
- Fresh leaves decoction is taken in morning and evening.

Bombax ceiba *L (Salmalia malabaricum Dc.) (*Bombacaceae)*,* Kate sawar MACH0059

- Dry fruit is used in the form of extract or powder before breakfast daily.
- Bark powder 5gms 3 times a day is useful for urination.

Butea monosperma *(Lamk.) Taub.* (Fabaceae), Palas, MACH0063

- Leaves juice or decoction is useful as per requirement.
- Takes seed powder in one teaspoon after meals

Celastrus paniculata Willd. (Celastraceae), Mal kanguni, MACH0087

- Fresh leaves crushed and mixed with curd, gives before breakfast-no intake except water up to 3pm.
- Releases stone in the form of powder.

Celosia argentea L. Var. *argentea* L.Sp. (Amaranthaceae), Kurdu, MACH0088

- Root decoction if taken in morning gives good results.
- Seed powder taken in a gap of 4 hours, gives very good results.

Crateva adansonii Dc.Subsp. odora(Buch. Ham.) (Capparaceae), Waiwarna MACH0301

- Bark is used in the form of powder or decoction-before breakfast.

Drimia indica (Roxb.)Jessop. *(Urginea indica)* (Roxb.) (Liliaceae), Jungli piyaz. MACH0302

- Bulb extract is useful in morning before breakfast.

Hemidesmus indicus (l.) (Periplocaceae), Anant mul. MACH0167

- Gives root powder daily morning, afternoon and evening.
- Leaf decoction is used in morning and evening.

Hollarrhena pubescens*. (Buch. Ham).Wall. ex. G. Don* (Apocynaceae), Pandhara kuda, Indrajaw. MACH0172

- Gives Internal bark powder one teaspoon in morning and evening.
- Stem powder used before meals.
- Seed powder takes before breakfast.

Kalanchoe pinnata (Lamk.) (*Bryophyllum calycinum*) (Craussulaceae), Panphuti. MACH0303

- Gives Fresh leaves juice at any time.

Macratyloma uniflora (Lamk.) verde*. (Dolichos biflorus Linn.)*(Fabaceae), Kulthi, Hulge, Kulith. MACH0304

- Fruits boiled in water and cold water gives to patient thrice a day.

Mentha spicata *L.* (Lamiaceae), Pudina. MACH0305

- Fresh leaves should be taken with salt after a particular intervals throughout the day.

Mimosa pudica *L.* (Mimosaceae), Lajalu, Lajwanti MACH0198

- Leaf juice is added in tea and used time to time.
- Root powder gives before breakfast.

Ocimum tenuiflorum L. (Lamiaceae), Tulsi, Tulas. MACH0209

- Entire plant should burn, ash of the plant mixed with water and given thrice a day.

Punica granatum L. (Punciaceae), Anar, Dalimb. MACH0306

- Seed juice is given before breakfast.

Raphanus sativus L. (Brassicaceae), Mula. MACH0307

- Root juice is given after meals.
- Leaf juice is given before breakfast- after this no intake up to lunch.
- Seed powder is useful before breakfast.

Tamarindus indica L. (Caesalpiniaceae), Imli, Chinch. MACH0237

- Dry exocarp of the pod is boiled in the water, this filtered water is given twice a day.

Tephrosia purpurea L. (Fabaceae),Sharapunkha, Unhali MACH0236

- Root powder or juice is useful if taken morning and evening.
- Gives leaf decoction-one glass before breakfast .
- Entire plant boiled and juice is given after particular intervals.

Terminalia arjuna (Roxb.) Wt**.** (Combretaceae), Arjun sadoda. MACH0237

- Gives bark powder after breakfast, lunch and dinner.

Tribulus terrestris L**.** (Zygophyllaceae), Goakru, Sarata. MACH0308

- Leaves decoction is taken in morning and evening.
- Fruit juice or extract is used in morning and evening.

Mixture:-

- Anantmul**(***Hemidesmus indicus* **)+**Goakru(*Tribulus terrestris*)+Kurdu(*Celosia argentea*) +Unhali(*Tephrosia purpurea)*.

Mix in water, boil-Filter and cool water should be given as per the requirement.

Results and discussion:-

This investigation presents a role of plants of this district for kidney stone treatment. Present investigation reveals that the entire plant or their different organs are utilized by tribal people residing at different corners of the district and also by rural and urban persons. After the survey it is observed that in Aurangabad district there is lot of traditional utility of plants for diseases But it is very dishearten to observe that some plants mentioned in this present work, many of them are gradually diminishing. Authors fears that the changing environment, increasing population, government planning may be responsible for this. In this present survey of investigation for Aurangabad district based on ethnobotanical information, an humble attempt is made in this work by way of gathering information . This has proved one fact that some of the plants are quite versatile having varied uses and secondly the knowledge about the ethnobotanical plants has developed independently and parallel, where cross linkage and mutual integrations have been very rare.

It is observed that in the studied area, high population density and urbanization have led to intensive exploitation of plant resources, which in turn brought about the depletion of forest areas. Many drug plants have disappeared and few have reached the brink of extinction and still others facing similar stress. There is urgent need for conservation of some important drug plants.

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Algal Flora Of Oil Mill Waste Water

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ABSTRACT *Polluted water habitats harbours particular type of algal flora. Oil mill waste water contains oil, oil products and other toxic substances. In present study algal flora of oil mill waste water is studied. Experimental work was carried out for one year i.e. from July 2014 to June 2015. A total of 26 species under 20 genera belonged to Chlorophyceae, Bacillariophyceae, Euglenophyceae and Cyanophyceae were recorded. Cyanophycean algal taxa dominated algal flora. The species of Gloeocystis, Nitzschia, Aphanothece, Oscillatoria, Phormidium and Plectonema were found dominant.*
Key words: *Algal flora, oil mill waste water.*

INTRODUCTION

Oil mill waste water contains oil, oil products and other toxic substances which causes pollution and produces detrimental effects on aquatic organisms. In such conditions certain algae grows and develop and found in diverse form. Kumar *et.al.* (1974) carried ecological studies on algae of oil refinery. The effects of crude oil on growth and tolerance on fresh water algae were observed by Batterton *et.al.* (1978) and Gaur and Kumar (1981).Reddy et.al.(1983) studied toxic effects of oil refinery effluent on algae.Present study deals with algal flora of oil mill waste water.

MATERIALS AND METHODS

In order to study algal flora of oil mill waste water, algal samples were collected from waste water of Mahesh oil mill located in Selu tehsil of Parbhani district of Maharashtra. Experiments were conducted for the period of one year i.e. from from July 2014 to June 2015. Algal samples were collected at monthly intervals. The phytoplanktons, floating and attached epiphytic forms of algae were collected in acid washed collection bottles. Algal samples were preserved in 3% formalin for further taxonomic investigations. Fresh as well as preserved algae were observed thoroughly under light microscope and identified with the help of standard literature on algae (Desikachary1959; Fritsch 1935, 1945;Philipose 1967;Prescott 1951,Sarode and Kamat 1984; Smith 1950).

RESULTS AND DISCUSSION

A total of 26 species under 20 genera were identified and recorded during the period of investigation (Table 1), of these 7 species under 6 genera belonged to Chlorophyceae, 5 species under 5 genera belonged to Bacillariophyceae, 1 species under 1genus belonged to Euglenophyceae and 13 species under 8 genera belonged to Cyanophyceae.

In presence study Cyanophycean algal taxa dominated algal flora of oil mill waste water. Similar kind of observations were made by Ramaswamy and Somashekar (1982), Somashekar and Ramaswamy (1983), Talekar and Jadhav (2009), while studying algal flora of different waste water habitats. The species of *Gloeocystis, Nitzschia, Aphanothece, Oscillatoria, Phormidium* and *Plectonema* were found dominant. *Gloeocystis gigas, Nitzschia palea, Aphanothece nidulans, Oscillatoria acuta, Oscillatoria obscura, Phormidium molle* and *Plectonema gracillimum* were found frequent.

Table 1:Algal taxa recorded from oil mill waste water.

Chlorophyceae
Gloeocystis gigas,Gloeocystis major,Chlorococcum humicola,Trebouxia humicola, Characium limneticum,Chlorella vulgaris,Ankistrodesmus falcatus

Bacillariophyceae
Gyrosigma baikalensis,Pinnularia doldosa,Cymbella aspera,Nitzschia palea,Surirella ovata.

Euglenophyceae
Euglena acus.

Cyanophyceae

Microcystis aeruginosa,Gloeocapsa polydermatica,Aphanocapsa pulchera,Aphanothece nidulans,Aphanothece saxicola,Synechococcus aeruginosa,Oscillatoria acuta,Oscillatoria obscura,Oscillatoria subbrevis,Phormidium laminosum,Phormidium molle,Phormidium usterii,Plectonema gracillimum.

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DIATOMS OF KHELNA RESERVOIR IN AURANGABAD DISTRICT OF MAHARASHTRA

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ABSTRACT *While studying algal diversity of Khelna reservoir in Aurangabad district of Maharashtra 14 taxa of diatoms were recorded and studied in detail during October 2014 to September 2015.Diatom taxa were identified on the basis of important taxonomic characters. Fragilaria, Navicula and Nitzschia were found dominant. Abundance of diatoms were found in summer and winter seasons.*

***Key words**: Diatoms, Khelna Reservoir.*

INTRODUCTION

Diatoms are well defined group of algae. They are characterized by the presence of silicified cells. Diatoms are ubiquitious and form quite an important group in aquatic ecosystems. Extensive review of literature reveals that, except few reports (Sarode and Kamat 1979,Barhate and Tarar 1983,1985., Kumawat and Jawale 2002, 2006,Mahajan and Nandan 2006,Talekar and Jadhav 2010, Mahadik 2015.) rare attention has been paid towards diatoms of Maharashtra. While working on algal diversity of Khelna reservoir in Aurangabad district of Maharashtra, the authors came across a number of interesting taxa of diatoms.

MATERIALS AND METHODS

Collections of algal samples were made at monthly intervals from 4 selected sites of Khelna reservoir for period of one year i.e. from October 2014 to September 2015. For identification, the diatoms were cleaned by Bruns method (Sarode and Kamat 1984) Diatoms taxa were identified according to Hustedt(1930),Venkataraman (1939) and Sarode and Kamat 1984.

RESULTS AND DISCUSSION

A total of 14 taxa of diatoms under 9 genera were identified and recorded throughout the period of study (Table1).Talekar and Jadhav (2010) recorded 21 taxa of diatoms under 10 genera. On the basis of occurrence of diatom taxa, the dominant genera were *Fragilaria*, *Navicula* and *Nitzschia*. Diatoms taxa were recorded from all selected sites of Khelna reservoir. Seasonal variation study of diatoms in khelna reservoir reveals that abundance of diatoms were found in summer and winter seasons. Similar kind of observations were made by Talekar and Jadhav (2010) and Mahadik(2015).

Table 1: Diatoms recorded in Khelna Reservoir.

Sr. No.	Name of Diatoms
1	*Fragillaria brevistriata*
2	*Fragillaria construens*
3	*Cocconeis placentula*
4	*Mastogloia recta*
5	*Gyrosigma acuminatum*
6	*Navicula cupsidata*
7	*Navicula subrhychocephala*
8	*Pinnularia doldosa*
9	*Cymbella aspera*
10	*Nitzschia closterium*
11	*Nitzschia palea*
12	*Nitzschia obtusa var. scalpelliformis*
13	*Surirella ovata*
14	*Surirella obtusa*

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Diversity of Cyanobacteria Over Water Reservoir

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ABSTRACT *In order to study the abundance of cyanobacteria over water reservoir, Andhari reservoir, located in Sillod tehsil area of Aurangabad district of Maharashtra has been selected . The experiments were conducted at weekly intervals for a period of one year from August 2014 to July 2015. A total of 47 samples were obtained spaning one year. The duration of exposure was normally of two hours. The petriplates were exposed either in morning or afternoon time. Cyanobacterial forms such as Aphanothece,Phormidium,Plectonema, Nostoc, Scyatonema, Myxosarcina, Microcoleus, Chroococcus,Gloecapsa and Lyngbya were abundant.*

***Key words**: Diversity, Cyanobacteria, water reservoir.*

INTRODUCTION

Cyanobacteria grows in variety of habitats like fresh water, soil, on moist rocks and on bark also. They remain viable in air in the form of spores and filaments. Except few reports (Balakrishnan and Gunale 1980, Jadhav and Chavan 2007,2009; Jadhav and Quazi 2010,Patil and Patil 2014) rare attention has been paid towards airborne cyanobacteria, although Indian climate is most favorable for cyanobacterial spores and filaments to become airborne. Present study deals with the abundance of cyanobacteria over water reservoir.

MATERIALS AND METHODS

In order to study the diversity of cyanobacteria over water reservoir a Andhari reservoir located in Sillod tehsil area of Aurangabad district of Maharashtra has been selected. The air samples were collected by using agarized Bold`s basal medium (Bolds 1942). Petriplates were exposed on the top of reservoir which 35 feet above ground level. Duration of exposure was normally of two hours,. The frequency of exposure was once in a week. Petriplates were exposed either in the morning or afternoon time of the day. The experiments were conducted for one year from August 2014 to July 2015.

RESULTS AND DISCUSSION

Occurrence of Cyanophycean algae in air in the form spores and filaments in atmosphere has been known since long time. Gregory and Sreeramalu (1958) reported abundance of *Gleocapsa* in air. Parker *et.al.(*1982) observed dispersion of cyanobacterial felts of benthic origin through ice cap of Meromictic saline lakes of Roos deserts. Sharma and Singh (1989) studied Cyanophycean air pollutants in air of Imphal. Balakrishnan and Gunale (1980), Jadhav and Chavan (2007,2009), Jadahv and Quazi (2010) and Patil and Patil (2014) extensively worked on distribution of Cyanophycean algal forms in air. In present study Cyanobacterials taxa such as *Chroococcus minor,Gleocapsa rupestris, Aphanothece nidulans, Aphanothece saxicola, Phormidium jenkelianum, Phormidium molle,Lyngbya major, Microcoleus acutismus,Myxosarcina burmensis, Nostoc muscorum, Nostoc puctiformae,Plectonema gracillimum, Plectonema nostocorum* and *Scytonema schmidtii* were found abundant.

Unicellular, colonial and filamentous Cyanobacterial forms were recorded throughout the period of study. Cyanobacterial cells are known to contain protein in high concentration and it is of considerable importance with reference to allergic reactions in sensitive individuals. Hence it is concluded that atmosphere over Andhari reservoir contains variety of airborne Cyanobacterial algal forms. Cyanobacterial flora over Andhari reservoir is rich and viable.

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Soil Algae Of Onion Field Of Ahmednagar District (M.S.)

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ABSTRACT *Soil algae are significant component of soil microflora. They play a significant role in soil fertility. Present Research work deals with the study of Algal flora of Onion (Allium cepa L.) field soil. Algal samples from moist places of onion field were collected at regular intervals from October 2015 to January 2016. Bold's basal medium was also used to culture algae from soil of onion field. Collected algal samples were observed thorougly under research microscope and identifed with help of standard literature on algae. Total of 28 species under 20 genra belonged to Chlorophyceae, Bacilloriophyceae and Cyanophyceae were identified and recorded. Algal forms Gleocystis, Chlorococcum, Nitzschia, Aphanothece, Oscillatoria, Phormidium, Lyngbya and Microcoleus were found dominant in order of their abunbance. Physicochemical analysis of onion field soil was also performed by selecting certain physicochemical parameters such as pH, Electrical conductivity, and Organic carbon, available Nitrogen, available Phosophorus and available Potassium to understand fertility status of soil. Algal flora of onion field is rich and it is in diverse form*

KEY WORDS: *- Algal Flora, Soil and Onion field.*

INTRODUCTION

Soil alge are those alge which are found on or in the soil. They play an important role in a fertility of soil Cyanophycean algae fixes atmospheric nitrogen. Soil algae have attracted the attention of Phycologists since past few decades. (Meeting 1981, Bongale 1985, Prasad 2005, Auti and Pingle 2007, Jadhav 2010, Nimbhore and Jadhav 2014.) Soil algal diversity study of paddy, banana, wheat, sugarcane and brinjal fields has been well documented. (Bongale and Bharati 1980, Kolte and Goyal 1985, Kottawar and Pachpande 1986, Nayak et. al. 2001, Patil and Chaugule 2004, Prasad 2005, Auti and Pingle 2006, Nimbhore and Jadhav 2014.) Onion *(Allium cepa L.)* is one the important vegetable crops of India. Extensive review of literature reviews that very rare attention has been paid towards algal flora of onion field. Therefore to fulfill this lacuna it has been decided to work on algal flora of onion field.

MATERIAL AND METHODS

An Onion field from Ahmednagar tehsil area has been selected for soil algal samples collections. Algal patches were collected from moist places of selected onion fields at regular interval from October 2015 to January 2016. Algal samples were collected in sterilized collection bottles. Collected aglal samples were brought to the laboratory and observed throughly under research microscope and identified with the help of standard literature of algae.

RESULTS AND DISCUSSION

Total of 28 species under 20 genra of algae belonged to Chlorophyceae, Bacilloriophyceae and Cyanophyceae were identified and recorded from onion field of Ahmednagar tehsil area. Of these 6 species under 6 genera belonged to Chlorophyceae, 5 species under 5 genera belonged to Bacilloriophyceae and 17 species under 9 genera belonged to Cyanophyceae (Table 1). Cyanophycean algal taxa dominated algal flora. Similar kinds of observation were made by earlier researchers (Bongale and Bharati 1984, Chaporkar and Gangawane 1984, Kottawar and Pachpande 1986, Auti and Pingle 2006, Jadhav 2010, Nimbhore and Jadhav 2014).

Classwise percentage contribution study of algal flora of onion field revals that highest contribution was of Cyanophyceae (60.75%), followed by Chlorophyceae (21.40%) and Bacilloriophyceae (17.85%). Algal taxa *Gleocystis, Chlorococcum*, *Nitzschia, Aphanothece, Oscillatoria, Phormidium, Lyngbya* and *Microcoleus* were found dominant in order of their

abunbance. *Chlorococcum humicola* was abundant in onion field. It is important constitutent of soil algal flora of various parts of world. Unicellular, colonial and filamentous algal forms were recorded present research work. Filamentous algal forms were found in maximum number.

Physicochemical analysis of onion field soil reveals fertility status of soil. The overall fertility status of selected onion field was moderate alkali (pH 8.15), Electrical conductivity is normal (0.38 milimhos/centimeter). Organic carbon low (0.38%), low available nitrogen (159.93 Kg/hectare), low available Phosphorous (10.97 Kg/hectare), where as available Potassium (392 Kg/hectare). Cyanophycean alge are found dominant in alkaline soil. Normal electrical conductivity supports growth of algae.

CONCULSION

A total of 28 species under 20 genera of algae were recorded form the soil of onion field. Cyanophycean algae were found dominant than Chlorophyceae and Bacillariophyceae. Unicellular, colonial and filamentous algal forms were recorded present research work. Filamentous algal forms were found in maximum number. Algal flora of onion field is rich and it is found in diverse form. Moderate alkaline nature and normal electrical conductivity of soil supports growth of algae especially Cyanophycean algae.

Table 1: Diversity of Soil Algae from Onion field

Chlorophyceae *Gloeocystis major, Oedogonium sp., Chlorococcum humicola, Trochisci aspera, Spirogyra sp., Cosmarium subumidium.*
Bacilloriophyceae *Pinnularia sp., Gomphonema, Cymbella aspera, Nitzschia palea, Surirella ovata.*
Cyanophyceae *Aphanothece nidulans, Aphanothece saxicola, Merismopedia tenuissima, Myxosarcina burmersis, Oscillatoria acuminata, Oscillatoria subbrevis, Phormidium abronema, Phormidium jenkelianum, Phormidium molle, Phormidium usterii, Lyngbya hieronymusii, Lyngbua major, Microcoleus acutissmus, Microcoleus lacustris, Microcoleus subtorulosus, Cylindrospermum michailovskaense, Nostoc muscorum*.

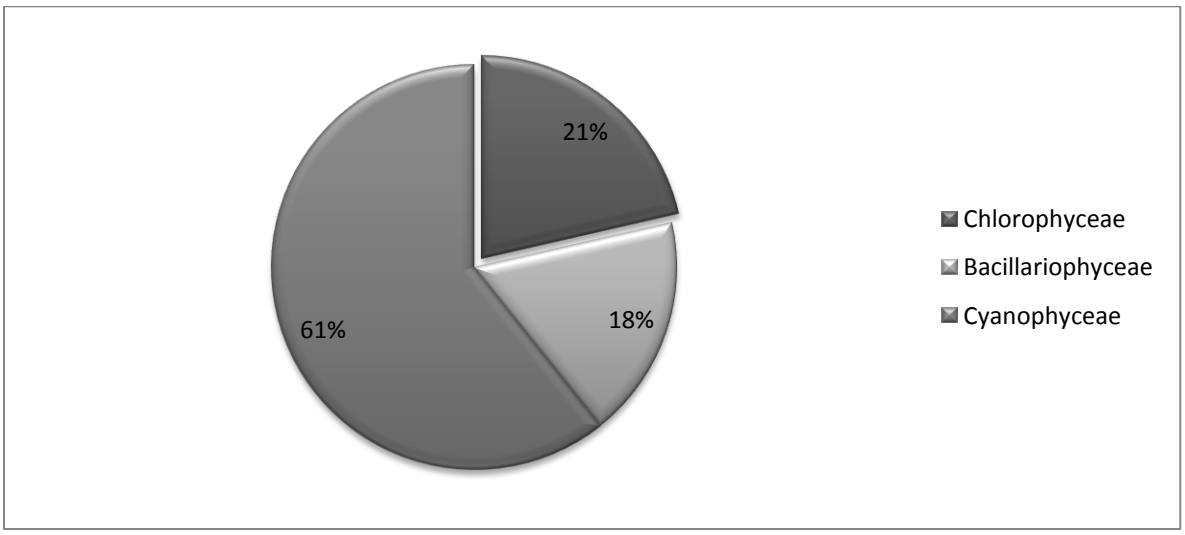

Fig.1: Classwise Percentage Contribution of algal flora of Onion Field Soil

Table 2: Physicochemical analysis of onion field soil

Sr. No.	Parameter	Observation	Fertillity Status
1	pH	8.15	Moderate Alkali
2	Electrical Conductivity (milimhos/centimeter)	0.38	Normal
3	Organic Carbon (%)	0.39	Low
4	Available Nitrogen (Kg/hectare)	159.93	Low
5	Available Phosphorous (Kg/hectare)	10.97	Low
6	Available Potassium (Kg/hectare)	392	High

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Physico-Chemical Profile of Salim Ali Lake In Aurangabd

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ABSTRACT *The present study deals with comparative study of water quality of Salim Ali Lake, Aurangabad (M.S.) India. The physico-chemical parameter characteristics were studied and analyzed. The result revealed that the parameters of Salim Ali Lake are temperature, conductivity, pH, dissolved oxygen (DO), biological oxygen demand (BOD), calcium(Ca^{2+}), magnesium(Mg2+), chloride(Cl-), pH, dissolved oxygen (DO), total alkalinity beyond the permissible limits according to WHO and ISI standards for drinking process.*

Key words: Physico-chemical parameters, seasonal variation.

Introduction

Hydrochemical studies of water depend on numbers of factor including nature of recharge, residence time of aquifer and pollution by anthropogenic activities. Water demand has increased over the year, which leads to water scarcity, in many parts of world. India is now leading towards ground water crises, mainly due to improper management of water resources and environmental degradation. Major areas in Maharashtra, including Godavari River and its area, facing significant shortage of drinking water supply due to the lack of insufficient monsoon rainfall in the study area and water flow in the river. The water reservoirs like Manjra project, Dhanegaon, Majalgaon project, Majalgaon Bendsura project, pali are the major drinking sources of water. But most of the residents in study area are depends mainly on ground water sources of drinking water.

Materials and Methods

Ten ground water samples were collected from the study area in different seasons i.e. summer, monsoon and winter. The chemical analysis of samples was carried out by following standard procedures.

Result and Discussion

Water samples were collected from the study area. The result of nine physico-chemicals parameters of waters is presented. The season wise data was presented in table. Some of the interesting observation is summarized below.

Physico-chemical parameters	Summer	Monsoon	Winter
Temperature	26.63	24.05	22.20
pH	08.32	7.32	08.14
Conductivity	111.20	126.50	132.00
TDS	45.78	52.63	54.73
TA	507.50	573.75	530.75
TH	275.34	329.56	362.75
CL^-	112.27	288.57	169.74
Ca^{2+}	82.04	125.75	140.25
Mg^{2+}	9.57	3.73	3.00
DO	8.80	7.8	3.27

Seasonal Variations of water Quality parameters.

1. Temperature (T)

In present investigation maximum value of water temperature were recorded in summer season corresponding with the atmospheric temperature. Our findings are in good agreement with those of Palharya et.al. (1993) Verma et.al., (1978) and Ganpati (1943). During summer, water temperature was higher because of low water level, clear atmosphere and greater solar radiation. Water temperature is lower in rainy season and it was due to frequent cloud, high percentage of humidity and high water level.

2. pH

There is seasonal fluctuation in ph values which is also reported by Sireenivasan (1965), Vyas and Kumar (1969). However maximum pH observed during winter is in agreement with Goals work. The higher value of pH in winter may be due to the growth of microscopic as well as filmental algae which utilize carbon from carbonates, sulpher from sulphate. Nitrogen from nitrates and phosphorous from phosphate converting them in to hydroxyl ion which are responsible for increase in pH.

3. Conductivity

In the present investigation maximum conductivity values were observed in the water sample. Usually high conductivity values were observed in summer season as compared to rainy and winter season which is in agreement with the observation made by Jeevan (1995) and Bansan (1984).

4. Total Alkalinity (TA)

The TA values above permissible limit, 200 ppm, in all the cases indicating presence of bicarbonate, maximum in summer and minimum in rainy season.

5. Total hardness (TH);

Hardness values are higher in most of the cases as per WHO and it may be decrease in water table. The values are low in winter and rainy which is mainly due to dilution.

6. Chloride ($c1^{-}$):

It is a natural substance present in all potable waters and it is usually present in sewage as a metallic salt.

Its concentration in fresh water is quite low and is generally less than that of sulphates and bicarbonates.

Industrial wastes, domestic sewage and excreta of man and animals are the important sources of chloride in water.

It is interesting to note that about 8-15 grams of sodium chloride (NaCl) is excreted by a person per day. Chloride cannot be removed biologically in treatment of waste as it is highly soluble with cations and does not sediment and precipitate.

It is harmless up to 1500 mg/l concentration but produces a salty taste at 250-500 mg/l.

7. Calcium (ca2+):

Calcium is the 5th most common element found in most natural water at levels ranging from zero to 100 mg/litre. Calcium contributes to the hardness property of water and taste. Results are usually reported as calcium hardness mg/litre equivalent to calcium carbonate. Source of calcium in water is the rocks, sewage and industrial wastes. At higher ph its concentration is decreased due to its precipitation as calcium, carbonate (ca03). High concentration in water causes lather formation with soap and not desirable in washing bathing and laundry. Scale formations take place along with magnesium in boilers. It coagulates with soap and makes dirty layers on sinks, tubes etc.

Calcium with sulfate inhibits malt formation and with chloride it inhibits growth of yeast. While small concentrations of calcium are beneficial in reducing the corrosion in the pipes due to the formation of thin layer of scale.

It has also been found to antagonize the toxicity of lead, aluminum zinc and toxic solutions of sodium, magnesium and potassium chlorides.

8. Magnesium (mg2+):

It occurs in all waters along with calcium but generally its concentration is very low then that of calcium. The sources in the natural water are rocks, sewage and industrial wastes, magnesium causes hardness of water and along with calcium poses problem of scale formation in boilers.

Concentration, as high as 500 mg/litre, imparts an unpleasant taste to the water. Magnesium combined with sulfate acts as texture tc human body.

9. **Dissolved Oxygen (DO)**

The lower value of do during summer may be due to loss of oxygen to the atmosphere at high Temperature and its utilization in fast decomposition of organic matter. The maximum amount of do was observed in monsoon due to aeration of water on account of rapid flow in winter solubility of oxygen increases with decrease in water temperature. The results are well in agreement with Jain, et. al., (1996).

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Post-harvest mycoflora of different amla varieties (*Emblica officinalis* L.)

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ABSTRACT *Fungal species diversity of amla different varieties like Banarasi, Kanchan, Balwant, Chakaiya, Krushna and Deshi. 100 fruit samples were randomly collect from each alma varieties. Total 15 genera and 24 fungal species were found from infected amla fruit. From Aonla fruits of all six varieties, fungal species diversity Maxsimum in Effect of different storage period on quantitative and qualitative disease incidence on different varieties of amla total 24 fungi were observed from seven varieties of amla viz. Banarasi, Kanchan, Balwant, Krishna, Chakaiya and Deshi. Effect of different storage period on different varieties observations show Aspergillus niger and Aspergillus flavus fungi found to be more dominant on all amla varieties. Krishna variety of amla showing lower minimum fungi were observed as compare to other amla varieties contrary maximum fungal load was seen on the Local amla variety.*
Key words: *Amla fruit, fungal species, different alma varieties.*

Introduction:

Amla (*Phyllanthus emblica* L.) king of arid fruits popularly known as "Indian gooseberry" a small sized tropical and subtropical fruit grows widely in North India. It is considered as "Wonder fruit for health" because of its unique qualities. However amla fruit is highly perishable and has a short shelf life of 5–6 days as fruit is sensitive to bruises, browning, desiccation and various post-harvest diseases. Among them, fruit rots caused by various species of fungi are more important because they affect the fruit quality, quantity and ultimately down the market value (Bhardwaj and Sharma, 1999). Although some fungi such as *Claviceps purpurea* have been known for centuries because of their high and acute toxicity, it was only after the discovery in 1960 of the aflatoxins, carcinogenic metabolites of *Aspegillus flavus*, that a large number of species were found as mycotoxin producers (Northolt & Soentoro, 1988). The production of mycotoxins, a group of secondary fungal metabolites, is reportedly dependant on the physic-chemical environment where the mould develops (Jimenez *et al*., 1991).

These fruits of Amla which are frequently used in making pickles, jellies and preserves are probably the richest known natural source of vitamin C. Its mineral and vitamin contents include calcium, iron, phosphorus, carotene, thiamine, riboflavin, niacin, vitamin C (one fruit contains as much as 24 oranges) and tannins. They are also used in making quality inks, ordinary dyes and shampoos and in tanning industry. In addition, dried Amla fruit is used in Ayurvedic and Unani system of medicine for various ailments like fever, liver disorder, indigestion, anemia, heart complaints and urinary problems (Bhattacharjee, 2004). The economic loss resulting from fungal and mycotoxin contamination of food stuffs is difficult to estimate. However, judging from the widespread occurrence of fungal and mycotoxin contamination and the large number of food stuffs affected, one can assume that such losses must be large (Stinson, 1981). These losses result in human illness, reduced food supply, poorer quality, economic hardships for growers and processes and ultimately higher price.

Material and methodology:

Fruit samples of Amla were collected from field and market of different alma varieties The fruits were randomly picked and were surface sterilized with a 2% aqueous solution of Sodium hypochlorite (NaOCl) for two minutes followed by rinsing with sterile distilled water (Kulik, 1981). Another set of untreated fruits was also used. The dried shells of fruits were then cut into 4 pieces with a sterile scalpel and plated together equispaced from each on PDA medium. Two of the pieces had their inner surfaces turned up and remaining two had their outer surface turned down. Plates were incubated at 28°C for 7 days during which the number of pieces that yielded colonies was noted, enumerated and sub cultured for identification. The fungi were identified after reference to Thom & Raper, (1945), Gilman (1957), Ellis (1971, 1976), Ellis & Pamella

(1985), Booth (1971), Domsch *et al*., (1980). The total number of fungal species was calculated on percent basis to find out the difference in nature and number of fungi arising fruits and the difference of PDA media used.

Occurrence of fungal diversity on different Amla varieties

Sr. No.	Name of the fungi	Varieties					
		Banarasi	Kanchan	Chakaiya	Balwant	Krishna	Deshi
1	*Alternaria alternata*	++	++	-	++	+	+++
2	*Aspergillus niger*	+	+++	+	++	+	++
3	*Aspergillus flavus*	++	+	-	-	++	+
4	*Aspergillus fumigatus*	-	++	+	+++	+	-
5	*Aspergillus terreus*	+	-	-	+	-	-
6	*Cladosporium herbarum*	-	-	+	-	-	+
7	*Cladosporium tenuissimum*	++	++	-	+	++	-
8	*Curvularia lunata*	+	-	+	-	-	-
9	*Colletotrichum gloeosporioides*	-	+++	-	++	+	++
10	*Dreschlera* spp.	-	+	-	-	+	-
11	*Fusarium moniliforme*	-	-	-	-	-	++
12	*Fusarium oxysporum*	++	+	++	-	-	+
13	*Nigrospora* spp.	-	-	-	-	+	-
14	*Penicillium chrysogenum*	++	-	+	++	-	+
15	*Penicillium citrinum*	-	++	-	++	-	++
16	*Penicillium digitatum*	-	-	+	-	-	-
17	*Penicillium islandium*	+	+	++	+++	++	++
18	*Penicillium notatum*	+	-	+	-	+	+
19	*Phoma exigua*	-	+	-	+	-	-
20	*Phoma putaminum*	-	-	-	++	-	+
21	*Rhizoctonia bataticola*	+	-	-	-	-	-
22	*Rhizopus stolonifer*	-	++	++	-	+	++
23	*Sclerotium rolfsii*	+	-	-	+	-	+
24	*Trichoderma viride*	+	+	-	-	-	++

(+++) High, (++) = Moderate (+) = Less, (-) = Absent

Result and discussion:

In present investigation of amla post harvest fungal diversity on different varieties. Quantitative and qualitative analysis of fungal species studied, at different environmental conditions. Total 15 genera and 24 fungal species were found from infected amla fruit. From Aonla fruits of all six varieties, fungal species diversity Maxsimum in Effect of different storage period on quantitative and qualitative disease incidence on different varieties of amla total 24 fungi were observed from seven varieties of amla *viz.* Banarasi, Kanchan, Balwant, Krishna, Chakaiya and Deshi. Effect of different storage period on different varieties observations show *Aspergillus niger* and *Aspergillus flavus* fungi found to be more dominant on all amla varieties. Krishna variety of amla showing lower minimum fungi were observed as compare to other amla varieties contrary maximum fungal load was seen on the Local amla variety.

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Diversity of fungal spores over Groundnut fields at Aurangabad District (MS)

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ABSTRACT *Groundnut is major oil seed crop of India which accounts for around 25% of the total oilseed production of country. In India Groundnut is produced in both seasons. Considerable loss of Groundnut production is due to airborne fungi. The fungal aerorspora of Groundnut (Arachis hypogea L.) were collected in the month of September and October, 2016 at specific time intervals. Meteorological plays an important role in dispersal of spores. Petri plates were exposed fortnightly and the fungal colonies were identified on the basis of Morphological characteristics. During present work total 13th different fungal spores were recorded on petri plate. Cladosporium, Alternaria, Dreschlara and Rhizopus were dominated in the field.*

(Keywords: *Fungal spores, Groundnut and Diversity)*

Introduction-

Groundnut (*Arachishypogea* L.) occupies first place among the all oil seed crops in India. In India about 75 million hectors of land is under groundnut cultivation from all oil seed crops. Lukose *et.al*. (2008) reported, groundnut as the world's fourth most important source of vegetable protein. It accounts around 25% of total oil seed production of the country. In India, it grown in 11 states in an area of 7.6 million hectares producing about 7.8 million ton of pods. The average annual productivity of this crop in India is about 1000kg/ha. In Maharashtra, it is cultivated in both khariff and Rabi season. The yield of groundnut is affected by various fungal diseases. Fungal spores are always present in air but their concentration depends on time of day, season, geographical locations and meteorological condition. The aim of present investigation were to determine the diversity of fungal spora on groundnut crop field.

Material and Methods-

The fungal aerospora of groundnut were collected by using petri plate exposure method with specific time intervals in Khariff season of 2016. The samples were collected from three different location of Aurangabad district. [Table no. I].The exposed plates were incubated at 28^{o}C temperature, after 3-5 days fungal colonies were grown and percentage of individual fungal species was calculated. Identification of fungi was done by morphological and colony characters with the help of literature (Barrnett).

Result and discussion-

The plates were exposed in morning and evening for 2-5 min over groundnut crop field and meteorological factors like temperature, humidity and rainfall were recorded. Total 216 fungal colonies and were recorded on potato dextrose agar plates of 13 different types. According to their occurrence in plate's total number of colonies calculated in terms of percentage (Table No. II).

The most frequently occurred spore types were *Alternaria(*21%), *Cladosporium*(20%), *Rhizopus*(14%), *Dreeschlera*(8.4%) and *Aspergillus*(8%). Among all these types of spores, the group Deuteromycota contributed highest percentage. Dominant contribution of Deuteromycotina spore types during Khariff revealed direct correlation to the highest relative humidity (90%), moderate temperature (26^{o}c) and rainfall(70mm). Similar types of result found by Gadekar (2013) and Sonawane (2014). Comparatively the occurrence of *Bispora* (0.8%), *Nigrospora* (0.8%) and *Trichoderma* (1.7%) were Comparatively less in the field.

Cercospora and *Alternaria* develops leaf spot, *Cercospora is* severe pathogenic fungi causing major airborne tikka disease which responsible for considerable damage and it's concentration over groundnut field was 3.5%, it is considerable (Arsule and Pande 2011). The frequency of tikka disease on foliage of the crop was noticed after 25th September and spores were found on Petri plates in October month (R.M. Kadam *et.al.*). Moderate range of

Temperature(26°c), relative humidity(90%) and rainfall (190mm) responsible for the increased infection of crop (Aher and Pande, 2004). This factor play an important role increasing fungal population in the environment. (Afzal *et al*). Role of *Curvularia*(7%) and *Helminthosporium*(2.6%) also prominent over groundnut field.

Table No. I Showing meteorological data of Aurangabad district.

Sr.No.	Sampling Station	Date	Temperature	Humidity %	Rainfall (mm)
1	Phulambri	04/09/16	26	92.43	9.5
2	Phulambri	11/09/16	24	95.00	18.75
3	Phulambri	18/09/16	25	90.00	34.5
4	Khultabad	25/09/16	26	86.43	7.0
5	Khultabad	02/10/16	27	85.00	---
6	Khultabad	09/10/16	27	90.29	31.5
7	Lasur	16/10/16	26	90.71	3.5
8	Lasur	23/10/16	25	93.00	7.0
9	Lasur	30/10/16	26	93.71	76.5

Table No. II Showing distribution of fungal spores from three location of Aurangabad District

Sr. No.	Spore Type	Station Name			Total	Percentage contribution
		Phulambri	Khultabad	Lasur		
1	*Alternaria*	9	18	22	39	21
2	*Aspergillus*	6	3	9	18	8
3	*Bispora*	---	2	---	2	0.8
4	*Cercospora*	---	6	2	8	3.5
5	*Cladosporium*	12	15	18	45	20
6	*Curvularia*	4	5	7	16	7
7	*Dreschlera*	5	6	8	19	8.4
8	*Fusarium*	8	---	10	18	4.4
9	*Helmethosporium*	---	2	4	6	2.6
10	*Nigrospora*	---	2	---	2	0.8
11	*Penicillium*	1	2	5	8	3.1
12	*Rhizopus*	8	9	16	33	14
13	*Trichoderma*	---	4	---	4	1.7

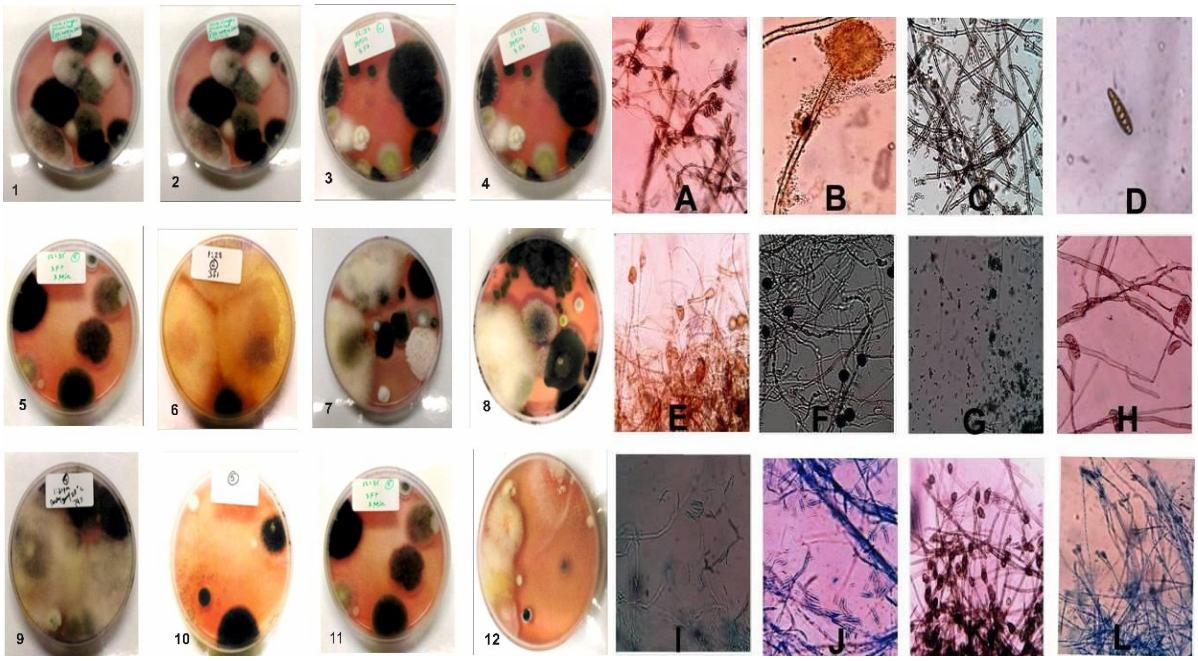

Photo plate I: showing fungal colony growing on exposed petri dish of different sampling stations
Photo plate II: Showing different types of Aeromycoflora Found on groundnut Field in Aurangabad District **A**. *Drehslera* **B.** *Aspergillus* C. *Cladosporium* D. *Helminthosporium* E. *Alternaria* F. *Nigrospora* G. *Trichoderma* H. *Drehslera* I & j. *Fusarium* K. *Curvularia* L. *Penicillium*

Conclusion-

The pathogenic fungal spores infect the leaf and affected the chlorophyll content. Decreased chlorophyll content reduces the rate of photosynthesis and also reduces the pods number along with their size. It results into reduction of crop yield per acre. Eventually farmers have to face economical losses.

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Atomospheric Concentraon Of Curvularia *Spores* Over Sunflower Fields

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ABSTRACT *Present paper deals with the aerobiological investigation over Sunflower fields by using Volumetric continuous Tilak Air Sampler was employed for exploring fungal air spora over a Sunflower field at Kada, Tal. Ashti and Dist. Beed.1st July to 30th September 2002 for first Kharif season and from 5th July t30thSeptember 2003 for second Kharif season. The present paper deals with airborne concentration of Curvularia spores over sunflower fields. The concentration of airborne Curvularia spores was assessed and the roles of the metrological parameters over the spore concentration were discussed. The spore concentration was maximum (7840/m3and13734/m3of air) in the month of September 2002 and August 2003during first and second Kharif season respectively.*

Key Words: *Aerobiology, Curvularia, Air Sampler, Sunflower field.*

INTRODUCTION

Aerobiology is an interdisciplinary science which deals with the study of biological component like pollen grains, fragments of fungal spores, hyphal fragments, bacteria, viruses, algae, lichens, minute insects & insect parts, protonzoancyst, etc. In the atmosphere a biotic particulates & gases affecting living organisms have been recently included in the concept of aerobiology. The aerobiological studies are mainly concern with interrelationship between the biological component in the atmosphere, source of biological component, their release in the atmosphere, their deposition & impact on health of plants & animals including human beings. Airborne infections & the resulting diseases threaten the lives & productivity of plants. Airborne diseases still pose a challenge to mankind.

The role of fungi in causing diseases to crop plants, man, domestic animal, in bringing deterioration of food grains in storage, valuable monuments has been subject of great interest for long time. Standing vegetation has a great influence of Aerospora of any place and it changes with changes in weather. Aerobiological survey conducted in various part of India revealed richness of Aerospora.

Sunflower (*Helianthus annus* L.) is one of the most important oil seed crops being grown all over the world. It is mainly grown for its oil, which is generally for culinary purposes in preparation of vanaspati and in manufacture of soaps and cosmetics .The sunflower oil is chemically a tri-glyceride. It contains 68% linolic acid, so it is especially recommended for patients having heart troubles. Sunflower seed cake or meal is a protein reach feed and is used as a concentrate for cattle, animals like pig, sheep, goat and poultry feed. Sunflower is native of North America. In Germany and Russia it is grown on large scale. Now a day's sunflower crop cultivation has become more popular among the farmers of Marathwada region. As considering survey of this crop that since last few years sunflower is subjected to various type of fungal diseases which may be soil borne, seed borne, airborne etc. The aim of present study was to find out the atmospheric concentration of *Curvularia* and its correlation with meteorological parameters. It was with the aim to find out the important airborne pathogens, their distribution and seasonal variation in the concentration these investigation were undertaken, the prediction of airborne fungal disease could be attempted. If well in advance information of airspora of this crop is made timely available. In view of the above fact using by continuous Volumetric Tilak Air Sampler carried out an aero mycological survey over sunflower field for two Kharif season.

MATERAIL AND METHODS

In the present investigation an exploration of airborne spores of *Curvularia* (Tilak and Kulkarni 1970) was undertaken over the fields of sunflower field for two Kharif season. Tilak Air Sampler was installed at a constant height of 1.5 meters above the ground level at Kada Tal Ashti Dist Beed (M.S.) for two Kharif season i.e. 1st July to 30th September 2002 for first Kharif

season and from 5th July t30thSeptember 2003 for second Kharif season . The air was sampled at the rate of 5litres/minutes which left traces of deposition over cellophane tape, affixed on the outer surface of drum. The slides were prepared every offer eight days. Before the scanning, the slides were marked with a ball pen point pen in the six equal parts, each parts, indicating the spore catch of two hours of sampling period. Area of 9600sq.micron of the total area of the trace obtained was scanned under 10Xx45X eye piece objective combination of binocular research microscope.. The transformation of spore was done which was based on visual characteristics of spore such as size, shapes. The metrological data was recorded during period of investigation .

RESULT AND DISCUSSION :

Spores usually 3-4 septate, olivaceous brown, ellipsoid, typically curved or bent, one of central cells distinctly larger and darker than the terminal cells, terminal cell pale. Spores smooth or verrucose, 17-45x11-20 um .

Spores occurred continuously. The spores contributed 4.47% and 620% during first and second Kharif season respectively.

The maximum monthly mean concentration (7840/$m^3$and 13734m^3) was recorded in the month of September 2002 and August 2003 during first and second Kharif season respectively. The maximum daily mean concentration (448/$m^3$and 1260m^3) was recorded on 25th September 2002 and 1st September 2003 first and second Kharif season respectively.

Patil (1985) showed that it belongs to day spora group exhibiting day time double pattern showing two peaks during day time . Some of the others reports of Pady (1957), Sreeramulu (1958). Kramer et al. (1959), Pathak and Pady (1965), Turner (1966) and Shukla (1971). Ress (1964) in Brisbane, recorded 0.47% spores from the total airspora which were more frequent during day time. Tilak and srinivasulu (1967), Mishra and Kamal (1971), Kulkarni (1971), Pande (1976), Tilak and Bhalke (1978), Mane (1978), Verma (1979), Shastri (1981), Patil (1983). Bhagwan (1983), Patil (1985) Venugopalachari (1986), Ramakrishna Reddy (1987), Minhaj (1988), Meghraj (1989) and Kavishwar (1990) reported the incidence of the spores in air ay different places. Thube (1992), Goud (1993), Narsimha (1996), Shinde (1996), Thite (1998) and Pawar (1998), recorded these spores over different fields. Dhimdhime (1999), reported these spores from airspora at Aurangabad. Tuljapurkar (2000), Garje (20000, Mali (2002) and Banswadkar (2002) recorded these spores over different fields. Gopan (2004) and Pathare (2005) reported 5.33% spores over sunflower fields. *Curvularia* occurred predominantly in the environment. Curvularia species are commonly found as a parasite or saprophytes on different grasses present in this area. Most species of *Curvularia* are facultative pathogen of soil, plants. *Curvularia* is mostly parasitic and saprophytic forms , being liberated from infected wood stored in forest, lumber yards and sawmill compounds. Leaf blight in Bajra due to *Curvularia* was observed by Patil et al.(1966).As well as being a contaminant, *Curvularia* may cause infections in both humans and animals.

The climatic factors generally are responsible to influence the sporadic outbreak at certain disease, however during period of present investigation did not occur. Thus the regional climate, not only determines the profitable growth of crop but also influences the dangerous of disease to which crops are proned, the relation between the development of disease and weather is the basis on which incidence and occurrence of diseases can be predicted. At matter of fact, plant disease forecasting is the natural corollary of plant disease epidemiology. Thus the atmospheric microbial population in relation to phytopathology has an ample scope for further investigations. Such studies would bring many useful results like disease forecasting which would ultimately help in projecting our crop.

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Studies Of Advanced Technology In Digital Science For Human Welfare

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ABSTRACT *Problem with environmental protection is vast, Although many GIS and Remote sensing techniques have beensuccessfully implemented, it has become quiteclear that two-dimensional maps with mostcomplex contours and color schema cannotprecisely present multidimensional and dynamicspatial phenomena. Most GISs in use today havenot been designed to support multimedia dataand therefore have very limited capability due tothe large data volumes, very rich semantics andvery different modeling and processingrequirements. And remote sensing is truly helpful to get special data of real time situation.*

This paper discusses some of thefeatures of a GIS, Remote Sensing Techniques, the general trends in this fieldand thetechnology behind it. It also describesthe advantages of using multimedia to implementa GIS and Remote Sensing Technology by extending its capabilities of presentinggeographic and other information. Then the mainsubsystems of a GIS have been presented. Thispaper also identifies some of the key areas whereMultimedia GIS systems could be very useful with Remote Sensing Techniques.

Keywords: *GIS Technology, Remote Sensing Technology, environmental Protection*

Introduction

GIS and Remote Sensing is one of the excellent tools for inventory and analysis of environment and its resources, owing to its unique ability of providing the synoptic view of a large area of the earth's surfaces and its capacity of repetitive coverage. GIS combines spatial data with the other quantitative, qualitative and descriptive information. When remotely sensed data are combined with other landscape variables organized with in a GIS environment provide an excellent frame work.

Marathwada has many rapidly expanding regions. The expanding industrial areas are directly responsible for increasing pollution in all cities of Marathwada region, ultimately resulted in the increase in quantity of solid waste. Solid waste management of Marathwada is considered as one of the most serious environmental problems. One of these impacts is due to location of dumping site in unsuitable areas. There is a tremendous impact on environmental degradation, health hazards and economic descend due to direct disposal of waste. There has to be appropriate planning for proper solid waste by means of analysis of the waste salutation of the area.

Solid waste management is a global environmental problem in today's world. There is an increase in commercial, residential and infrastructure development due to the population growth and this has bad impact on the environment. Solid waste management of Marathwada is considered as one of the most serious environmental problems confronting municipal authorities in developing countries.

In order to select and plant the most suitable system for storage, transportation and disposal of solid waste the composition and characterization study is play a significant role in waste management system. Characterization is also important to determine its possible environmental impacts on nature as well as on society.

Geographical information system is associated with basic terms, Geography and information system. The literal interpretation of geography is all about the earth. GIS is a system or a science which has an ability to capture, store, update, manipulate analyze and display all kind of spatial geographical data.it is designed to work with spatial data or geographical coordinates.

Some definitions of GIS is given in different publication are as below:

1. "A system which uses a spatial database to provided answer to queries of a geographical nature" (Goodchild, 1991)

2. "A computer assisted system for the capture, storage, retrieval, analysis and display of spatial data within a particular organization" (Clark, 2001)
3. "A powerful set of tools for collecting storing, retrieving at will, and displaying spatial data from the real world" (Burrough, et al, 2000)

"An organized collection of computer hardware, software, geographical data, and personal designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information" (ESRI)

The Last definition given above is one of the most rigorous definition of GIS, This definition includes requirement of personal trained in the technology who can capture, store and update the data, and provide answer to the complex queries of the management by integrating information contained in various layers, tough maps, tables and charts.

All over the world transportation of objects are taking places, Business Government Schools hospitals, private organizations, nonprofit organization are taking advantage of GIS system. Information which is being stored spreadsheet and databases has limitations, now it is being unleashed in new way in the form of geography. This is new approach uses geography to gain new perception, make better informative system.

Remote sensing is the process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance from the targeted area. Special cameras collect remotely sensed images of the Earth, which help us "sense" things about the Earth.

Generally, Remote sensing refers to the activitiesof recording/observing/ perceiving (sensing) objects or events at far away (remote) places. In remote sensing, the sensors are not in direct contact with the objects or events being observed. The information needs a physical carrier to travel from the objects/events to the sensors through an intervening medium.

Problems

The commonly observed problems in the area or the key issues were.

1. The garbage is not lifted at regular intervals everywhere.
2. The waste bins are most of the time in a pitiful condition lying full of garbage without being cleaned and also bins are either uncovered or not lying upright.
3. There was no segregation of solid waste categories like paper, glass, polythene, food material etc.

On the other side the municipal authorities had their reasons for this mismanagement of the waste maintenance

1. Thecitizens do not throw the waste inside the bins so it often lies outside and around the bins, making the area around the bin look dirty.
2. Thewaste lifting capacity is quite less in comparison with the amount of waste generated in the city.

There is also a shortage of manpower, equipment's and machinery.

Objectives

1. To study of GIS system and Remote sensing technology and its features in Solid Waste Management.
2. To determine the optimum route for solid waste collection and disposal.
3. Remote sensing technology will useful to know real time position of filled solid waste bins.
4. To study the comparative significance of GIS System and Remote Sensors in Solid waste management.
5. To examine the impact of GIS and Remote sensors on Solid waste management.

Applications of Multimedia GIS

Education - Education is a field where integration ofmultimedia and GIS can bring enormousbenefits. Students will learn faster and moreefficiently. In addition, it will be possible toindividualize learning and tune it to particularpreferences of each student. In this model ateacher becomes a guide rather than a repositoryof facts. It is the computer that takes on a role of"an infinitely patient teacher."

Mapmaking - GIS can use and combine all layers thatare available for an area, in order to produce anoverlay that can be analyzed by using the sameGIS. Such overlays and their analysis radicallychange decision-making process that include,among others:

- Site selection
- Simulation of environmental effects (forexample, creating perspective views ofa terrain before and after mining)

- Emergency response planning (forexample, combining road network andearth science information to analyze theeffects of a potential earthquake)

Land Information

GIS has aided management of landinformation by enabling easy creation andmaintenance of data for land records, landplanning and land use. GIS makes input, updates,and retrieval of data such as tax records, land-useplan, and zoning codes much easier then duringthe paper-map era. Typical uses of GIS in landinformation management include managing landregistry for recording titles to land holdings,preparing land-use plan and zoning maps,cadastral mapping etc. Input of data into a landinformation GIS includes: political andadministrative boundaries, transportation, andsoil cover.

Like this there are many applications available as follows

1. Infrastructure and Utilities
2. Environmental
3. Archaeology
4. Natural Hazards
5. Forestry
6. Military GIS
7. Oceanography
8. Water Resources

Hypothesis

1. GeographicInformation system (GIS) is the most important technology to gather the geospatial information of earth, i.e. we can gather real time information from this technology.
2. Remotesensing technology is also useful to know real time information of the any object, so that this is a good solution to effective solid waste management.

Methodology

Both primary and secondary data were used in the study. The primary data were collected from field surveys and observation. Whereas, the secondary data for the study was acquired from internet, reports, books, journals, governmental institutions and other documents. The main data used for this study were image of the city with spatial resolution of 5 m, master plan of the town and topographical map of the city. Pre- processing operations such as radiometric, image restoration and rectification were applied in order to enhance the analysis of the image.

Sampling method

In present research, researcher will use the simple random sampling technique.

Summary and Conclusions

GIS in essence is an applied science,and I believe that while the GIS vendorcommunity, hardware and software vendors,provide us with newer, better and fastertechnological tools, it is in the end, the domainspecialists applying the tool that define state-ofthe-art. In this paper an attempt has been made to design anddevelop an appropriate storage, collection and disposalplan for the Aurangabad Municipality Corporation (AMC) ofMaharashtra State (India).

A GIS optimal routing model based on the parameterssuch as population density, waste generation capacity, roadnetwork and the types of road, storage bins and collectionvehicles, etc., is developed and used to trace the minimumcost/distance efficient collection paths for transporting thesolid wastes to the landfill. The proposed model can beused as a decision support tool by the municipal authoritiesfor efficient management of the daily operations for movingsolid wastes, load balancing within vehicles, managingfuel consumption and generating work schedules for theworkers and vehicles.

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Assessment of Seed Mycoflora of Charoli (*Buchanania lanzan)*

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ABSTRACT *The present investigation deals with growth of various types of fungi on the seed of charoli in storage . For such assessment seeds of charoli were kept in different temperature .Many species of fungi were found on seed coat of charoli , but among them predominant were Aspergillus and Rhizopus.*

The mycoflora analysis of seeds showed a wide range of fungal contamination in 20 samples collected from different markets . Twenty three species and one variety belonging to 15 genera were isolated from charoli seeds on three types of media. Aspergillus niger, A. flavus, A. fumigatus, A. ochraceus, Penicillium chrysogenum and Rhizopus stolonifer were the most common fungal species isolated on Agar -agar medium at 28ºC, while Eurotium amstelodami, Zygosaccharomyces rouxii, A. niger and P. chrysogenum were common on Standard blotter method .

***Key words**: Buchanania lanzan , Aspergillus and Rhizopus, Standard blotter paper method P. chrysogenum*

Introduction

Scientific name of charoli is *Buchanania lanzan.* Buchanania Latifolia Roxb (Buchanania-lanzan-Spreng).It,belongs to Family –Anacaradaceae It is one dry fruit seeds commonly used in various receipes in India. They are tiny almond-flavoured dried seeds of a bush. Charoli mainly grows in tropical region of India. Shende S. and Rai M(2005) and it is an endemic as well as vulnerable plant. Flowering season is from january to march. It is cultivated across India, primarily in the northwest. The roots of charoli gives cooling effect and are useful in treatment of diarrhoea. Skin diseases can be cured with its leaves. Fruits are used in treating cough and asthma. It grows on yellow sandy loam soil and is a commercially useful tree species throughout. Chironji – Buchanania lanzan, Charoli is called Priyala in Ayurveda. It is used as a cooking spice. It is aphrodisiac, nourishing, cardiac tonic but it may cause indigestion. Charoli seeds are used in the Ayurveda and Unani systems of medicine. Pankaj Oudhia, Robert E. Paull 2008. India is striving hard to increase agricultural production with a view to accelerate food production to feed the ever increasing population through an integrated approach towards the application of farm technology (Neergaard, 1970; Dharamvir, 1974) . About 90 percent of all food crops are propagated through seeds. They act as passive carriers of fungi, bacteria, viruses and nematodes. Bakers (1972) defined seed borne pathogens and a large number of pathogens belonging to 90 fungal and 5 bacterial genera are seed transmitted (Phatak, 1980; Tomlinson, 1987). Among the various microorganisms associated with seeds, fungi play an important role in determining the quality of grains and seeds (Mirocha et al. 1976; Dennis, 1977, Gupta, 1994).

Methods and Material:

Collection of Seeds: The seeds were collected from local market from retailer shop.

Detection of Seed Mycoflora

The seed mycoflora was isolated by using standard blotter paper method, Agar plate method and Seed washing method as recommended by International Seed Testing Association (ISTA,1966), De Tempe (1970), Neergaard (1973) and Agrawal (1976). Observations were recorded in percent incidence of seed borne pathogens, its association with non-germinated seed and distribution on seed surface. Fungi which appeared on seed were isolated in pure culture for identification and for further study. Three different methods of isolation techniques for assessment of seed mycoflora were used.

I. Standard blotter paper method:

This is the most convenient and efficient of all the incubation methods. Doyer (1938) was first to adopt blotter paper method in seed health testing. A pair of white blotter papers 8.5 cm diameter were soaked in sterile distilled water, and were placed in pre-sterilized petriplates of 10 cm diameter. Ten seeds of test sample per petriplate were then placed at equal distance on moist blotter. 400 seeds were used in each experiment. The plates were incubated at 25 $\pm$ 2^0c under diurnal conditions. On seventh day of incubation seeds were first examined under stereoscopic microscope for determining the fungal growth. The identification and further confirmation of seed borne fungi was made by preparing slides of the fungi.

II.Agar plate method

In Northern Ireland, Muskett and Malone (1941) first used this method for seed health testing. In this method, pre sterilized petriplates were poured with 15 ml of autoclaved Glucose Nitrate Agar medium (GNA) or potato dextrose Agar (PDA). On cooling of the medium ten seeds per plate of the sample to be studies were equidistantly placed aseptically. Incubation and other details of the study were same as described for blotter test method. The various moulds appeared on seeds in blotter and Agar plates were isolated and maintained on GNA slants.

III. Seed washing method:

100 seeds were taken in flask with sterile distilled water for their soaking. The flasks were subjected to mechanical shaker for 5 – 10 minutes. One ml of seed washing thus, obtained was plated on GNA. The plates were incubated at room temperature for development of colonies and observation were made. Fungi developed within 3 days. These colonies were immediately transferred to GNA / PDA slants for further study.

ISOLATION OF SEED BORNE FUNGI AND ASSESSMENT OF SEED MYCOFLORA OF CHAROLI.

Charoli seeds were investigated for the incidence of mycoflora. The seeds were incubated on standard blotter paper, agar plate and seed washing at $27^0\pm$ 2^0 c for a period of seven days. The surface unsterilized and sterilized seeds were subjected to the test. The observations of fungi for percent incidence were recorded.

Table 1. Fungi Isolated From Seeds of Charoli *Buchanania lanzan.*

Sr.No	Name of fungi	Percent (%) Incidence of Mycoflora						Appearance of colony
		Standard blotter Paper		Agar plate		Seed Washing		
		USS	SS	USS	SS	USS	SS	
1.	***Aspergillus flavus***	50	48	51	49	48	40	Early
2.	***Aspergillus niger***	48	45	49	45	45	39	Early
3.	***Aspergillus candidus***	45	40	45	41	42	40	Early
4.	***Aspergillus fumigatus***	30	25	32	29	30	25	Early
5.	***Aspergillus terreus***	20	18	21	18	21	20	Early
6.	***Alternaria alternata***	20	19	18	15	19	18	Late
7.	***Fusarium oxysporum***	15	14	16	15	16	14	Early
8.	***Fusarium semitectum***	10	08	12	10	09	06	Late
9.	***M. phaseolina***	10	08	11	06	10	05	Late
10.	***Penicillium citrinum***	10	08	11	10	08	04	Late
11.	***Sclerotium rolfsii***	05	05	05	03	05	00	Late

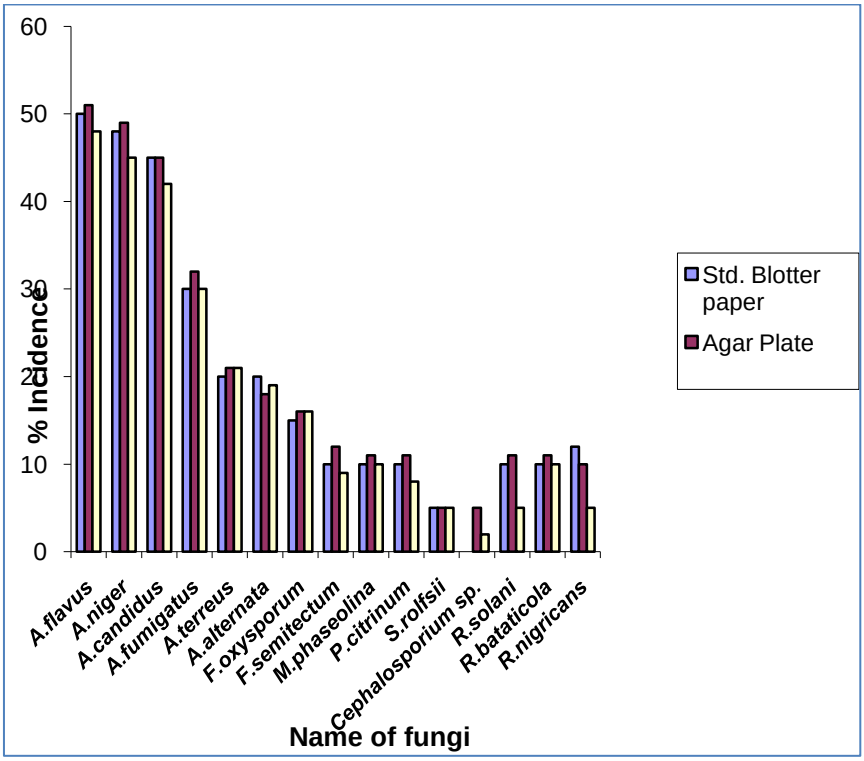
12.	***Cephalosporium sp.***	**00**	**02**	**05**	**02**	**02**	**00**	**Late**
13.	***Rhizoctonia solani***	**10**	**08**	**11**	**05**	**05**	**02**	**Late**
14.	***Rhizoctonia bataticola***	**10**	**05**	**11**	**06**	**10**	**05**	**Late**
15.	***Rhizopus nigricans***	**12**	**02**	**10**	**05**	**05**	**00**	**Late**

Result And Disscussion:

In all fifteen fungi were found to be associated with the seeds of this cultivar shown in table 1, Fig.1 and plate**–I**. In case of standard blotter paper, the percent incidence of ***Aspergillus flavus*** (50%) was highest followed by ***Aspergillus niger*** (48%) , ***Aspergillus candidus*** (45%), ***Aspergillus fumigatus*** (30%), ***Aspergillus terreus (***(20**%)** and ***Alternaria alternata*** (20%).Where as all other fungi were within the range of (2-15%). ***Sclerotium rolfsii*** was recorded in traces***. Cephalosporium*** sp. was not recorded.

In case of agar plate ***Aspergillus flavus*** (51%) gave highest percentage of incidence and followed by ***Aspergillus niger*** (49%), ***Aspergillus candidus*** (45%) and ***Aspergillus fumigatus*** (32%) In case of seed washing ***Aspergillus flavus*** shows (48%) while ***Aspergillus niger*** (45%) and ***Aspergillus candidus*** (42%). ***Sclerotium rolfgii***, ***Cephalosporium*** sp. and ***Rhizopus nigricans*** were not recorded on surface sterilized seeds.

It is clear that among three methods agar plate favours the growth of fungi and gives higher percent incidence. Seed is the most important unit of crop production and its health plays important role in agriculture, which determines the plant population and final yield. One of the major constraints that deteriorate the seed quality is the seed-borne fungi present inside or on the surface of seeds



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Studies on host range of Alternaria alternata isolated from *Ocimum santum.*

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ABSTRACT *Species of Alternaria cause range of disease with great economic importance on large variety of medicinal herbaceous plants cultivated for its medicinal properties. Alternaria species are parasitic causing leaf spot diseases. It shows diversity with respect to morphological, physiological, pathological, molecular and cultural level. Virulence and sporulation found to be different on different medicinal plants which leads to significant bio-diversity. The results regarding qualitative and quantitative incidence of Alternaria alternata were found to be variable in different types of herbaceous medicinal plants.*

Fourty nine cultivated weed spacies of botanical families of medicinal plants were artificially inoculated ,of this 26 species were found to be susceptible to Alternaria alternata.

Key words:-Alternaria alternata , Medicinal plants, Leaf mycoflor

Introduction

Introduction:-

Leaf is the basic and most vital part of the plants having medicinal properties, it is used while forming various types of infusions and paste and decoction for curing the particular disease. Leafs are playing role as a host for fungal growth and contamination .Leaf associated mycoflora of medicinal plants show great host range of *Alternaria alternata*. The isolation from different herbaceous medicinal plants have been found to be differing with varying virulence and sporulation. The occurrence of *Alternaria* species on different varieties of medicinal plants showed significant biodiversity.

Many *Alternaria* species showed their incidence on leafs along with the other leafs spot disease causing fungi. The result regarding qualitative and quantitative incidence of *Alternaria* were found to be variable in different types of medicinal herbaceous plants.

Present study were carried out to know the ability of *Alternaria alternata* to degrade and utilize the medicinal plant content .The degrade and utilize biodeterioration of medicinal values indicate the host range of *Alternaria alternata*.

Methodology:-

Collection of sample:-In present research work the fungal infected leaf of *Ocimum santum* is collected randomly and fresh infected leaf is used for the isolation of fungus.

Isolation :-For fungal isolation Potato dextrose agar (PDA) plate method is adopted .Isolation was done using PDA media. Inoculation of infected sample on growth media and identification of isolates was next step leading to microscopic observations.

Pathogenicity of isolates: -Pathogenicity test was carried out by using Koch's postulate. Mean of host range screening was Artificially inoculated plants which were grown in sterilized soil. The plants were kept at room temperature under Day light florescent lamps to induce sporulation. Conidia were washed off with tap water and filtered through chesse cloth.

In all experiments, sections were cut from the margins of lesions on infected plants and washed with sterile water. Growth of isolate on subculture media used to screen presence of *Alternaria alternate.* A leaf spot index (LSI) based on a 0-5 visual scale was used to score suspectibility to infection by the pathogen. The scale was based on the number and size of lesions and the percentage of leaf area affected on the whole plant.

Table of host range of A.alternata:-

Sr.	Name of the plant and family	Presence of *A.alternata*
1	*Abutilon indicum* (L.) Swe (Malvaceae)	-ve
2	*Acalypha indica L.* (Euphorbiaceae)	-ve

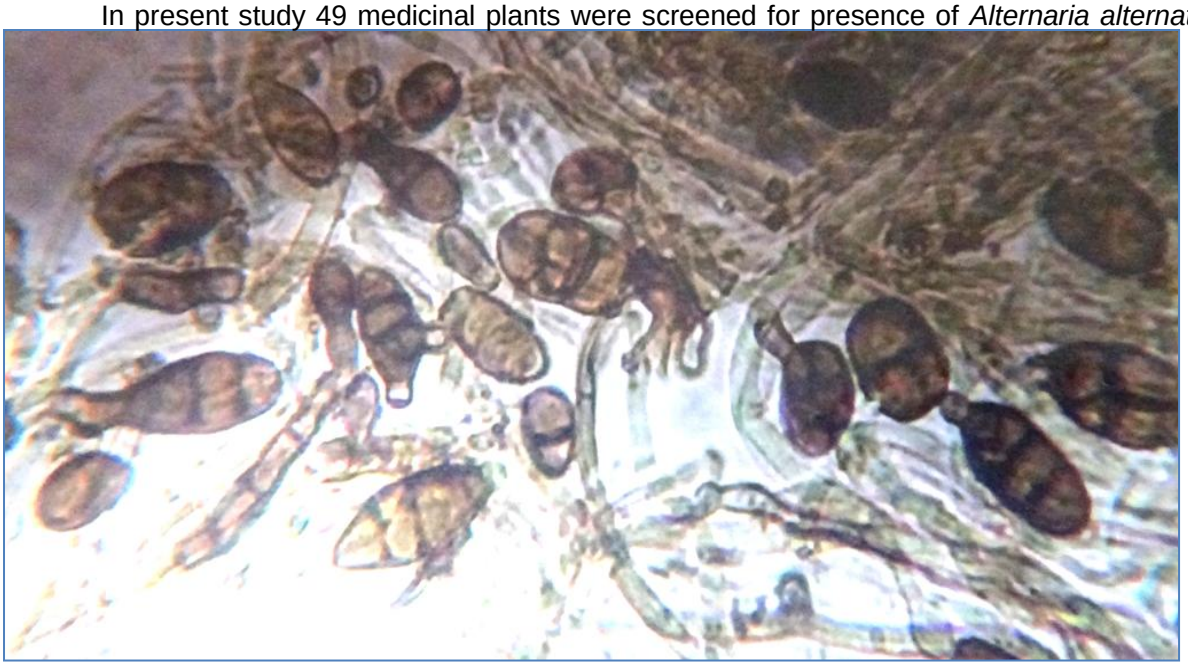
3	*Adhatoda zeylanica* Medic, (Acanthaceae)	+ve
4	*Agave Americana (Agavaceae)*	+ve
5	*Alocasia indica (Alocaceae)*	+ve
6	*Aloe –vera* (L.) Burm.F. (Liliaceae)	+ve
7	*Argemon alternat L.* (Papaveraceae)	-ve
8	*Biophytum sensitivum*(L.)DC., (Oxalidaceae)	-ve
9	*Basella alba* (L.) (Basellaceae)	+ve
10	*Barleria prionitus* (L.) (Acanthaceae)	+ve
11	*Bracuca nigra* (L) Koch. (Brassicaceae)	+ve
12	*Calotropis* procera (Ait.) R.Br. (Asclepiadaceae)	-ve
13	*Cassia tora* L., (Caesalpiniaceae)	+ve
14	*Cathranthus roseus* (L.)G.Don., (Apocynaceae)	-ve
15	*Cleome alterna* L. (Cleomaceae)	-ve
16	*Curcuma loga L.,* (Zingiberaceae)	-ve
17	*Cyperus rotundus L.,* (Cyperraceae)	+ve
18	*Datura innoxia* mill., (Solanaceae)	+ve
19	*Datura metel L.,* (Solanaceae)	+ve
20	***Dioscria** bulbifera* L., (Dioscoraceae)	-ve
21	*Erythrina verigatya* L. (Fabaceae)	-ve
22	*Hibiscus rasa–sinensis* L. (Malvaceae)	-ve
23	*Hygrophila schulli* (B.Ham) S.M.Al., (Acanthaceae)	-ve
24	*Ipomoea fistulosa* Mart .ex Choisy. (Convolvulaceae)	+ve
25	*Jasminum sambac* (L.) Ait., (Coleaceae)	+ve
26	*Jatropha curcas* L. (Euphorbiaceae)	_ve
27	*Kalanchoe pinnata* (Lamk.)Pers., (crasssulaceae)	+ve
28	*Lawsonia inermis* L. Pers. (Lythraceae)	-ve
29	*Lufiaacutangula* var.acutangula (L.) Ron (cucurbitaceae)	+ve
30	*Linum usitatissium* (L) (Linaceae)	+ve
31	*Mentha spicata L .,* (Lamiaceae)	+ve
32	*Mimosa pudica* L. (Mimosaceae)	-ve
33	*Momordica harantia L.* (Cucurbiraceae)	+ve
34	*Nerium indicum* mill ., (Apocynaceae)	-ve
35	*Ocimum* santum (Lamiaceae)	+ve
36	*Oxalis* carniculata L. (Oxilidaceae)	-ve
37	*Quisqualis indica L.* (Combretaceae)	-ve
38	*Raphanus sativus* L. (Brassicaceae)	+ve
39	*Rauvolfia tetraphylia* L. (Apocynaceae)	+ve
40	*Sesamum indicum* L. (Pesaliaceae)	-Ve
41	*Solanum virginanum* L. (Solanaceae)	+ve
42	*Tinospora cordifolia* (wild .)Miers.(Menispermmaceae)	-ve
43	*Tridex procumbens L.,* (Asteraceae)	+ve
44	Trigonella *foenum* –Graecum L., (Fabaceae)	+ve
45	Tylophora *indica* (Burm.f.)Merr.,(Asclepidaceae)	-ve
46	*Triumphetta malabarica* Koen –ex.Rottb. (Tiliaceae)	-ve
47	*Vitex negundo L.,* (vitaceae)	+ve
48	*Withania somnifera* (L.) Dunal (solanaceae)	-ve
49	*Xanthium indicum Koen.,* (Asteraceae***)***	+ve

Result and discussion: Fungi are responsible for inducing many physiological changes in the plant as a whole or any part of it which termed as plant diseases. Relationship between pathogen and host play imp. role as both effects each other . Host provides nourishment to growing pathogen and disease spread. Proper control of fungal diseases in today scenario requires detail understanding of host –pathogen complexicity. Diseases control strategy must follow the host –renge study which becoming the important attribute in Mycology. *Alternaria* cause renge of diseases to medicinal plants also.it show physiological and morphological diversity in respect to host renge on medicinally important plants. *Alternaria* species are parasitic causing leaf spot diseases. Some species of *Alternaria* produce a variety of mycotoxins,

including *A .alternata*. (Alexopoulos & Mims, 2004).The identification and isolation of *Alternaria alternata* from different medicinal plants have been found to be differing with virulence and sporulation in regards to specific host range occurrence. Growth pattern, physiological behaviour, virulence and sporulation regarding host specificity define various aspects of host range.

Alternaria alternata on Ocimum sanctums

In present study 49 medicinal plants were screened for presence of *Alternaria alternata*



out of total plant species 26 plants spotted as host for respected fungi and 23 medicinal plants found avoiding host renge.

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Studies on Leaf Spot Diseases of Medicinal Plants at Toranmal Area of Nandurbar District.

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ABSTRACT *Toranmal is a second coolest hill station in the Maharashtra state. Satpuda mountains not only covers the hilly ranges but also become important in tribal life style of various ethnic groups inhabiting the Toranmal area .Medicinal plants surrounding areas are having life saving drugs used by ethnic peoples from historical ages. Leaf is a vital part of plant frequently used by tribals of Toranmal area of Nandurbar district in Ethnomedicinal preparations. While using the leaves as Ethno medicines , leaf spot diseases of medicinal plants are ignored. It may cause side effects due to toxicity of mycoflora present on leaves. So present paper focuses on leaf spot diseases of 15 species with 12 families.*

Key words :- Leaf spot diseases , Toranmal area , Ethnomedicinal plants.

Introduction:

Toranmal is an hill station in Akrani taluka of Nanadurbar district. It is rich in heritage of greenery, cultural significance and incredible natural surroundings .It is located between Latitude 21 degrees ,54 minutes N and Longitude 74 degrees 27 minutes E and 74 degrees ,30 minutes above sea level (M.B.Patil 2015). Tornmal is second coolest hill station in the Maharashtra state .The name 'Tornmal ' is given due to frequently occurring plant known by the name 'Torna ' (*Zizuphus rugosa*) ,another story about name suggest that name is derived from Torna'- a tribal goddess who is present in temple located in hilly regions of plateau.

It have an approximate area of 41.43 sq. kilometres ,Yashwant Lake which covers about 1.59 km and a maximum depth of 27 meters , kamal talab or Lotus lake covered with lotus flower and beautiful waterfall in rainy season called Sita Khai ,another view points are Aawashabari , Gorakshnath Temple ,Khaki point ,Machindra Gumpha ,Forest etc. The population of Toranmal is 30,000 of which 60% is tribal. Gorakhnath temple is the site of a yatra attended by thousands of devotees on Mahashivratri. Pilgrims come from Maharashtra, Madhya Pradesh and Gujarat.

Toranmal is a site where various types of Medicinal plants are occurring in natural surroundings .Many of medicinal plants are infected by fungal disease specially with leaf-spot diseases. As per the Dictionary.com, leaf spot may be defined as " A limited often circular ,discoloured ,diseases areas on a leaf ,usually including a central region of necrosis''. The highest species richness as well as frequency of colonization of endophytic fungi was found in the leaf segments, rather than the stem and bark segments of the host plant species. (N .S. Raviraja Dr.et.al.2005). All pathogens which occurrence on medicinal plants seriously damages the Secretary oil contained in infected plants modifying the composition of the plants volatile fraction (D'Aulerio,A.Z.-Zambonellia,A.1995.)

Tribal surrounding Toranmal uses Ethnomedicines easily available to them .The leaf plays important role in preparation .But diseases like fungal spot diseases of medicinal plants are not taken into consideration and there is huge possibility of fungal contamination in such preparation .So fungal leaf spot diseases plays

key role in such type of research work, which provide a tiny stage contributing towards diseases of medicinal plants.

Medicinal Plants Conserved Area, Toranmal, District –Nandurbar

Methodology:

Densely populated areas of medicinal plants of Toranmal are visited frequently during the period of Nov.Dec.2015 to Jan.-Feb .2016. The collection of leaf spot diseases of certain medicinal plants is done during the period .Each type of leaf spot of particular species was collected in the sterile polythin bags. The infected material was carried to the laboratory for further study.The fungal pathogen responsible for leaf spot was isolated on solid PDA (Potato Dextrose Agar) media.

with the help of inoculation of small infected areas of leaf on the PDA amended petridish in sterile environmental diseases undergo through the same procedure. incubation of inoculated plates were done at room temperature 23 +- 1c0 .The inoculated plates were observed of respective medicinal plants was purified by repeated identification of isolates was by microscopic observation based upon growth pattern , hyphae structure and spore types.

Table: Leaf spot diseases of medicinal plants at Toranmal Dist. Nandurbar.

Sr no	Botanical Name Of Medicinal Plants	Common Name	Family	Fungal pathogen causing Leaf Spot diseases
1	*Abrus precatorius L.*	Gunja,Ratti	Leguminosae	• *Pseudocercospora abricola.*
2	*Aloe vera (L) Burmf.*	Korphad	Liliaceae	• *Alternaria sp.* • *Colletotrichum pestalotiopsis.*
3	*Buchnania Lanzan spr*	Charoli	Anacardeaceae	• *Colletotrichum gloeosporioides.*
4	*Cassia tora L.*	Tarota	Caesalpinacea e	• *Alternaria cassia,* • *Corynespora cassiicola.*
5	*Diospyros melanoxylon Roxb.*	Tembru	Ebenaceae	• *Cercospora kaki.*
6	*Eucalyptus sp.*	Nilgiri	Myrtaceae	• *Bartalinia terricola,* • *Ceracospora brachiata,* • *Cylindrocladium clavatum* • *Phomopsis eucalypti zerova*
7	*Jatropha curcas L.*	Chandra	Euphorbiaceae	• *Cercospora sp.* • *Pseudocercospora sp.*
8	*Madhuca longifolia (Koen)Macbr.*	Mohu	Sapotaceae	• *Ceracospora haticola* • *Pastalotia peraguariensis* • *Pestolotiopsis dichacta.*
9	*Nyctanthes arbor-tristis*	Parijat	Oleaceae	• *Corynespora cassiicola*
10	*Ricinus communis L.*	Aerand	Euphorbiaceae	• *Alternaria ricini* • *Cercospora ricinella*
11	*Synzigiun cumini (L).Skeels*	Jambhul ,Jamann	Myrtaceae	• *Pestalotia sp.*
12	*Tectona grandis L.*	Sagwan,	Varbanaceae	• *Cercospora tectonae,* • *Colletotrichum*

				gloeosporioides
13	*Terminalia arjuna*	Arjuna	Combretaceae	• *Pestalotiopsis palmarum.*
14	*Terminalia bellirica(Gaertn.) Roxb*	Behada	Combrataceae	• *Alternaria alternata* • *Curvularia lunata,* • *Mystrosporiella terminalae*
15	*Typha domingensis Per.*	Pankanis,Padukadi,Bagburi	Typaceae	• *Epipolaeumty pharum* • *Phomatyphae dominguenis*

Result and discussion: Medicinal plants playing important role in the life of Tribal peoples. Nature is providing resources and opportunities for tribal to survive and sustain in extreme conditions. Due to lack of communication and endemism they totally depend upon nature for healthcare. Historical wisdom of uses of medicinal plants provides chances to overcome health problems. Leaf is the most important part of plant used for such a preparation on local level, though it also playing role as a host for different microorganism. Fungi are important microorganism causing leaf spot diseases.

Figure :2*) Aloe vera* Leaf spot

Figure: 1) *Abrus precatorius* Leaf spot

Figure : 3) *Jatropha curcas* Leaf spot

Preparations made with such a leaf spot diseases ,show harmful results. Contamination of fungi may cause lethal effects as it is having mycotoxins. But local healers are not aware of this facts. Many peoples are turning towards phytopathy,and if leaf spot diseases are ignored.it may dangerous for the phytotherapy thats why present research aims to study leaf spot diseases of certain medicinal plants of Toranmal Area of Nandurbar district. Above listed Fifteen medicinal plants shows the presence of leaf spot diseases.

This plants leafs are mostly used for medicinal preparations to treat various kinds of diseases with different methods and medium. Various types of fungi present on leafs. *Cercospora* spp. found most abundunt. Some fungi present on host are pathogenic and some are only associated to particular host. Leaf spot symptoms present on diseased leafs. Symptoms changes according to plant host and the causal fungus. A typical leaf spot changes from pin head size to whole encompassing entire leaf .In early growing season wet ,cool and moist environment favours leaf spots.

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EFFECT OF STORAGE CONDITION ON STABILITY OF B-CAROTENE OF SOME LEAFY VEGETABLES

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ABSTRACT *β-Carotene is the precursor of vitamin A. The major source of vitamin A is carotenoids specially β -carotene, essential for normal growth and development of immune system function. Vitamin A also functions as antioxidants. β -carotene is helpful in protecting cancer, liver, prostate cancer etc. They help body from damaging molecule called free radicals due to their potency as an antioxidant. The carotenoids as the primary dietary source of pro-vitamin A, they are converted into vitamin A (retinol) helpful in good vision, eye health and healthy Skin. During pregnancy and breastfeeding period, vitamin A has important role in healthy development of fetus. Almost all green leafy vegetables and fruits are rich source of β-carotene. Storage conditions affect on bioavailability of β-carotene. During present piece of work we have seen effect of different concentrations of lemon juice on bioavailability of β-carotene on various vegetables. Some selected vegetables were Methi (Trigonella foenum graecum L.), Spinach (Spinacia oleracea L.), Coriander (Coriandrum sativum L.) and Shepu (Anthum graveolens L.). The level of β-carotene was determined by using Holden's method. From the results it was revealed that stability of β-carotene was increased by treating vegetables with different concentrations of lemon juice.*

Key words *- β-carotene, Bioavailability, Leafy Vegetables**:***

Introduction:

The leafy vegetables contain vitamins, minerals and carotenoids acts as antioxidants. The vegetables are excellent source of fiber, folate and carotenoids; also contain vitamin C, K and minerals iron, calcium **(Sheetal Gupta, 2013)**. Diets rich in potassium may help to maintain healthy body and blood pressure. Some of the vegetables are good sources of carbohydrates (leguminous vegetables, sweet potato, potato, onion, garlic and methi), proteins (peas, beams, leafy vegetables and garlic), vitamin A (carrot, tomato, drumstick, leafy vegetables), Vitamin B (peas, garlic and tomato), Vitamin C (green chilies, drumstick leaves, Cole crops, leafy vegetables and leaves of radish), minerals (leafy vegetables, drumstick pods). As per dietician, daily requirement of vegetables is 75 - 125 g of green leafy vegetables, 85 g of other vegetables and 85 g of roots and tubers with other food.The leafy vegetables have been widely used in many countries for various kinds of salads, such as fresh, mixed or garnish salad.

The Importance of β-carotene in human diet:

Vegetables are an important place in the vegetation diets in India. The body needs dietary fats to absorb in the carotene and vitamin present in leafy vegetables β-Carotene is the most prominent member of the group of carotenoids natural colorants that occur in the human diet **(Tilman Grune, 2010).** Important components of vegetables include vitamins, particularly those that act asantioxidants. Antioxidant compounds, vitamin A and β -carotene are present in the greatest quantity in vegetables**. (L.A.Howard, 1999).** Dietary beta-carotene is obtained from a number of fruits and vegetables, among the vegetables the most important sources of carotenoids are Carrots, Spinach, Trigonella, Coriander, apricots and sweet potatoes. Carotenoids also play an important potential role in human health by acting as biological antioxidants (**Farida Anjum, 2008).** Bioavailability is the efficiency with which ingested pro-vitamin A. Carotenoids are absorbed into vitamin A in the body. The nutritional quality of minerals in vegetables depends on quantity as well as bioavailability. The products of the carotenoids metabolism are vitamin A, very active compound, other common carotenoids like- β-cryproxanthin, α-carotene, were considered to active β-carotene **(Joao Gustavo Provesi, 2011).** Carotenoids in leafy vegetables can stop the growth of the certain types of skin diseases, stomach cancer, lung cancer etc.

Materials and methods:

The selected fresh leafy vegetables were purchased from local market at Aurangabad. The samples were washed thoroughly with tap water. The fresh leafy vegetables viz. Trigonella, Spinach, Dill and Coriander were soaked into different concentration of lemon juice viz. 1%, 5%, 10% and 15%. These soaked vegetables were separately kept in polythene bags in a refrigerator at 4ºc and were analyzed to extract β –carotene after 16, 24, 48 hours.

Extraction of β-carotene: The β- carotene from the samples was as separated by Holden's method. After extraction the reading was measured on single beam spectrophotometer (systronics) at the wavelength of 450nm.

Result and Discussion:-

To study the effect of storage condition by treating the vegetables with preservative lemon juice with various concentration of lemon juice, the level of β- carotene in Fenugreek, Spinach, Dill, and Coriander was estimated. The level of β-carotene was 3.2, 3.98, 2.8, and 0.46 for Trigonella, Spinach, Dill and Coriander respectively. Concentration of lemon juice was 1%, 5%, 10%, 15% respectively. The β- carotene content of the fresh vegetable after has been given in table no.1. Vegetables were soaked in lemon juice to check the losses due to degradation of carotenoids. The level of β- carotene at 16, 24 and 36 hours was decreased in 1% lemon solution. The same vegetables were soaked in 5% lemon juice where there was further decrease in level of β– carotene. When these vegetables were subjected to 10% concentration here level of β - carotene was increased after 36 hours. Lastly these vegetables were subjected to 15% concentration here level of β - carotene was increased double to that of control. The highest readings were noted in case of 10 % and 15 % solution at 36 hours in case of Trigonella followed by Spinach and Dill. During observations it was noticed that the level of moisture decreases but at lower concentration of lemon juice β-carotene level also decreases. Secondly at higher concentration of lemon juice treated samples show positive correlation and even there is weight loss but level of carotene increases.

Conclusion:

From the results it was concluded that, there is lack of adequate facilities for preservation of vegetables. Vegetables once brought from weekly market could not preserve for 7 to 8 days. Vegetable is not grown in ample due to lack of irrigation facilities. Even though it has been produced 40% population is below poverty line and could not purchase refrigerators. At these circumstances it is essential to find out alternatives for preservation of vegetables. The lemon is chiefly available in the rest of months of the year average population can also take benefit of this technique.

Table No. 1: Effect of lemon juice on Stability of β- carotene

Name of the vegetable	Fresh Sample	Conc. % of Lemon juice	16 hrs.		24 hrs.		48 hrs.	
			control	Treatment	control	Treatment	control	Treatment
Trigonella **Spinach** **Dill** **Coriander**	3.2 3.98 2.8 0.46	1	3.1 2.6 2.16 0.48	2.2 1.98 1.92 0.38	2.4 2.34. 1.84 0.94	2.1 1.94 1.8 **0.95**	2.06 2.02 1.78 1.3	**1.98** **2.5** 1.58 1.24
Trigonella **Spinach** **Dill** **coriander**	0.98 0.67 1.1 0.96	5	0.64 0.24 0.6 0.38	**0.66** 0.22 0.84 **0.48**	0.9 1.04 0.78 0.95	0.98 **1.22** 0.72 0.94	1.04 1.12 1.02 1.24	**1.1** **1.2** **0.98** **1.3**

Trigonella	1.3		1.4	**1.46**	1.2	1.18	0.98	**1.24**
Spinach	1.1		0.84	0.9	1.24	**1.3**	1.1	**1.14**
Dill	0.89	10	0.98	**1.1**	0.92	**1.02**	1.32	**1.38**
Coriander	0.66		0.64	**0.82**	1.1	1.16	1.08	**1.12**
Trigonella	1.12		0.72	**0.88**	0.9	0.78	1.3	**1.48**
Spinach	1.2		1.3	**1.38**	1.2	**1.14**	1.22	**1.38**
Dill	0.98	15	0.78	0.72	0.82	0.62	0.78	0.74
Coriander	0.78		0.44	0.54	0.64	**0.7**	0.88	**0.96**

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