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27. ISOLATION OF FUNGI FROM DEGRADED VEGETABLES WASTES

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ABSTRACT

Market places and agricultural area the people negligees towards the degraded vegetable waste which left behind. Particularly these wastes vegetable, impact on environment pollution. These waste vegetables thrown in open space it become a health hazards. In the present investigation, isolation of potential fungal strains from degraded vegetable waste has been made. Fungi superior for degradation and utilization of vegetables waste in the biocompost. Collection of some fruity vegetable waste included, Onion, Tomato, Brinjal, Sweet Pepper, and Green Bean_waste from Jalna district for laboratory purposes i.e. Isolation and identification of fungi associated with vegetable waste were carried out. Vegetables waste material inoculated on PDA at $27^{\pm}$ 2^{0}c for isolation of different fungi. Total of 29 entities were isolated, 6 species from _Onion, 6 species from Tomato, 7 species from Brinjal, 4 species from Sweet Pepper and 6 species from Green Bean. Maximum incidence of fungi like *Aspergillus niger*, *A. flavus*, *Fusarium oxysporum*, *Rhizopus stolanifer* followed to *Penicillium* sp was found. These fungi might be developing ability to degrade the waste.

KEY WORD: Isolation, Fungi, Waste Vegetables, PDA.

Introduction:

Fruits and vegetables generally have necessary vitamins, fats, minerals and oil in the right proportion to maintain growth and development. However fruits and vegetable, have serious challenges to their existence and these may affected and get spoilage by pests, in adequate rainfall and fungal attack Amusa, N.A., Kehinde, I.A. and Ashaye, O.A. (2002). A huge amount of these materials are left on farmlands to be decomposed by microorganism such as bacteria and fungi. The ability of some microorganisms to metabolize lignin and hemicelluloses (Silva, *et al.*, 2005), beside the increasing energy demand has focused worldwide attention on the utilization of renewable resources, particularly vegetable residues, agricultural and agro-industrial wastes, such as sugarcane bagasse (Acuna-Arguelles, *et al.*, 1994), wheat bran (Singh, *et al.*, 1999).

On the other hand, their major components as cellulose, starch, lignin, xylan, and pectin can be used by several microorganisms both as a source of energy for growth and as carbon source for synthesis of cell biomass and producing enzymes and other products with high commercial value (de Freitas, *et al.*, 2006 and Costa, *et al.*, 2007).

The genus *Aspergillus* encompasses organisms whose characteristics are of high pathological, agricultural , industrial, pharmaceutical, scientific and cultural importance and play a important role in the degradation of organic substrate, particularly plant material (Bignell, 2010; Goldman & Osmani, 2008; Samson & Varga, 2009).Fungal genera like *Trichoderma* and *Aspergillus* are known to be cellulase producers and crude enzymes produced by these microorganisms are commercially available for agricultural

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use Peij N. Gielkens MMC et al. (1995), the capacity of thermophilic microorganisms to assimilate organic matter depends on their ability to produce the enzymes needs for degradation of the substrate. Tuomela M. & et al. (2000). *Aspergillus niger* is the more efficient for the degradation of agriculture wastes.

Microbes play important role in degradation of waste, particularly fungi. The present investigation made on isolation of these degrading fungi.

Material and Methods

Collection of samples

Different vegetable waste that is Onion, Tomato, Brinjal, Sweet Pepper and Green Bean waste were collected from agriculture and market places. Samples are separately kept inside clean plastic bags, transfer to laboratory and store at room temperature until mycological analysis (Mohmoud,et al.,2011). The vegetable wastes cut in to pieces were inoculated on agar medium for isolation of fungi.

Isolation and Identification of fungi

PDA was prepared the standard procedure contained per liter: Potato 200gm, Dextrose 20gm, Agar 20gm and 1000ml distilled water. (Anonymous, 1968) and the pH was adjusted to 6.00 using pH meter with the help of 1% HCl. The medium was then sterilized in an autoclave at 121°C temperature for 15 minutes. They were prepared according to the manufacturer's instructions. The infected samples of dates were cut into 3 mm pieces with sterile razor blade, surface-sterilized in 0.1% Mercury chloride ($HgCl_2$) for 2 minutes, then placed on Potato Dextrose Agar (PDA) one percent stryptomycin solution was added to the medium before pouring in to petriplates for preventing bacterial growth and incubated at room temperature for 5 days. After incubation, colonies of different shape and colors were observed on the plates. A pure culture of each colony type on each plate was obtained and maintained. The maintenance was done by sub-culturing each of the different colonies onto the PDA plates and incubated at room temperature again for 5 days (Jha, 1995).

The technique of James and Natalie (2001) was adopted for identification of the unknown isolated fungi using cotton blue in lactophenol stain. The identification was achieved by placing a drop of the stain on clean slide with the aid of a mounting needle, where a small portion of the mycelium from the fungal cultures was removed and placed in a drop of lactophenol. The mycelium was spread very well on the slide with the aid of the needle. A cover slip was gently applied with little pressure to eliminate air bubbles. The slide was then mounted and observed with x10 and x40 objective lenses respectively. The species encountered were identified in accordance with Chees brough (2000).Identification were made with help of standard literature, D. S. Mukadam (1997).

Table: 1. Isolation of fungi from vegetables waste on PDA:

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Waste sample				Onion		Tomato		Brinjal		Sweet Pepper		Green Bean	
Fungi	Colony colour		Texture	No. of colony	Incidence %	No. of colony	Incidence %	No. of colony	Incidence %	No. of colony	Incidence %	No. of colony	Incidence %
	Surface	Reverse											
Aspergillus niger	Black	Creamish White	Velvety	12	40	8	27	11	37	10	33	8	27
Aspergillus flavus	Yellow Green	Reddish Gold	Powdery	10	33	7	23	-	-	8	27	6	20
Fusarium oxysporum	White	Magenta red	Floccose	8	27	8	27	9	30	6	20	6	20
Rhizopus stolanifer	darken with ege	White	Velvety	8	27	11	37	10	33	9	30	7	23
Penicillium sp.	Olivacious Green with White margin	Orange to Red	Powdery	6	20	6	20	8	27	-	-	-	-
Alternaria alternata	Whitish green	Greyish Black	Cottony	4	13	5	17	5	17	-	-	6	20
Trichoderma harzianum	Light Green	Light yellow	Moderately compact	-	-	-	-	5	17		-	4	13
Curvularia lunata	Blackish Brown	Black	Downy	-	-	-	-	3	10	-	-	-	-

Result and Discussion:

The result from table, the study revealed eight fungal genera isolated from Onion, Tomato, Brinjal, Sweet Pepper, and Green Bean waste. Identification based on morphological characteristics by observing colony features (Color and Texture) and incidence percentage of fungi, The highest percentage of *Aspergillus niger* content 40% was recorded with Onion waste followed by Brinjal, Sweet Pepper, Tomato, and Green Bean waste which contained 37%, 33%, 27% 27%, respectively. Similar result were showed by K. Shehu, S. Muhammad (2011). The highest percentage of *Aspergillus flavus* content 33% was recorded with Onion waste followed by Tomato, Sweet Pepper, and Green Bean waste which contained 23%, 27%, and 20% respectively. The highest incidence percentage of *Fusarium oxysporum* content 30% was recorded with Brinjal waste followed by Onion, Tomato, Sweet Pepper, and Green Bean waste which contained 27%, 27%, 20%, 20% respectively. The highest incidence percentage of *Rhizopus stolanifer* content 37% was recorded with Tomato waste followed by Brinjal, Sweet Pepper, Onion and Green Bean waste which contained 33%,30%, 27% and 23% respectively. Ibrahim AD, Musa K, Sani A, Aliero A.A, Yusuf B.S (2011) The highest incidence

percentage of *Penicillium sp*. Content 27% in Brinjal waste followed by Onion and Tomato waste which contained 20%, 20% respectively. The highest incidence percentage of *Alternaria alternata* content 20% was recorded with Green Bean waste followed by Tomato, Brinjal and Onion waste which contained 17%, 17%, 13% respectively. The highest incidence percentage of Trichoderma content 17% was recorded with Brinjal waste followed by Gree Bean waste which contain 13% respectively. The incidence percentage of Curvularia lunata content 10% was recorded.

The result summarized indicate that the vegetables waste decaying successfully take place due to association of fungi. It can be concluded from the results regarding the degradation of vegetables waste with the help of these fungi. However, the fungi which appeared on vegetables waste but they are found to grow fast and degrade vegetables waste successfully among the isolated fungi like Aspergillus sp, *Fusrium sp*, *Rhizopus sp* fungi were present in high degree of surface of majority decomposed vegetable waste residues Onuorah Samuel1,* , Obika Ifeanyi2, (2015) and Sch. Acad. J. Biosci. (2014) This clearly indicate that these fungi might be developing ability to degrade.it is clear from the result concluded that deuteromycetes fungi superior for degradation and utilization of vegetables waste in to biocompost.

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