Solid Waste management by Degrading fungi

Namita Kumari and Surendra Kumar Prasad

Department of Botany, Magadha Mahila College, Patna-1 (India)

ABSTRACT

We witness a significant increase in day to day solid waste materials in all the areas. This is largely because of rapid population growth and economic development in the country. The per capita of municipal solid waste generated daily in India ranges from 100 gm. in small towns and 500 gm. in large towns. So solid waste management has become a major environmental issue today. It is well known fact that different mycoflora are very good decomposer. In our research project, we had identified the fungal population present in municipal waste soil of Patna. Fungal genera responsible for the degradation of so many vegetables and fruits had also been investigated. This gave a detailed microbial population present and responsible for the degradation of waste and its proper management.

Key words: Saprophytic, decomposition, environment, population.

Some soil fungi are beneficial for solid waste management. Some saprophytic fungi cause decay & decomposition of dead remain plants and their waste taking up the complex compounds (cellulose and lignin)by secreting enzymes. Many saprophytic fungi by degrading the plant wastes maintain the never ending cycle of co, (carbon dioxide), which is most important raw material for plant photosynthesis in nature. Present paper deals with extensive survey of fruits & vegetables degrading mycoflora from garbage soil of Patna using different baits ie fruit and vegetables.

Patna is the capital city of Bihar geographically located between 25.35°N

latitude and between 85.5° & 85.16° east latitude having a mean elevation of 173ft. above sea level. The city is warm populated and has comprehensive sectors such as residential, commercial, educational, medical, agricultural, other function.

Collection of samples :

During study soil samples of garbage site *i.e.*, Musallahpur Hat,Bazaar samiti, Rampur nahar were scraped from layer of soil not exceeding 10cm deep,mixed packed in sterilized polythene bags with 95% ethanol for 30 minutes and stored at 5°C.

(284)

Fungi	Aspergillus	A.niger	А.	Chaetomium	Curvularia	Mucor	Penici-	P. oxali-	Rhizo-
	flavus		fumigatus	globossum	lunata	sps	llium	сит	pus
							citrinum		nigricans
Garbage soil	+	+	+	+	+	+	+	+	+

Table-1. Fungal species recorded directly from soil sample

Table-2. Fungal species recorded in garbage soil samples collected using different baits (fruit & vegetables)

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SN.	Fungal sps	Asper-	Α.	Curvularia	Fusarium	Mucor	Penici-	Rhizopus	Tricho-
	Baits	gillus	niger	lunata	sp s	sps	llium	nigricans	derma
		flavus					sps		lignorum
1	Pyrus malus	+			+		+		+
2	Citrus limon	+	+				+		
3	Musa sapientum				+	+			
4	Solanum tuberosum			+	+				
5	Luffa cylindrica		+		+			+	+
6	Abelmoschus esculentus			+	+				

Selection of bait & and their preparation:

Two types of baits such as fruits & vegetables were taken.

Fruits	Vegetables				
1. Pyrus malus	1. Solanum tuberosum				
2. Musa sapientum	2. Luffa cylindrica				
3. Citrus limon	3. Abelmoschus esculentus				

All baits were cut into pieces and sterilized with 0.1% HgCl₂, solution for 1 minute, blot dry, repeated 5 times.

Procedure:

Fungal isolation was done by two methods-

1. Directly from soil using standardized soil dilution plate technique method:

Soil sample were taken from garbage of 15 different localities of Patna.

S.D.A., P.D.A.&R.B.A. mediums were used for isolation in this technique.

2. Soil using different baits-baiting method: Soil sample were taken in sterilized glass petridishes and moistened with sterilized distilled water. Bait after surface sterilization were uniformly distributed. These specimens were incubated in moist chamber for period of two weeks. After two weeks developed fungal were made slide for their identification and also made slant for isolation.

As indicated in table 1. Garbage soil consisted of fungi such as Aspergillus flavus, A. fumigatus, A. niger, Chaetomium globosum, Curvularia lunata, Mucor sps, Penicillium citrinum, P. oxalicum; Rhizopus nigricans.

Table-2. on bait fruit A. flavus, A.

niger. Fusarium sps, Mucor sps, Penicillium sps, Trichoderma lignorum & lekakoro found. On bait vegetables A.niger, curvularia lunata, Fusarium sps, Rhizopus nigricans & Torula graminis were observed, some fungi A. niger, Fusarium sps, Torula graminis were found on both.

A total of 12 differen fungal species were found, which were responsible for the degradation of different waste materials. All these fungal species were omnipresent in the soil of Patna and were actively involved in degradation of wastes and maintaining our ecosystem

James *et al.*² stuied yeast fungus from cloud forest reserve in Ecuador. Rashad *et al.*⁷. isolated *Fusarium oxysporium* on banana and Grape, *A. oryzae* on Orange, *A. niger* on apple, *A. flavus* on mango. Sarkar *et al.*⁹ said that fungus *Macrophomina phaseolina oryzae* degrade banana. Goeble *et al.*¹ studied the effect of farming system, habitat type, and bait type on the isolation of entomopathgenic fungi from citrus fruit soil in south Africa. Sarfaraj khan *et al.*⁸ explained fungi on vegetables and their ethnomedicinal value. Miedes and Lorences⁴ identified the *Penicillium* degraded apple and tomato. Perombelon *et al.*⁵ identified *Clostridium* species responsible for decay of Potatoes. Pieta *et al.*⁶, are related with degrading fruits and vegetables in soil.

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