

Screening of Suitable Microorganisms for Decomposing Organic Waste (Pressmud) *In Vitro*



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Abstract

The Organic Waste which are rich in Cellulose, Hemi Cellulose, Lignin and Wax, generally take 180 days or more in composting under normal conditions. It is necessary to work out the microbial technique for composting of pressmud in a shorter period.

For Decomposing the Organic Waste (Pressmud) *in Vitro*, a Survey of rural Land and Urban Compost pits of Shahjahanpur, Bareilly, Lucknow, and Sitapur districts, was made. 25 FYM Samples were collected from different compost pits were found. All the 25 Isolates were screened out for their initial decomposing ability viz-*Trichoderma Viride*, *Aspergillus nigr*, *Asperilous flavus*, *Rhizopurnigrieans* and *Aspergillus fumigatus* were taken for further study. The 1st, 2nd and 3rd sets of experiment were drawn on 30th, 60th & 90th days, respectively and the data were recorded on dry weight of organic matter (pressmud).

On the basis of percentage loss in dry weight of organic matter, *Trichoderma Viride* was found to have the highest decomposing ability at 60th days (60%) and at 90th days (65%) followed by *Aspergillus niger*, *Aspergillus flavus*, *Rhizopus nigricans* and *Aspergillus famigatus*.

Keywords: Pressmud, Screening, Dry Weight.

Introduction

The modern agriculture technique such as use of higher levels of inputs of fertilizers and Plant protection chemicals have destroyed stable traditional ecosystems. Which has caused the deterioration in physical, chemical and microbial activities of the Soil. It has been realized that the increase in production was achieved at the cost of soil health and that sustainable production at higher level is possible only by the proper use of factors which will help to maintain the fertility of soil. The addition of compost improves soil structure, textures & tilth (Biswas et. al 1971, Gaur et. al. 1972) and Hesse & Mishra 1982.

Aim of the Study

Recent years have witnessed renewed interest in recycling of farm, urban and agroindustrial wastes through biocomposting by which they are converted into organic manures. Composting is self heating, thermophilic and aerobic biological process which occurs naturally in Pressmud is an organic waste material of sugar industries. It is also known of filter cake. On an average each ton of sulphitation pressmud contains 17 Kg N, 36 Kg P, 14 kg & 23 Kg S besides secondary and trace elements (Yadav 2001). The organic wastes which are rich in Cellulose, hemicellulose, lignin and wax, generally take 180 days or more in Composting Under normal conditions. A rapid composting method by using microbial inoculant which can reduce the period of composting will be more acceptable to farmers and industries as well. The huge quantities of waste materials can be composted in a shorter period on a limited piece of land. It is therefore, necessary to work out the microbial technique for composting of pressmud in a shorter period, with this objective, the present study has been proposed for screening the micro organisms (Cellulolytic) having decomposing ability of pressmud (*in Vitro*).

Materials and Methods

Survey of rural & urban compost pits in different sugar factory zones of Shahjahanpur, Bareilly, Hardoi, Sitapur, Lakhimpur & Lucknow districts was made in month of August - October. The FYM (Farm Yard Manure) Sample were collected from different compost pits for isolation of micro-organisms. These samples were collected from different compost

pits for isolation of micro-organisms. These samples were collected very carefully and were kept in polybags and sealed them over a flame. By this process external contamination into the samples may be avoided. Now these samples were brought to the Soil Microbiology laboratory of sugarcane Research Institute, Shahjahanpur and were stored at ± 4 c in refrigerator for further studies. The fungi isolates were identified depending on their colonial characteristics, type of spores and their arrangement and other important Characteristics (Gilman, 1967, Domsch & Gams 1992, Ainsworth et.al 1973: Ellis 1976). Microorganisms of cellulolytic nature were isolated from the collected compost Samples by using serial dilution method (Gaur, 1990). Dilution of the samples in 1:10, 1:50, 1:100, 1:500 poured in all these test tubes. A long and strip of sterile filter paper was inserted in each test tube and fixed between the upper end with cotton plug and lower end of paper strip dipped in liquid medium (Dubos medium and diluted sample). All these test tubes were incubated at $28 \pm 2^\circ$ Croom temp) & periodic observations for decomposition of the paper were made. When mottled decomposed areas appeared, the paper strip from the test tube was removed and the affected area macerated in a small quantity of Sterile water. These solutions were plated on cellulose peptone agar and Rose Bengal agar medium using serial washing technique in petridishes. For each test tube single petridish was used and these were incubated at 28° C. When the colonies of microorganisms developed they were isolated of fresh medium in culture tubes. A total of 25 Isolations were made out of which 25 Isolates were obtained. Table1.

Results and Conclusion

The isolates having initial decomposing ability were identified on the basis of their mycelial growth characters and sporulations. Five isolates *Trichoderma Viricle*, *Aspergillus niger*, *Rhizopus nigricans*, *Aspergillus flavus* and *Aspergillus fumigates*. It was found that *Trichoderma viricle*, *Aspergillus niger*, *Rhizopus nigricaus*, *Aspergillus*

flavus & *Aspergillus fumigatus* were able to cause mottling & *Trichoderma virides* shows highest mottling on 5th day. Comparatively to others. The degree of mottling also varied periodically. It initiated on third day and reached maximum on sixth day. *Rhizopus nigricans* initiated on fourth day and reached maximum on Seventh day. *Aspergillus fumigatus* was initiated on fourth day and reached maximum on Sixth day. *Aspergillus flavus* was initiated on fifth day and reached maximum on eighth day Table (1)

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Table (1): Quantity of Inoculated Substrate (Pressmud) 40gms

S.No.	Isolates	Dry Weight of organic matter (g)					
		30 th days	%age loss in dry Wt.	60 th days	%age loss in dry Wt.	90 th days	%age loss in dry Wt.
1.	<i>Trichodermaviride</i>	23.0	42.5	16.0	60.0	14.0	65.0
2.	<i>Aspergillus niger</i>	22.6	43.5	17.0	57.5	15.6	61.0
3.	<i>Aspergillus flavus</i>	25.0	37.5	21.0	47.5	18.0	55.0
4.	<i>Rhizopus nigricans</i>	24.0	40.0	22.5	43.7	19.0	52.5
5.	<i>Aspergillus fumigatus</i>	26.0	35.0	23.0	42.5	20.0	50.0
6.	Control	32.0	20.0	27.0	31.2	24.5	38.7