RESEARCH ARTICLE

International Journal of Plant Sciences, (January to June, 2010) Vol. 5 Issue 1 : 53-55

Efficacy of *Phanerochaete chrysoporium* (MTCC-787) on the biodegradation of coir waste

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Accepted : September, 2009

SUMMARY

An investigation was carried out to convert coir waste, an environmental pollutant into organic manure by inoculating a white rot fungus, *Phanerochaete chrysoporium* for 60 days. The results of the study revealed that after 60 days of biodegradation, the lignin, cellulose and organic carbon, C:N ratio, total phenol, reducing and non-reducing sugars showed a decreasing trend. An increasing trend was observed in total nitrogen from 0.26 to 1.01 per cent after 60 days of *Phanerochaete chrysoporium* inoculation.

Key words : Phanerochaete chrysoporium, Biodegradation, Coir pith

The green revolution in India has led to an abundance of crop residues. The quantity of agricultural residues and by products produced in India is about 1396 metric tons, of which the quantum of crop residues is to the tune of 273.3 metric tons. In TamilNadu, a quantity of about 20 metric tons of crop residues are available every year. Various agricultural waste and by products of agrofarm waste industries are being used effectively as an organic manure (Selvi and Selvaseelan, 1992). Coir pith hillocks is a common sight in places like Kinathukadavu, Pollachi, Thenkasi and other coir fibre extraction centres. It is estimated that the total quantity of coir pith produced in India is about 5, 00, 000 tonnes and around 2000 tonnes are produced per working day. About 5 lakhs metric ton of the coir waste can be converted into 2-9 lakh tons of organic manure valued for over 20 crores (George, 1995).

Hence, the present investigation was carried out to convert the environmental pollutant, coir waste into nutrient enriched organic manure by inoculating *Phanerochaete chrysoporium*.

MATERIALS AND METHODS

Collection of materials :

Phanerochaete chrysoporium (MTCC-787) was bought from Institute of Microbial Technology, Chandigarh, India. Fresh coir pith samples were collected from Cheenapuram village in Kunnathur near Erode.

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Biochemical analysis:

Biochemical analysis of raw and decomposed coir waste was undertaken at an interval of 15 days for 60 days following the method

- Estimation of cellulose (Updegraff, 1969).
- Estimation of lignin (Goering and Vansoest, 1975).
- Estimation of organic carbon (Walkeley and Black, 1934)

– Estimation of total nitrogen (Microkjeldhal method – Humphries, 1956).

- Estimation of total phenol by folin - Ciocalteau method (Bray and Thorpe, 1954).

- Estimation of reducing sugars by Dinitroslicylic acid method (Miller, 1972).

RESULTS AND DISCUSSION

The results obtained from the present investigation are presented in Table 1.

Cellulose and lignin content :

Investigation on cellulose and lignin content of coir waste revealed a steady reduction from 35.53 per cent (raw) to 20.80 per cent and from 35.79 (raw) to 9.12 per cent in *Phanerochaete chrysoporium* inoculated samples after 60 days of decomposition (Table 1).

The result is in accordance with the result of Marimuthu *et al.* (1999) who found that there was reduction in cellulose content from 26.50 per cent to 10.10 per cent in coir pith after 45 days due to *Pleurotus* spp. inoculation. Similar result was also obtained by Sridevi and Padmaja (1999) who also reported that the lignin content in fresh coir pith sample was 29.0 per cent and it was decreased to 8.6 per cent in the 10 year old coir pith sample (under natural environment).

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