RESEARCH PAPER

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Weed extract: Cheap source for better yield and biological efficiency of *Pleurotus florida*

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In recent years the mushroom technology has traveled far a head. The domestication of various mushroom species has been tried globally. Many of which are now commercially cultivated for food as well as medicinal purposes for an amateur and professional cultivator. The production of mushroom has become important factor, which does not promote the growers. The important priority of profession is to maximize the production of mushroom by using various techniques. Extract of certain weeds, *viz*., *Argemone maxicana*, *Cannabis sativa*, *Ageratum conyzoides*, *Parthenium hysterophorus* and *Calotropis procera* were tested for better production of oyster mushroom *Pleurotus Florida*. Among these *Parthenium hysterophorus* (977 g, 97.7%), *Cannabis sativa* (882 g, 88.2%), *Ageratum conyzoides* (860 g, 86.0%) extract were proved most significant in terms of yield and biological efficiency of mushroom.

Key words : Weed extract, Biological efficiency and *Pleurotus florida*

INTRODUCTION

Mushroom which is a fleshy saprophyte fungus are found growing on damp rotten log of wood trunk of tree, agriculture waste materials, decaying organic matter and in damp soil rich in organic substance. Ebible mushroom are highly nutrition and can be compared with eggs, milk and meat (Naraian, 2002). The content of essential amino acids in mushroom is high and close to the need of the human body. Mushroom is easily digestible and it has no cholesterol content. Mushrooms also called white vegetables or boneless vegetable meat contain sample of proteins, vitamins, fibers and medicines.

Wide spread malnutrition with ever-increasing gap in developing countries has necessitated the search of alternative sources of protein because the production of pulses has not kept pace of our requirement due to production growth. Animal protein beyond the reach of the most of the people in these countries. About 5-20 kg of vegetable protein goes to produce a kilo of animal protein were tried to reject due to off flavors and consumer resistance. Ebible mushroom have been recommended by the FAO as food contributing to the protein nutrition of the developing countries depending largely on cereals. Their use got further impetus during the late 1960s on account of the growing world wide food shortage, especially of protein in the underdeveloped countries (Sohi, 1992).

Mushrooms are a class of heterotrophic fungi and due to the absence of chlorophyll in their cell they completely depend on the substrate for all their nutritional requirement of carbon, water, nitrogen and minerals. In any cultivation programme on mushroom the primary requisite is preparing a suitable substrate. Pleurotus species can grow on a variety of fresh lignocellulosic residues requiring very little pretreatment (Bano and Rajarathnam, 1982).

Weeds are known to complete available nitrogen and light at an early growth stage of economical plants (Smith and Levick, 1974). The heavy weed burden not only reduced vegetative growth and yield significantly but also had a detrimental effect on the crops due to an unmanageable weed population (Mason and Madin *et al.*, 1996). Because of weed have been successfully utilized in *Pleurotus florida* cultivation. Therefore, there is vast scope to eliminate them by employing mushroom cultivation technology which not only protects the economical plants but also produce nutritive fungal food at low cost. Keeping these in mind, an effort is made to increase yield and biological efficiency of *Pleurotus florida* by applying certain weeds extracts.

MATERIALS AND METHODS

This work was carried out in biotech lab training and demonstration center, Ambikapur, Chhattisgarh during June 2008 to December 2008. Parental stains of *Pleurotus florida* were provided by mushroom Biotechnology Lab, Indira Gandhi Agriculture University, Raipur, Chhattisgarh. The cultures were maintained on

Table 1 : Effect of weed extract on yield and biological efficiency of *Pleurotus florida*

Weed extract	Spawn run time (days)	Pin head initiation (days)	First harvest (days)	Total yield (g/kg dry substrates)	Yield differences from control (g)	Biological efficiency (%)
Argemone maxicana	16	19	24	705	705-720= -15	70.5
Cannabis sativa	16	19	24	882	882-720= +162	88.2
Ageratum conyzoides	16	19	24	860	860-720= +140	86.0
Parthenium hysterophorus	16	19	24	977	977-720= +257	97.7
Calotropis procera	16	19	24	812	812-720= +92	81.2
Control	16	19	24	720	720-720= 0.0	72.0

malt extract agar medium with regular sub-cultures at monthly intervals. Spawn was prepared on wheat grain following standard procedure (Upadhyay and Fritsche, 1997). 15 days old spawn was used for experimentation.

Various weeds, *viz.*, Argemone maxicana, Cannabis sativa, Ageratum conyzoides Parthenium hysterophorus and Calotropis procera were collected from different sites of Surguja District. These were later extracted by the methods suggested by Shiddique *et al.* (2004). Wheat straw was used as a substrate for the of *Pleurotus florida* cultivation. The substrats were chemically sterilized with formalin and bavistin. Wheat straw was soaked in separate containers in a solution of chemicals (Bavistin 50 ppm and formalin 750 ppm) for 12-15 hrs. The polythene bags were then prepared by layer spawning methods. The bags were incubated in cultivation room at 25-30^0 C for the spawn run. When mycelia had completely covered the begs, the polythene covering were turned off and relative humidity was maintained between 85-90 per cent.

The weed extracts were sprayed at the time of exposure of begs and the just after the harvesting fruiting bodies. Various parameters of cultivation, *viz.*, spawn run time pinhead initiation, yield and biological efficiency were separately recorded for every weed extract in three subsequent flushes. The biological efficiency of mushroom was determined as percentage yield of fresh mushroom in relation to dry weight of the substrate as suggested by Chang and Miles (1989). Those extracts showed significant yield difference were considered for mushroom cultivation.

RESULTS AND DISCUSSION

The results obtained during present study are presented in the Table 1. All the begs took equal time for completion of spawn run *i.e.* 16 days. They did not show variation in primordial development and day of harvest even after application of weed extract. It was due to short time interval between exposure of beds and pinhead initiation. Among extracts tested, only one of them gave lower yield and biological efficiency than control.

It was observed maximum in the bags treated with *Parthenium hysterophorus* extract (977 g, 97.7%) followed by *Cannabis sativa* extract (882 g, 88.2%), *Ageratum conyzoides* extract (860 g, 86.0%) and *Calotropis procera* extract (812 g, 81.2%). It was either due to action of alkaloids present in weed extract or to obvious reasons. Present finding was somewhat similar to the result of Banwar and Thakur (2004), who observed the effect of plant extract on cultivation of oyster mushroom *Pleurotus florida*. However, they could not obtained significant differences in yield and biological efficiency.

In present investigation *Parthenium hysterophous*, *Cannabis sativa* and *Ageratum conyzoides* were found to be most significant weed extract. These were already proved as good cultivation medium. Negi and Gupta (1995) showed that *Cannabis sativa* leaves in combination with wheat straw are the most suitable substrate for higher yield of Pleurotus *sajor caju* while Das *et al.* (1985) suggested use of *Parthenium hysterophorus* as a substrate for raising yield of oyster mushroom.

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REFERENCES

Bano, Z. and Rajarathnam, S. (1982). In : *Tropical mushroom* (eds. S.T. Chang and T.H. Quimio). The Chinese Univ. Press, Hong Kong, pp. 363-380.

Banwar, R.R. and Thakur, M.P. (2004). *J. Mycol. Pl. Pathol.*,. **34**(3) : 954-956.

Chang, S.T. and Miles, P.G. (1989). *Edible mushroom and their cultivation*, CRC Press Boca Raton, pp. 256-274.

Das, T.K., Sarmah, M.K. and Sarmah, R. (1985). *Curr. Sci.,* **54**: 1186.

Mason, M.G. and Madin, R.W. (1996). *Australian J. Exp. Agric.,* **36**: 443-450.

Naraian, R. (2002). Effect of nitrogen supplementation on the yield of fruit bodies and changes in enzyme profile of *Pleurotus florida*. Ph. D. Thesis, Dr. R.M.L. Avadh Univ., Faizabad, p: 19.

Negi, P.S. and Gupta, R.C. (1995). *Indian J. Mycol. Pl. Pathol.* **25**(3): 954-956.

Shiddique, A.B., Gogoi, R. and Puzari, K.C. (2004). *J. Mycol. Pl. Pathol.,* **34**(2): 291-292.

Smith, D.F. and Levick, G.R.T. (1974). *Australian J. agric. Res.,* **25**: 381-393.

Sohi, H.S. (1992). Importance of edible mushroom in Indian diet and factors responsible for low production of cultivated mushroom, *Indian Phytopath.*, **45** (2): 147-157.

Upadhyay, R.C. and Fritsche, W.(1997). *In : Advance in Mushroom Biology and Production* (eds. R.D. Rai, B.L. Dhar and R.N. Verma) MSI, Solan (HP), pp: 281-290.