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RESEARCH ARTICLE

Comparative study of different grains on spawn development of *Pleurotus sajor caju* (Fr.) Singer

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SUMMARY

In recent years there is great advancement in mushroom technology. 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. Mushroom seed (Spawn) production involves sophisticated technology with high investment requiring laboratory and equipments with accessories. The major constraint in mushroom production is non-availability of spawn. The technology of spawn production is given by eco-care and aware. Mushroom which is a fleshy saprophyte fungus are found growing on damp rotten log of wood trunk of trees, agricultural waste material, decaying organic matter and in damp soil rich in organic substrates. Three grains *viz*., wheat, rice and gram were tested for production of *Pleurotus sajor caju* spawn. *Plurotus sajor caju* spawn has been recognized as a highly potential converter of cheap cellulosic material in to valuble protein at a very nominal cost. The results obtained during the present investigation, rice grains (8.33 days) were found to be the best grains for speedy development of spawn of *Pleurotus sajor caju* (Fr.) Singer. Whereas wheat and gram grains (12.33 days) took same period of spawn development of *Pleurotus sajor caju* (Fr.) Singer.

Key Words : *Pleurotus sajor caju*, Grain spawn, Spawn run time

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Spawn is pure culture of mycelium growing on a solid substrate such as grain. Mushroom spawn has a fundamental role in global agricultural productivity. Its production has not been adopted by many farmers due to insufficient knowledge of scientific techniques needed for spawn production and mushroom cultivation. Just as seed quality is important to crop production, so is spawn quality to mushroom production. The most frequently used substrate for spawn production is wheat and there is need to use the more widely available maize grain as substrate for grain mother spawn production of oyster mushrooms (Mbogoh *et al.*, 2010). Spawn grains such as wheat, millet and corn have been reported to affect carpophores production (Nwanze *et al*, 2005).

The cultivation of edible fungi has been accepted as the easiest on farm biotechnology for profitable removal of various lignocellulosic agricultural, industrial and forestry by-products, specially in the developing countries, although about 200 species of edible fungi have been reported from India, only three *viz*., *Pleurotus* spp., *Agraricus bisporus* and *Volvariella species* are preferred for commercial cultivation and *Pleurotus* spp. alone constitutes about 65% of the total mushrooms production in the country (Munjal, 1982).

Mushrooms are used as delicious flavored food and having nutritional value between meat and vegetables. Mushrooms are rich in protein, vitamin and minerals. It is

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low caloric food with very high potassium, sodium ratio and without starch as well as cholesterol. Vast quantities of renewable lignocelluloses wastes are generated every year in developing countries like India with economics, which are basically agricultural. However, mushroom spp. has been reported to grow and yield successfully on many plant wastes. In special reference of Chhattisgarh 36.4 lakh tone of agricultural waste material left after animal consumptions can be used as substrates for mushroom production.

Oyster mushroom *Pleurotus sajor caju* (Fr.) Singer have great potential as an integral part of a sustainable agricultural system. Many types of organic wastes generated in agriculture or by the food processing industry are added to the waste stream annually. These materials could support oyster mushroom production, if systematically collected and processed. The major problem associated with the transfer of technology for spawn production and mushroom cultivation is the lack of technical know-how to its cultivation.

Mushroom offers prospects for converting lignocellulosic residues from agricultural fields, forest into protein rich biomass. Such processing of agro waste not only increases nutrient cycling in the environment but the by-product of mushroom cultivation is also a good source of manure, animal feeds and soil conditioner.

Improved spawn production technology is necessary to increase the production of mushroom. Its production technology has not been standardized in Chhattisgarh. Therefore, an attempt has been made to find out the best grain for spawn production.

Present communication, different grains *viz*., wheat, rice and gram were screened to determine the most suitable grain spawn for better yield, biological efficiency and minimum spawn run time of *Pleurotus sajor caju* (Fr.) Singer. The aim of used various different grains are to get maximum production of fruiting bodies but it is an intricate problem. Moreover, the knowledge, shell help to plan and prepare for the crop and equip one with a physiological tool to control the quality, quantity, timing and other characters of the *Pleurotus sajor caju* (Fr.) Singer mushroom cultivation.

MATERIAL AND METHODS

In any mushroom cultivation programme the primary requisite in preparing a suitable spawn. *Plurotus sajor caju* (Fr.) Singer can grow on a variety of fresh lignocellulosic residues requiring very little pretreatment (Yadav *et al.*, 1998). Therefore it is of great economical importance and it also helps to overcome the protein malnutrition in the world.

This work was carried out in Biotech lab training and demonstration center, Ambikapur, Chhattisgarh during June 2013 to August 2013. Parental strains of *Pleurotus species* (Fr.) Singer were provided by Mushroom Biotechnology lab, Indira Gandhi Agriculture University, Raipur, Chhattisgarh. The cultures were maintained on potato dextrose agar medium (PDA) with regular sub-cultures at monthly intervals (Aneja, 2001). Mushroom spawn was prepared on wheat grain following standard procedure (Sivaprakasam, 1980**)**. 15 days old spawn was used for experimentation. Three grains *viz*., wheat, rice and gram were evaluated as spawn substrates.

Clean and healthy grains were used for the preparation of mushroom spawn. All three grains were washed and soaked overnight in fresh water then boiled with two litre water per kg seed for 15-20 minutes till they become soft but remained firm. Water was drained off and boiled grains were spread over blotting paper to remove the excess water for 20-30 minutes. The grains were impregnated with 10% calcium carbonate ($CaCo_3$) and 10% calcium sulphate ($CaSO_4$) on the dry weight basis. Two hundred and fifty grams of coated grains were filled in 500 ml of narrow mouth bottles.

The bottles were plugged bye non-absorbent cotton. There were three replicates for each grain. These bottles were sterilized at 15 lbs pressure (PSI) and temperature 121°C for 30 minutes. The sterilized bottles were left for 12 hours and shaked for re-absorption of the condensed water droplets. Sterilized bottles containing grains were inoculated with 15 days old mother spawn @10% (w/w) of boiled grain under aseptic condition and the bottles were incubated at 25 ^{0}C for 15 days.

RESULTS AND DISCUSSION

The present study was undertaken with an aim to find out the best grains for preparation of early and best grain spawn. In the present work, three different grains were evaluated for spawn production of *Pleurotus sajor caju* (Fr.) Singer, an oyster mushroom. The parameter assessed in the study, deals with the number of days taken for spawn production from the day of inoculation to the growth and development of mycelial net on the different grains. The spawn development was determined by the white mat of mycelia of *P. sajor caju* (Fr.) Singer on each grain.

The results presented in Table 1 and Fig. 1 showed the time required for spawn development of *Pleurotus sajor-caju* (Fr.) Singer. The wheat and gram grain took same period (12.33

Table 1 : Effect of different grains on spawn development of *Pleurotus species* (Fr.) Singer

Sr. No.	Grains	*Pleurotus sajor caju* (Fr.) Singer spawn development period (Days)			
		Replication-I	Replication-II	Replication-III	Mean of three replication
1.	Wheat	11.0	12.0	14.0	12.33
2.	Rice	08.0	08.0	09.0	08.33
3.	Gram	12.0	14.0	11.0	12.33

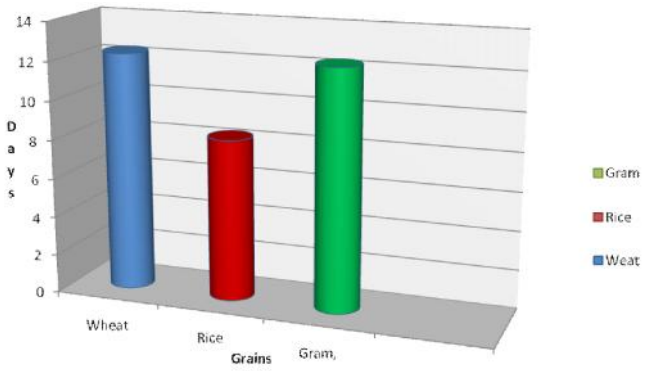

Fig. 1: Effect of different grains on spawn development of *Pleurotus species* (Fr.) Singer

days) for spawn development of *Pleurotus sajor-caju* (Fr.) Singer. Rice grain recorded minimum (8.33 days) period for spawn development and recommended for spawn production of cultivation on *Pleurotus sajor-caju* (Fr.) Singer.

Jiskani *et al*. (2000) conducted experiments on the effect of different grain on spawn growth of oyster mushroom, *Pleurotus florida* and reported that the sorghum grains were found to be best medium for spawn growth followed by maize, wheat and pearl millet grain, respectively. Nwanze *et al.* (2006) examined the effect of spawn grains such as wheat, millet and corn on the culture of lentinus squarrosulus. The results showed that corn spawn induced highest yield and dry weight of fruiting as compared to wheat and millet spawn. These observations are in agreement with the result of Kotwaliwale *et al.* (1991) who found maize grains were suitable for spawn development of *Pleurotus* species and Sharma (2003) also found that kutki, jowar and maize grain took minimum period for spawn run of *Pleurotus* species.

It is clearly evident from the results that all the three grains are suitable for spawn production purpose. Hence, it is concluded that rice grain is best the grain spawn for production of oyster mushrooms *Pleurotus sajor-caju* (Fr.) Singer.

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