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Mushroom Production using Crumpled Straw as Substrate

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ABSTRACT

Mushroom production technique is quite easy, simple, and remunerative. It can be grown easily by farm women and unemployed rural youth. It also gives an alternative income or additional income to the farmers. The management of the crumpled paddy and wheat straw is presently a difficult task. Burning these crumpled paddy straw and wheat straw create a polluted environment. Hence, for proper management of crumpled paddy straw the present study was designed at several villages like Dhanpur, Dantiamuhan, Badakhaladi and Bholagadia of Betnoti, Baripada, Kaptipada and Shamakhunta block respectively during the month of July to September, 2020 by Krishi Vigyan Kendra, Mayurbhanj-1. The study revealed that though the production is less but net income and B: C ratio is significantly higher in demonstration practice than the farmers practice, as the cost for bed preparation of farmer's practice is more than the demonstration practice. Also, by this method of utilizing the crumpled straw the environment pollution is lowered down and the soil health will be saved. Hence, the awareness regarding mushroom production by using crumpled straw is required as in near future the scarcity of the availability of bundle straw is going to be witnessed by the growers.

Keywords: Mushroom, Crumpled straw, Income, Substrate

INTRODUCTION

Mushrooms are non-poisonous and consumable fungus having high nutritional and medicinal value. Mushrooms are rich source of vitamins, minerals and proteins (Caglarirmak, 2007; Rachna and Sodhi, 2013; Kumar, 2017). The mushrooms generally contain 19 to 35% protein, 50 to 65% carbohydrate but the fat content is very negligible in comparison to protein and carbohydrate (Wani *et al*, 2010). Mushroom production technique is very easy and simple (Singla and Goel, 2024). Mushrooms can be grown easily by farm women and unemployed rural youth (Muthuramu *et al,* 2015). It can give an alternative or additional income to the farmers (Kumar, 2017; Kumar *et al,* 2023). Odisha occupies 1st position in producing paddy straw mushroom in India. The climate of Odisha (hot and humid) is very suitable for paddy straw mushroom production. Mayurbhanj district is a leading district in the paddy production therefore, the paddy straw is available in plenty in this district. Hence, there is wide scope and opportunity for paddy straw mushroom production. Crumpled straw management is now a days a great problem for the whole world. Some of the farmers also go for its burning for its management. But it affects the environment as well as badly affects the soil.

Mayurbhanj is a paddy growing district and 339,000 ha areas grown paddy in *Kharif* and 5800 ha areas grown paddy in *Rabi*. In this mechanized age and fluctuating climate most farmers generally adopt threshing of paddy by axial flow thresher, tractor, bullock or by combined harvester in this district. Most of the farmers of Mayurbhanj also burn the crumpled paddy straw and few of them use it as cattle feed. Hence, it is now emerging major problem of this district, state Odisha and to the country India also. Keeping the above-mentioned facts in mind and viewing to the concern problem, KVK Mayurbhanj-1 conducted one front line demonstration on Mushroom production by using crumpled straw as substrate at village Dhanpur, Dantiamuhan, Badakhaladi and Bholagadia of Betnoti, Baripada, Kaptipada and Shamakhunta block respectively in 2020.

MATERIALS AND METHODS

This front-line demonstration on Mushroom production by using crumpled straw as substrate was conducted at the villages namely, Dhanpur, Dantiamuha, Badakhaladi and Bholagadia of Betnoti, Baripada, Kaptipada and Shamakhunta block respectively during the month of July to September, 2020 by Krishi Vigyan Kendra, Mayurbhanj-1. Ten beneficiaries were selected for this FLD against their

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Table 1: Growth pattern of paddy straw mushroom

Practice	Biological efficiency (%)	Mycelia growth (day)	Pin head appearance (day)	Maturation of fruiting bodies (day)
Demonstration	9.28	6	9	13
Farmers' practice	10	7	10	14

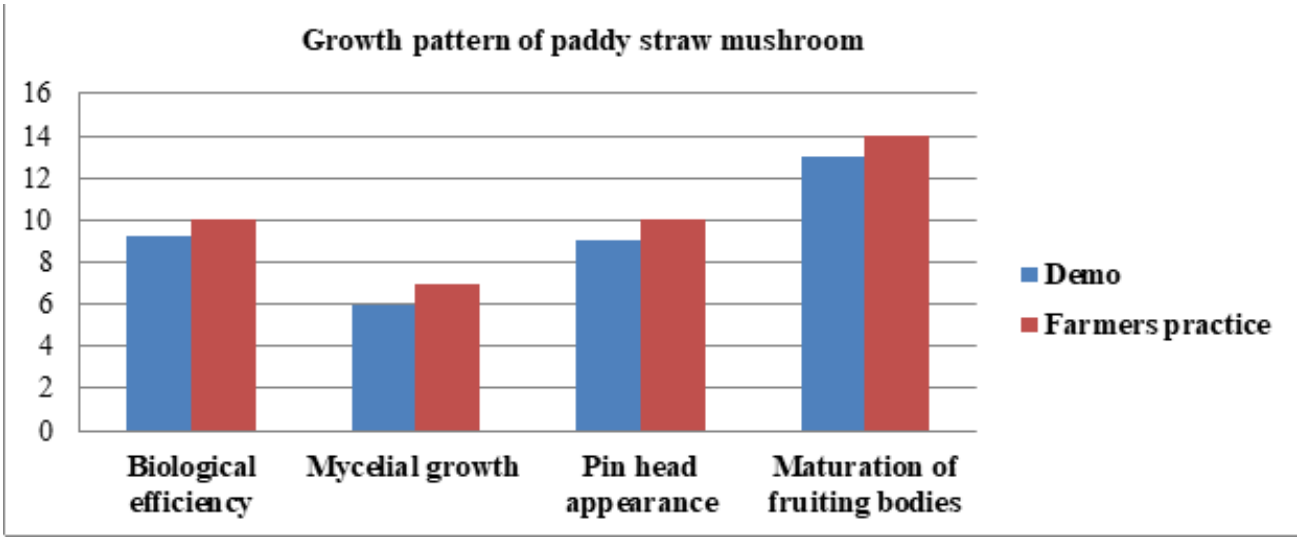

Fig. 1: Growth pattern of paddy straw mushroom production

traditional practice of Mushroom production by using paddy straw as substrate.

Front line demonstration on mushroom production by using crumpled straw as substrate

In this method, for preparation of one bed paddy straw mushroom, the materials required were, crumpled paddy straw- 7kg, paddy straw mushroom spawn (3%) - 210g, Bengal gram flour (3%) - 210g (additional food), white polythene sheet- 1 m^2 and carbendazim- 12g. In this method, crumpled paddy straw of 7kg was put in a perforated polythene bag and soaked in water for 5 hours. It was sterilized with addition of 12 gram of carbendazim in the water followed by soaking of straw. The soaking straw was strained from water and spread on a shade space for drain out of excess water and maintaining moisture of paddy straw to 65%. Then the mushroom bed was prepared by putting 3% of additional food (Bengal gram flour) and 3% of paddy straw spawn in the three layers of crumpled paddy straw on a rack. After that covering of the mushroom bed with 1m^2 white polythene sheet on it was done. Finally, 13-14 days 1st flush production of 80% was observed and after 4-5 days of first flush, last flush of 20% came out.

Mushroom production by using bundled straw as substrate

In this method of mushroom production 7 kg of bundled paddy straw was put in soaked in water for 10-12 hours. It was sterilized with addition of 12 g of carbendazim in the water followed by soaking of paddy straw bundle. The soaking straw bundle was strained from water and spread on a shade space for drain out of excess water. Then the mushroom bed was prepared by putting 3% of additional food (Bengal gram flour) and 3% of paddy straw spawn in the three layers of bundled paddy straw on a rack. Cover the 1m^2 white polythene sheet on it. Then after 13-14 days 1st flush production of 80% was observed and after 4-5 days last flush of 20% came out.

RESULTS AND DISCUSSION

The ten number of participants were provided with 200 number of paddy straw mushroom spawn and they prepared twenty (20) demonstration bed using crumpled straw and 20 beds of farmer's practice bed using bundled paddy straw. Along with this the participants were provided with 42 kg of Bengal gram flour. White polythene sheet was contributed by the participants themselves.

Table 2: Paddy straw mushroom production and income

Practice	Production (Kg/20 Bed)	Cost of cultivation (Rs.)	Gross income (Rs.)	Net income (Rs.)	B:C
Demonstration	13	600	1960	1360	3.26
Farmers' practice	14	1200	2100	900	1.75

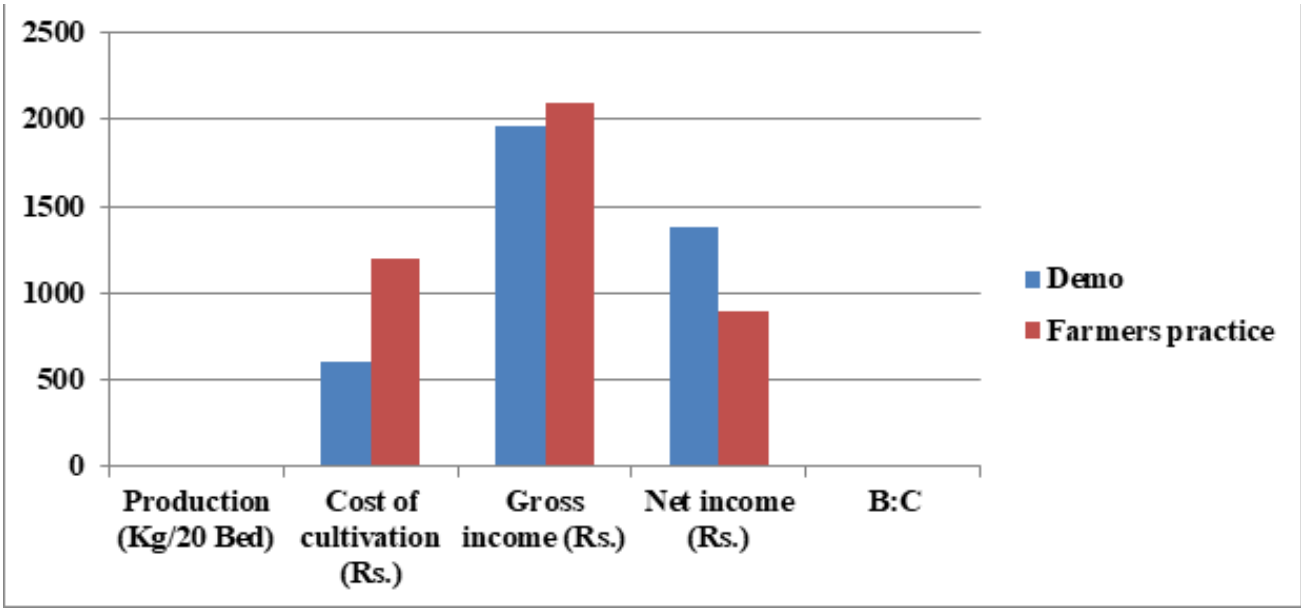

Fig. 2: Paddy straw mushroom production and income

Growth pattern of paddy straw mushroom

The biological efficiency of demonstration bed using crumpled paddy straw was 9.28% whereas the biological efficiency of farmer's practice was 10%. It was clearly indicated that the biological efficiency of farmer's practice was more than demonstration practice. The duration required for mycelia growth, pin head appearance and maturation of fruiting bodies of demonstration practice and farmer's practice was 6 d, 9 d and 13 d and 7 d, 10 d and 14 d, respectively and observed significantly higher duration required by farmer's practice than demonstration practice.

Paddy straw mushroom production and income

The production of paddy straw mushroom from demonstrated bed using crumpled straw was 13 kg/20 beds. The cost of cultivation by using crumpled straw was Rs. 600/- per 20 beds. The gross income from 20 beds was Rs. 1960/- with a B: C ratio of 3.26 and net income from 20 bed was 1360/-. The biological efficiency was 10%, whereas the production of paddy straw mushroom from farmer's practices bed using bundled straw was 14 kg/ 20 mushroom bed. The cost of cultivation by using bundled straw was Rs. 1200/- per 20 mushroom bed. The gross income from 20 mushroom bed was Rs. 2100/- with a B: C ratio of 1.75. The biological efficiency was 9.28%. Though the mushroom production by demonstration practice was significantly lower than farmer's practice but the net income and B:C ratio of demonstration practice was significantly more than the farmer's practice.

CONCLUSION

Mushroom production process is very easy and simple, neither any complicated technique nor extra ordinary equipment required for the paddy straw mushroom production. This production technique is widely accepted by the farmers, farm women, unemployed rural youth, and tribal people. But the major constraint behind production of paddy straw is unavailability of bundled straw. Again, challenging to this problem with some modification to standard technique and procedure of paddy straw mushroom, now crumpled straw is replacing the bundled straw. Though the production is less but net income and B:C ratio was significantly higher in demonstration practice than the farmer's practice as the cost for bed preparation of farmer's practice is more than the demonstration practice. Again, by this method of

utilizing the crumpled straw the environment pollution is lowered down and the soil health will be saved. Hence, its massive awareness is required as in near future there will be scarcity of bundle straw.

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