

Milky White Mushroom Farming-A Viable and Lucrative Enterprise

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Mushrooms, known for their culinary value, are a potential source of protein that can enrich human diets. Besides their protein content, mushrooms are entitled with various attributes like low cholesterol, high vitamins (riboflavin, folate, thiamine, pantothenic acid, niacin, C, and D,) rich in iron, potassium and phosphorous, folic acid. In view of the consumer preference towards organic, pesticide residue free food, mushroom farming is gaining momentum worldwide. Mushrooms can be grown with use of modern agro techniques in a closed smaller space, with minimal investment by recycling agricultural wastes. In countries like India, mushroom farming can be a profitable venture since raw materials such as straw and plant residues are abundantly available at farmers' disposal. Moreover, climatic conditions for mushroom growth are ambient. Since, majority of the Indian farmers are resource poor, mushroom production units are a source of viable income from agricultural wastes with less requirement of water, land, and finance. Commercial production units of mushrooms greatly contribute to resource utilizations, economy, job creation, nutritional security etc. besides sustaining during the periods of inclement weather. Hence, mushroom cultivation has significant potential to be a profitable agri-business venture. Some important mushrooms grown in India are: button mushroom (*Agaricus bisporus*), oyster mushroom (*Pleurotus spp.*), paddy straw mushroom (*Volvariella volvacea*), white milky mushroom (*Calocybe indica*) and shiitake mushroom (*Lentinus edodes*). Of these, white milky mushroom, also termed as "Dhuth chatta" was originated from India and is being grown in humus rich soil especially after first monsoon showers (i.e., Months of May and August).

Commercial cultivation of white milky mushroom has wide scope owing to its ability to grow in wide variety of lingo-cellulosic wastes relatively at a high temperature range 30-38 C. In addition, production technology is easy due to short crop cycle of 7-8 weeks with maximum of three pickings and has less contamination with molds. White milky mushroom is comparatively high yielding (140 kg fresh mushroom per 100 kg dry substrate) with relatively long shelf life (up to 7 days). Market demand is also high due to its pure white colour, preferable shape, potential health benefits,

nutritional and medicinal properties. White milky mushroom is source of as it is rich in vitamins (particularly vitamin B and vitamin D) and minerals (like potassium, phosphorus, and selenium), beta glucans, ergo sterols, amino acids and fiber content.

Production technology

India has great potential to be a leading producer of white milky mushroom due to the fact that white milky mushroom was originated on same land. Even though, milky mushrooms grow during late spring in nature, it can be cultivated throughout the year. The production technology is labor intensive and comprise of following steps

1. Spawn production: Wheat or sorghum seeds are best substrate for white milky mushroom spawn production. Seeds are thoroughly washed, soaked for 4-5 hours and is double sterilized by adding pinch of sucrose and water. Sterilized seeds are taken in polythene bags with mouth sealed with cotton plug. Mycelium from pure culture plate is transferred in to these bags under aseptic conditions. Inoculated bags are incubated in incubator for spawn production. 20 days old spawn is selected from mushroom cultivation.
2. Substrate preparation: Ligno-cellulosic agricultural waste is substrate for mushroom production of which paddy straw is best substrate for white milky mushroom cultivation due to its abundance offering structural support and rich in vitamins, protein and minerals along with basic lignin and cellulose. Paddy straw chopped in to 3-5 cm bits for sterilization. Sterilization can be done chemically by overnight soaking paddy straw in formalin 200ml/200lit. Two table spoons of Carbendazim can be added to sterilizing tank. Presoaked paddy straw bits should be squeezed and dried under sun up to suitable moisture content. Alternatively, paddy straw can be sterilized by boiling.
3. Bed preparation: Polythene bags of size 60 x 30cm, 80 gauge should be taken and tied at the bottom. Later, the paddy straw has to be laid as bottom layer in polythene bags up to three

inches height, which in turn was overlaid with spawn layer, duly placing more of spawn on edges. Another layer of paddy straw has to be laid over spawn layer. Paddy straw was laid as layers alternating with spawn layers up to 6 layers and tied at top. Holes should be made randomly on bed for proper ventilation and air circulation. These beds should be hanged or kept in racks in dark room and an ideal temperature of 30-38°C and a relative humidity of 90-100% are to be maintained.

4. Casing mixture preparation: Clay loam soil and coco peat in the 1:1 ratio is an ideal casing mixture with high water holding capacity and retention of good air space ratio for facilitating gaseous exchange. Casing mixture should be steam sterilized before casing. Alternatively, chemical sterilization can be done with 2% formalin, and should be followed by covering with polythene sheet.
5. Casing after spawn run: Casing means application of thin layer of casing mixture on the surface of mushroom bed to induce buttons formation. Phase of mushroom cultivation where complete colonization of substrate by mycelia is termed as "Spawn run". After complete spawn running (average 30 days), beds are cut to two equal halves and a thin layer of one cm casing mixture is laid over mushroom bed. Light sprinkling with water is done at this

stage and beds are maintained at 35 C, 80-90 % relative humidity and about 3000lux light intensity. Light triggers fruiting in spawn run beds. Natural light is the best source of light and hence proper ventilation has to be provided.

6. Harvesting: Pin head button sized mushrooms will develop at 10-days-after casing. Subsequently, after seven more days, the mushrooms grow into full size and will be ready for harvest. Harvesting should be done with clean knives by cutting at the base of the stipe. Stir the top of the bed after first harvest and spray water regularly for two more pickings.

Precautions

1. Fumigate the cropping area before initiating mushroom cultivation
2. Sterile and aseptic conditions should be maintained during bed preparation
3. Mushroom beds should be placed in dark room for faster spawn running
4. Transfer mushroom beds to light room after casing to initiate fruiting
5. Regular light watering should be given over casing mixture
6. Check for mold contamination, insect infestation and rat damage frequently and contaminated beds are to be discarded without delay
