

Cultivation technology of shiitake mushroom



G. Sridevi¹, K. Manikandan² and U. Surendran³

¹Department of Soil Science and Agricultural Chemistry, Tamil Nadu Agricultural University, Coimbatore (T.N.) India

²Department of Soil Science and Agricultural Chemistry, Agricultural College and Research Institute, Killikulam (T.N.) India

³Department of Soil Science, Centre for Water Resources Development and Management, CWRDM, Calicut (T.N.) India
(Email : smathareddy@gmail.com)

Taxonomy :

Kingdom	: Fungi
Division	: Basidiomycota
Class	: Agaricomycetes
Order	: Agaricales
Family	: Marasmiaceae
Genus	: <i>Lentinula</i>
Species	: <i>edodes</i>



Introduction : Shiitake mushroom is native to Asian continent and it is mainly reported from China, Japan and Korea since ancient time onwards. This is a parasitic mushroom and grows on live woods. *Shii* in Japan refers to the tree *Castanopsis cuspidata* and wood logs of this tree are earlier used for cultivation of this mushroom. Further “take” means mushroom in Japanese language. The name of shiitake is derived by combining these two words. It is also referred as sawtooth oak mushroom, black forest mushroom, black mushroom, golden oak mushroom and oakwood mushroom.

Shiitake mushroom occupies the second rank in world mushroom production next to button mushroom. But this mushroom is not common in India and scattered reporting are available for cultivation of this mushroom. Research on shiitake is available in significant amount both on production as well as medicinal studies from this mushroom.

Nutritional value : The nutritional profile of shiitake mushroom varies with the mushroom strain, substrate used, incidence of pest and diseases and other management factors.

Cultivation technology : Saw dust is the base material for this mushroom as it is wood inhabiting fungi. Wheat bran is added as a nitrogen supplement whereas gypsum and lime is added to maintain the substrate pH at 5.5-6.0. In case of wood log method of cultivation, woods of suitable is used as a substrate.

Methods of cultivation :

Sr. No.	Nutritional parameter	Content
1.	Protein (%)	18.85
2.	Carbohydrate (%)	63.60
3.	Fat (%)	1.22
4.	Vitamin D (IU/g)	205
5.	Sodium (mg/kg)	82.49
6.	Potassium (%)	2.10
7.	Iron (mg/kg)	37.55
8.	Manganese (mg/kg)	17.48
9.	Zinc (mg/kg)	89.63
10.	Selenium (mg/kg)	Traces

Natural log cultivation : This cultivation technology is one of the earliest methods adopted by people. Peoples believe that mushroom from wood logs are superior in quality compared to mushrooms from synthetic log method. Species suitable for wood log cultivation are *Quercus* spp., *Castanopsis chinensis*, *C. tissa*, *C. fordil*, *C. lamontii*, *Elaeocarpus chinenses*, *E. japonicus*, *E. lancaefolius*, *Lithocarpus calophylla*, *L. glaber*, *L. spicatus*, *Betula lutea*, *B. nigra*, *Salix nigra*, *Carpinus laxiflora*, *Alnus serrulata* and others. The middle aged green woods need to be selected and cut (10-15 cm diameter) in winter as wood contains more nutrients and thick, attached bark during winter season. Summerwood produces low yield because of loose bark and low nutrients. Cut woods are kept as such for next 10-15 days to dry the excess moisture in wood and to keep the moisture content around 60%. Excessive moisture invites diseases whereas dry wood poorly supports the mycelial growth.

Holes (1 x 1 x 2 cm) are made in dried logs at a distance of 15 cm in a row. One row of hole is required for every 2.5 cm diameter of wood. Holes are made in adjacent row in alternate fashion so that it gives diamond pattern. Spawn is filled in the holes softly and sealed with paraffin wax. Similarly wax is applied on both cut ends as



Hole making

Spawn

Spawn plucking

Holes in alternate rows



Hole making

Spawn

Spawn plucking

Holes in alternate rows

it avoids moisture loss from cut ends. These logs are placed in shade as flat pile with sufficient space. This reduces moisture loss and provides apt light exposure to wood logs. Spawn run completion needs minimum of 6-18 months. In summer, pile needs to be covered with straw or gunny bags to prevent moisture loss.

The spawn-run completed logs are subjected to cold-water immersion for 24 hour in summer or kept at 10-15°C in winter to promote fruiting. These logs are leaned against some supports and the surrounding temperature

is maintained at 15-20°C and humidity at 80-90%. Mushroom starts appear after two to three months and are harvested upto 3 times in a flush. Resting period of 30-40 days is required between flushes. In a year 3-4 crops obtained and one inoculation produces mushrooms upto 6 years.

Synthetic log method : Saw dust and wheat bran is mixed together in 80:20 proportions and water added to obtain 60% moisture. The substrate pH is stabilized at 5.5 to 6.0 with the help of gypsum and lime. One kg of prepared



Mushroom shade house

Cropping stage

Cropping under natural shade



Table : Comparison of log and bag method of cultivation

Parameter	Log method	Bag method
Substrate used	Wood log	Saw dust and wheat bran
Spawn run period	8-12 months	60 days
Biological efficiency	10-15 %	> 60 %
Package of practices	Lengthy and arduous	Shorter and easier
Mushroom quality	Excellent	Good
Production period	> 3 years	8 months
Market supply	Irregular	Regular

substrate is filled in poly bags and sterilized in autoclave at 15 psi pressure for two hours. Spawn is inoculated to these sterilized bags at the rate of 2-3 %. These inoculated bags are kept in growing rooms at 21±1°C for spawn run. Four hour light exposure on daily basis is needed during spawn run. Spawn run completes in 60-80 days. After colonization of mycelium on the surface, it turns yellow and subsequently small mycelial buffs formed all over the surface.

After buff formation, polythene bags are removed. Now cropping room is maintained at 19°C and 2000-3000 ppm of CO₂ through cooling and fresh air introduction. Light watering is needed daily or depending upon the moisture content. Excessive watering causes black

surface which reduces yield at later stage. With progress of time, substrate become brown and pin head starts appearing.

Soaking of substrate in cold water (12°C) for 3-4 hour is required at this stage for fruit body initiation. Now cropping room temperature is reduced to 18°C. First flush of mushroom starts within 10-12 days. Mushroom is harvested by twisting and sharp cutting. The second and third flush requires cold water soaking for 12 and 18 hours, respectively. The production cycle by this method is 3-4 months. It yields about 60-80 per cent biological efficiency.

Received : 27.09.2021

Revised : 11.10.2021

Accepted : 15.11.2021

RNI : UPENG/2006/16373

ISSN : 0973-1547

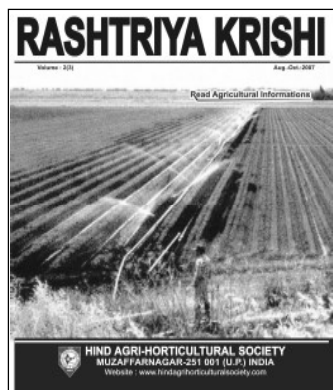
Accredited By NAAS : NAAS Rating : 4.15

INTERNATIONAL JOURNAL OF PLANT SCIENCES

An International Research Journal

Visit : www.hindagrihorticulturalsociety.co.in

THE ONLY HIGH TECH MAGAZINE FOR THE INTERNATIONAL AGRICULTURE INDUSTRY



Article are invited from the scientist, subject Specialists, Teachers, Students, Farmers and Professionals in the field of Agriculture and Horticulture, Aromatic and Medicinal Plants and other Allied subjects of Agriculture and Science
(All the author must be the member of the magazine)

**Annual Subscription fee Rs. 500/-
Abroad U\$ 50.00**

**Life Subscription fee Rs. 5000/-
Abroad U\$ 750.00**

All payment should be made to
RASHTRIYA KRISHI / राष्ट्रीय कृषि

