Review on Production Technology of Different Type of Mushroom
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Abstract:
Mushrooms add additional income to farmers and there are wide variety of mushrooms and their cultivations that need to be known for its rearing. Mushrooms even add additional benefits in diet with their nutritional facts. This article is focused on types mushrooms their characteristics and their production. Mushroom cultivation includes high cost to benefit ratio.

Keywords:Types of mushroom, characteristics, production.

I. INTRODUCTION

Only Oyster and button mushrooms are popular in India than the other mushrooms for cultivation and production. But, other Mushrooms also delicious and has great market.

India has different climatic conditions and hence there is scope for cultivation of special type mushrooms like Milky mushroom (Calocybeindica), Shiitake mushroom (Lentinula edodes), Winter mushroom (Flammulinavelutipes), Reishi mushroom (Ganoderma lucidum), Black ear mushroom (Auriculariapolytricha), Pink oyster mushroom (Pleurotuseous).

Result of study concluded that special mushrooms cannot require any special efforts. Special mushrooms also contain medicinal properties like anticancer, antidiabatic, etc. Hence, farmers should take its cultivation also and it will helpful for raising their economic condition. Its production technology is simple as like as Oyster mushroom. (Agrios., 2005; Sharma, and Kumar 2012a; Sharma, and Kumar., 2012b). People are not aware about the special mushrooms though, it has a great market and medicinal values.

Special mushroom cultivation is not only medicinal importance for consumer but also economic for its cultivation to the farmer. Special mushroom with its scientific fix name is given below

<table>
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<th>Sr. No.</th>
<th>Name of Special Mushroom</th>
<th>Scientific Name</th>
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<td>1.</td>
<td>Milky Mushroom</td>
<td>Calocybeindica</td>
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<td>2.</td>
<td>Shiitake Mushroom</td>
<td>Lentinula edodes</td>
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<td>Winter Mushroom</td>
<td>Flammulinavelutipes</td>
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<td>Ganoderma lucidum</td>
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<td>5.</td>
<td>Black Ear Mushroom</td>
<td>Auriculariapolytricha</td>
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<td>6.</td>
<td>Pink Oyster Mushroom</td>
<td>Pleurotuseous</td>
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</tbody>
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2. CULTIVATION OF MILKY MUSHROOM

2.1 Materials required:
Substrate (Wheat straw, Paddy straw, etc), Spawns, Autoclave, Polypropylene bags (35x55 cm), Needle, Racks, Hand pump and Chemicals (Formaldehyde, Streptomycin, Carbendazim).

2.2 Introduction
• Scientific Name: Calocybeindica.

• It is robust, fleshy, milky white, umbrella like mushroom.
• Suitable for hot and humid climate.
• Suitable temperature: 25-35 0c.
• It can be cultivated throughout the year.
• It was reported for the 1st time in India by Purkayastha and Chandra (1974).
• Name is derived from ancient Greek term “Kalos” meaning “Pretty” and “Head”.

http://ijesc.org/
2.3 Flow chart of mushroom production

Chopped paddy straw (3-5 cm) ↓
Soaked in cold water (4-5 hr) ↓
Drain out excess water ↓
Sterilization of substrate: Hot water treatment (3-4 hr) or chemical treatment with Carbendazim 7.5 g + formalin 125 ml per 100 lit. water for 18 hr ↓
Drain off excess water ↓
Drying at 60-70% moist level ↓
Prepared bed (Spawning) ↓
Pining the beds ↓
Incubated bed for 12-15 days ↓
Removal of polythene bags and apply casing ↓
Beds are shifted to cropping room ↓
Regularly sprayed water (maintain 50-60% Moisture level) ↓
Pin heads appear 8-10 days after casing ↓
Harvesting after 3-5 days ↓
Drying and Packing

3. CULTIVATION OF SHITAKE MUSHROOMS

3.1 Introduction
• Scientific Name – Lentinula edodes.
• Also called ‘Black forest mushroom’ or ‘Log mushroom’.
• It is most important culinary medicinal mushroom which ranks at 2nd number of total mushroom production in the world only next to button mushroom.
• It is prized mushroom with a delicious taste and texture.
• Lentinan (a cell wall constituent extracted from the fruiting bodies of shiitake) is an immuno-modulating agent which may be useful both as a general rejuvenate for older persons as well as prophylactically to protect healthy, physically active young people from overwork and exhaustion.

3.2 Flow chart of shitake mushroom production

Mixture of hard wood, sawdust, wood chips, rice bran and calcium sulphate ↓
Fill 1 kg wet substrate (65 % moisture) to polypropylene bags ↓
Plug bags with non-absorbent cotton ↓
Sterilize the substrate (121 °C, 15 lbs pressure for 15-20 minutes in autoclave) ↓
Cool the bags to room temperature ↓
Spawning (aseptically @ 5% of wet substrate) ↓
Spawn running (22-26 °C, 60-70 days)
Cold-water shock treatment (10-15 °C water for 6-8 hours) ↓
Fructification (22-26 °C, 80-85% RH, light, cross ventilation) ↓
Sold as fresh or dry mushroom (Sharma and Kumar, 2012)

4. WINTER MUSHROOM

4.1 Introduction
- Scientific Name: *Flammulinavelutipes*.
- It grows at very low temperature in nature; hence its name is winter mushroom.
- During the growth it often freezes and continues to grow when it gets warmer.
- It is the popular food in the Far East, especially in China.
- It ranks 6th in terms of total world mushroom production.

4.2 Characteristics
- Cup shaped,
- Ear like appearance.
- Reddish – brown colour.
- Rubbery to gelatinous texture.
- Surface usually includes
- Minutely fine hairs.

4.3 Flow chart of production:

Substrate ↓
Sawdust + Wheat / Rice bran ↓
Wetting 65% ↓
Pasteurization 15 p.s.i. for 1 ½ hr ↓
Spawning @ 4% dry wt. basis Wheat grain based spawn ↓
Incubation (22-25 °C, high CO₂ And dark) ↓
Pinning (10-14 °C, 85% RH, light 800 lux) ↓
Maturation (3-5 °C, RH 80% ) ↓
Harvesting ↓
Marketing / Sun drying ↓
Packing (Sharma and Kumar, 2012)

5. CULTIVATION OF REISHI MUSHROOM

5.1 Introduction
- Scientific Name: *Ganoderma lucidum*.
- Grow well in pH : 5.5
- Reishi mushroom is pharmacologically as well as commercially the most important medicinal mushroom in world with current global trade of about 2 billion dollars.
- Trade in India has crossed Rs. 100 cores annually through imports from Malaysia and China.

5.2 Characteristics
- Kidney or fan shaped.
- Reddish with a wet, lacquered appearance when young.
- Shiny, reddish cap.
- As they, age the flesh becomes tougher and spores drop.
Air currents often blow these spores to the top of the mushroom, dulling its shiny cap. The newest growth often shows up as a whitish edge.

5.3. FLOW CHART OF PRODUCTION:

Mixture of wet sawdust and rice bran ↓
Fill 1 kg wet substrate (65% moisture) to polypropylene bags ↓
Plug with non-absorbent cotton ↓
Sterilization of the substrate (121 °C, 15 lbs pressure for 15 minutes in autoclave) ↓
Cool the bags to room temperature ↓
Spawning (Aseptically, @ 5% of wet substrate) ↓
Spawn running in dark room (28-30 °C, 25-35 days) ↓
Open the bags and shift to cropping room (28-35 °C, 80-85% RH, light, cross ventilation) ↓
Pinhead initiation (10-15 days after opening bags) ↓
Fruit body expansion (kidney shaped, reddish to brown in colour, 15-20 days) ↓
Harvesting (when the white colour of the growing edge just disappear) ↓
Sold in various forms of dry mushroom, mushroom powder and products (https://iihr.res.in)

6. CULTIVATION OF BLACK EAR MUSHROOM

6.1 Introduction

- Scientific Name: *Auriculariapolytricha*.
- Also called ‘Black jelly’.
- Temperature: 25-30 °C.
- pH: 6.5
- It is popular in NEH (North Eastern Hill) regions of India.
- Presently, the cultivation of black ear mushroom has become profitable venture in some of the Asian countries. Thailand is a major importer of this mushroom for local use and 80% of the dried produce of Taiwan is exported to Hong Kong, Japan, USA.
- Cultivation of this mushroom is considered to be recent in India.

6.2 Characteristics

- Darker, thicker and long haired.
- This mushroom has a special quality of retaining its characteristics crispness on cooking.

6.3. Flow chart of production:

Wheat straw ↓
Soak for 16-18 hours in cold water ↓
Drain out excess water ↓
Mix 5% wheat bran ↓
Fill 2 kg of polypropylene bag ↓
Autoclave (121 °C, 15lbs pressure for 15 min.) ↓
Cool at room temperature
Spawning @ 2%

Spawn running (25-26°C for 20-25 days)

Give cross cut to give slits and hang the bags for fruiting at 25-26°C

Spray water twice on bags and maintain high relative humidity 85-90%

Give 1-2 hours diffused light and aeration also

Emergence of fruit bodies in 10-12 days

Mature for harvesting in next 4-5 days

Sun drying

Selling

(www.nrcmushroom.org)

**Note:** After 3-4 flushes of harvesting of these, fresh mushroom yield obtained may be 1-1.4 kg per kg dry straw

### 6. CULTIVATION OF PINK OYSTER MUSHROOM

#### 6.1 Characteristics
- Pink in colour.
- Caps may be scaly, rubbery or smooth.
- Suitable for summer season.

#### 6.2 Flow chart of production:

- **Sustrate** (viz. paddy straw, sugarcane bagasse, coir pith, sorghum straw, ragi straw and mixed bed)
- Selected substrate chopped into 5 cm long
- Soaked in clean tap water for 12 hours
- Sterilization (121°C, 15 lbs pressure for 15 minutes)
- Spawning
- Pinning
- Spawn running (80-90% RH for 12-14 days)
- Primordium initiation observed on 17-22 at days after spawning
- Harvesting after 3-4 days after primordium initiation
- Drying
- Selling

(https://www.researchgate.net)

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