

Scientific cultivation of Split Gill Mushroom

Sumitra Ph, M. Shivakanta and Akshay M

College of Agriculture, Iroisemba, Central Agricultural University, Imphal, Manipur

Corresponding Author: sumitrapathology@gmail.com

Introduction

Mushrooms are meaty, spore-producing reproductive structures of basidiomycete fungi, usually formed above ground on soil or their nutrient source. The FAO suggests that edible mushrooms serve as a food source to fulfill the protein needs in developing countries, where a significant portion relies primarily on cereals. Typically, edible mushrooms are low in calories and fat; abundant in vitamins B, D, K, and occasionally A and C (Alam et al., 2007); have higher protein content than any other plant-based foods; and serve as a valuable source of minerals (Qin, 1989). Consequently, considerable focus has been directed towards mushrooms as 'functional food' to enhance and support a nutritious diet, in addition to their important contributions to human disease management (Chang 1999, Khan et al., 2009).

S. commune is an edible mushroom that thrives in natural environments, particularly in the rainy season, on decomposing wood. It has been found on every continent excluding Antarctica (Khatua et al., 2013). *S. commune* is recognized as an excellent source of proteins, vitamins, fats, and minerals (Adejoye et al., 2007). It contains abundant P, Mg, K, and Se, along with a high fiber content exceeding 50% of its net weight (Ghorai et al., 2009). Although *S. commune* grows on decaying woods of different species under natural conditions.

Species Overview

Schizophyllum commune Fr. (Family: Schizophyllaceae) is a frequently found and broadly distributed edible mushroom that naturally thrives on rotting wood during the rainy season. The genus *Schizophyllum* translates to "split gill," which is why this mushroom is often referred to as the split gill mushroom. It is a wood-decaying fungus that typically leads to white rot and is uniquely different from other gill fungi (Imtiaj et al., 2008).

The mushroom is commonly found on all continents except Antarctica, as there is no wood available to serve as a substrate (Khatua et al., 2013). It is used as both food and medicine in South Asian nations such as Thailand, Taiwan, Malaysia, Vietnam, Southern China, and Northeastern India. In North-East India, the state of Manipur refers to this mushroom as "Kanglayan," and it is a popular ingredient in the Manipuri pancake dish known as "Paaknam." In Mizoram, the regional name is "Pasi" (where pa denotes mushroom and si signifies small) and it ranks as

one of the most esteemed edible mushrooms within the Mizo community.

S. commune is primarily recognized for its significance in medicine (Oso, 1981; Han et al., 2005). From a pharmacological perspective, *S. commune* holds substantial importance due to its production of the polysaccharide schizophyllan, which exhibits notable medicinal properties and has potential applications in preventing various human ailments (Ooi and Liu, 1999; Wasser, 2002). Although it is a highly valued edible mushroom with considerable medicinal benefits, research regarding its beneficial properties and the development of commercial cultivation techniques for *S. commune* remains in its infancy in India.

Cultivation Requirements

Substrate Preparation

The success of split gill mushroom cultivation depends heavily on substrate selection and preparation:

1. Substrate Composition

Agricultural by-products rich in cellulose, such as rice, wheat, maize residues, and sawdust, are commonly used for split gill mushroom cultivation. Although sawdust is considered one of the best substrates, its practical use is limited since the identification and collection of suitable hardwood sawdust is difficult, and excessive cutting of trees contributes to deforestation. In contrast, paddy straw is easily available, inexpensive, and environmentally sustainable. It provides sufficient nutrients and structure to support healthy mycelial growth and fruiting, making it the most suitable substrate for the cultivation of split gill mushroom. Moreover, supplementation with nitrogen-rich materials such as wheat bran or rice bran further enhances its nutritive value and improves yield.

2. Sterilization Process

The substrate was sterilized either by autoclaving or steam sterilization at 121 °C (250 °F) for 45 minutes, or by pasteurization for 4 hours when an autoclave was not available. During this process, strict sterile conditions were maintained to prevent contamination. After sterilization, the substrate was allowed to cool completely before inoculation with mushroom spawn.

3. Spawn and Inoculation

Pure culture spawn obtained from a reputable mycological supplier should be used for inoculation to ensure healthy and vigorous growth. The substrate is inoculated

under sterile conditions to prevent contamination, with a recommended inoculation rate of 2–3% spawn to substrate volume. Throughout the transfer process, clean and controlled conditions must be maintained to achieve successful colonization.

Cultivation Technologies (Kanglayen)

1. Cultivation is carried out on sawdust of selected trees or rice straw (80%), supplemented with rice bran (16 %), CaCO_3 (2 %), and CaSO_4 (2 %).
2. Wetting of substrate mixture to maintain a moisture of 55-65%.
3. Mixed substrate is filled in polypropylene bags (0.8-1 kg wet weight/ bag).
4. Bags are sterilized in an autoclave at 22 psi for 90 minutes or pasteurize for 4 hours
5. Grain spawn is inoculated @ 3% (wet wt basis, top spawning), and bags incubated at 4 hr/20 hr light / dark cycles at 23-25°C.
6. The spawn run took 15-25 days.
7. After complete spawn, run bags were shifted to cropping room temperature of $28 \pm 2^\circ\text{C}$, RH (80-82%). The polythene bags were then cut vertically to facilitate fruiting.
8. After 2-3 days of the small primordia developed and water is sprayed on the cut open surfaces of the bag
9. In the next 3- 4 days, they mature into full-grown fruit bodies
10. Harvest mushrooms at an early stage before unveiling the margin of the cap.
11. 100- 200 g of fresh mushrooms can be harvested from 1 kg of dry substrate.
12. Mushrooms can be consumed fresh or sun dry.

REFERENCES

A. Imtiaj, C. Jayasinghe, G.W. Lee, H.Y. Kim, M.J. Shim, H .S. Rho, T.S. Lee (2008), Physicochemical requirement for the vegetative growth of *Schizophyllum commune* collected from different ecological origins *Mycobiology*, 36, pp. 34-39.

Adejoye, O.D., Adebayo-Tayo, B.C., Ogumjobi, A.A., Afolabi, O.O. (2007). Phytochemical studies on

Schizophyllum commune (Fries) a Nigerian fungus. *World ApplSci J.* 2(1),73-76.

Alam, N., Khan, A., Hossain M.S., Amin, S.M.R., Khan, L.A.2007 Nutritional analysis of dietary mushroom *Pleurotus florida* Egger and *Pleurotus sajorcaju* (Fr) Singer. Bangladesh, *Mushroom* 1(2):1-7).

B.A. Oso (1981), Fungi and Mankind. Inaugural Lecture University of Ibadan, Nigeria p. 40.

C.H. Han, Q.H. Liu, T.B. Ng, H.X. Wang (2005), A novel homodimeric lactose-binding lectin from the edible split gill medicinal mushroom *Schizophyllum commune* *Biochem. Biophys. Res. Commun.*, 336 pp. 252-257.

Chang, S. (1999). World production of cultivated edible and medicinal mushroom in 1997 with emphasis on *Lentinus edodes* (Berk) Singer In China Int J Med Mushrooms. 1,291-300.

Ghorai, S., Banik, S.P., Verna, D., Chowdhury, S., Mukherjee, S., Khowala, S. (2009). Fungal biotechnology in food and feed processing. *Food Res Int.* 42,577-587.

Khan, M.A., Khan, L.A., Hossain, M.S., Tania, M., Uddin, M.N. (2009). Investigation on nutritional composition of common edible and medicinal mushrooms cultivated in Bangladesh. *Bangladesh J Mushroom.* 3(1),21-28.

Khatua, S., Paul, S., Acharya, (K. 2013). Mushroom as the potential source of new generation of antioxidant: A review. *Research J. Phar and Tech* 6(5), 496-505.

Qin, S.X., (1989). Effect of different cultivation materials on nutritive composition of *Pleurotus* fruiting bodies. *Edible fungi of China*, 3:12-13.

S. Khatua, S. Paul, K. Acharya (2013), Mushroom as the potential source of new generation of antioxidant: a review *Res. J. Pharm. Technol.*, 6 , pp. 496-505.

S.P. Wasser (2002), Review of medicinal mushrooms advances: good news from old allies *Herbal. Gram.*, 56 pp. 28-33.

V.E.C. Ooi, F. Liu (1999), A review of pharmacological activities of mushroom polysaccharides *Int. J. Med. Mushrooms*, 1 pp. 195-206.
