UNIVERSITI PUTRA MALAYSIA

CULTIVATION AND IDENTIFICATION OF SELECTED WILD EDIBLE MUSHROOM (LENTINUS SP.) GROWN ON SAWDUST SUBSTRATE

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Cultivation and Identification of Selected Wild Edible Mushroom (*Lentinus* Sp.) Grown on Sawdust Substrate

By

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CERTIFICATION

This project paper entitled, “Cultivation and Identification of Selected Wild Edible Mushroom (*Lentinus* Sp.) Grown on Sawdust Substrate” is prepared by Nurul-Fatini Binti Takril and submitted to the Faculty of the Agriculture in partial fulfillment of the requirement of PRT 4999 (Project) for the award of the degree of Bachelor of Horticultural Science.

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ABSTRACT

Mushrooms have been consumed since in the earliest history. Mushrooms are famous and a valuable source of food. Currently, the variety of mushrooms in Malaysian markets is not as diverse as those actually found on earth. Some of the mushrooms sold at retail stores in Malaysian markets are *Auricularia polytricha* (Black jelly mushroom), *Pleurotus ostreatus* (Oyster mushroom), *Pleurotus sajor-caju* (Grey oyster mushroom) and *Pleurotus florida* (White Oyster mushroom). Therefore, one of the efforts to support the situation is to increase the variety of mushroom species in local markets. Malaysia is situated in a tropical region that is supported by diverse habitats which very suitable for the growth of various types of wild mushrooms. Interestingly, a number of wild mushrooms under genus *Lentinus* are widely used as food and they possessed therapeutic properties. A number of *Lentinus* species such as *L. squarrosulus*, *L. sajor-caju*, and *L. strigosus* have been reported as edible. Although *Lentinus* species are reported as edible, they are not yet cultivated in Malaysia as commercial mushrooms. Thus, the objectives of this study are 1) to identify the morphological characteristics of *Lentinus* species, 2) to isolate and cultivate pure culture mycelia of *Lentinus* species, and 3) to evaluate the biological efficiency of *Lentinus* species grown on sawdust substrate. The wild edible *Lentinus* were collected along the rivers in Selangor areas. The pure culture was isolated from the fruiting bodies. Spawns of *Lentinus* were grown on sawdust substrate. The yield of fruiting bodies was observed. This study introduces the cultivation of wild mushroom species that have a potential to commercialize as an edible mushroom for future of mushroom industry in Malaysia.

Keywords: Mushrooms, *Lentinus*, sawdust, cultivation

ABSTRAK

Cendawan telah dimakan sejak awal sejarah lagi. Cendawan adalah sumber makanan yang berharga dan terkenal. Pada masa ini, jenis-jenis cendawan di pasaran Malaysia tidak menawarkan kepelbagaian jenis cendawan yang benar-benar terdapat di bumi. Sesetengah daripada mereka yang dijual di kedai-kedai runcit di pasaran Malaysia adalah *Auricularia polytricha* (cendawan Jeli Hitam), *Pleurotus ostreatus* (cendawan Tiram), *Pleurotus sajor-caju* (Cendawan Tiram Kelabu) dan Florida *Pleurotus* (Cendawan Tiram putih). Oleh itu, salah satu usaha untuk menyokong keadaan yang berlaku ini adalah dengan meningkatkan pelbagai spesies cendawan di pasaran tempatan. Malaysia terletak di kawasan tropika yang dikelilingi oleh pelbagai habitat, terutamanya hutan hujan tropika. Walaupun pelbagai aspek penyelidikan tentang cendawan liar telah dikaji secara meluas sepanjang dekad yang lalu, kajian terhadap tahap domestik mereka adalah sangat kurang. Menariknya, sejumlah cendawan liar di bawah genus *Lentinus* digunakan secara meluas sebagai makanan dan mereka memiliki sifat-sifat terapeutik. Beberapa spesies *Lentinus* seperti *L. squarrosulus*, *L. sajor-caju*, dan *L. strigosus* telah dilaporkan sebagai tidak boleh dimakan. Walaupun spesies *Lentinus* dilaporkan sebagai boleh dimakan, ia belum lagi diusahakan di Malaysia sebagai cendawan komersil. Oleh itu, objektif kajian ini adalah 1) untuk mengenal pasti ciri-ciri spesies *Lentinus,* 2) untuk mengasingkan dan mengkultur daripada kultur asli mycelia dari spesis *Lentinus* 3) untuk menilai kecekapan biologi *Lentinus* spesies yang ditanam pada substrat habuk kayu. *Lentinus* liar yang boleh dimakan akan dikumpulkan dari bukit-bukau, sungai, sekitar kawasan Selangor. Permerhatian telah dilakukan terhadap hasil tubuh cendawan yang berbuah. Kajian ini memperkenalkan kultivasi

cendawan liar yang mempunyai potensi untuk dikomersilkan sebagai cendawan yang boleh dimakan untuk masa depan industri cendawan di Malaysia.

Kata kunci: Cendawan, *Lentinus*, dedak kayu, kultivasi

CHAPTER 1

INTRODUCTION

Wild edible mushrooms are used as source of food and source of income in more than 80 nations (Boa, 2004). There is a huge diversity of aspects mainly different types, from truffles to milk-caps, chanterelles to termite mushrooms, with more than 1100 species recorded in a variety of research works. A small group of wild edible mushrooms species are of economic importance in terms of exports, but most importantly they are used as source of food in developing nations. They provide an important diet in central and southern Africa during the months of drought when the supply of food is often critically low and also a valuable trait for the rural people around the world (Boa, 2004). Fungi are a distinct group of organisms that involve species with expansive and obvious fruiting bodies (macrofungi). The best known cases of macrofungi are the mushrooms. They have a top and a stalk and are regularly found in fields and woodlands. Most are inedible but there are prominent illustrations that can be eaten. The quantity of harmful species is generally low and few of them are lethal. The most natural edible mushrooms are those that are developed and sold fresh or tinned in shops. Boa (2004) stated that around the world, an expected 1,069 species of mushrooms have been accounted as the purpose of human sustenance (Semwal et al., 2014).

Tropical woods such as coniferous forests and broadleaf forests seem to be perceived as the setting up of ectomychorrizal associations with the mycelium of diverse mushrooms (Semwal et al 2014). This advantageous relationship between mushrooms

growth development and its growth habitat shows that the growth of fungus component of the forest ecosystem is mandatory to the health of the forest itself where mushrooms depend on photosynthetically fixed carbon produced by their associated host trees to extend their vegetative mycelium in the soil and to form mycorrhizas as well as fruit bodies for sexual reproduction (Egli, 2011). In any case, numerous tropical forests give off an impression of being experiencing worldwide environmental changes and apparently an increased awareness to various insect attack (Semwal, 2014). With the issues highlighted, it has turned out to be more crucial to make profit from wild mushrooms in two ways; in advancing development of seedlings in a tree nursery and as a sustenance reason for humans. Smiley et al. (1997) justified that many studies that have been made to demonstrate the ectomychorrizal affiliation, upgrade the development and the efficiency of the mushroom vegetation of a region. Some edible mushrooms are quite similar in appearance to harmful mushrooms and they may even have similar natural surroundings. Mushrooms are one of the best sources of antioxidant act intentionally as a rich wellspring of normal anti-toxins. Study conducted by Suzuki et al., (1990) showed that the cell wall of mushroom which comprises of glucan are outstanding for their immunomodulatory properties, and the secondary metabolites have been observed to be dynamic against microbes and infections that were researched (Choudhary et al., 2015).

Exudates from mushroom mycelia are oppose against protozoans, for example, the intestinal sickness parasite *Plasmodium falciparum*. Humans and microorganisms share common microbial rivals, for example, *Staphylococcus aureus*, *Escherichia coli*, and *Pseudomonas aeruginosa*, therefore human can profit by the antimicrobial

compounds produces by mushrooms against the parasites. The principle components influencing development of mushroom cell wall are nutrient sources and environmental factors, for example, temperature and pH.

Carbon sources are critical and fundamental on the growth development of mushrooms. In various carbon sources, such as glucose, galactose, mannose, fructose, sucrose, cellulose, dextrin, and starch can be used for growth. In addition, nitrogen sources, such as ammonium nitrate, calcium nitrate, yeast, soya bean, arginine and glutamic corrosive have been utilized to supplement mycelium growth. The ideal temperature and pH of mycelial growths differ with strains or types of the mushrooms. For instance *Volvariella volvacea* develops well at 35^{o}C, *Pleurotus eryngii* at 25^{o}C, and *Lentinus strigosus* at 35^{o}C. Isaka et al., (2001) further reported that the ideal pH of ammonia fungi, saprobic mushrooms and mychorrhiza mushrooms are pH 7, 7-8 and 5 or 6 consecutively (Semwal, 2014). The present study was conducted to identify features of selected wild edible mushroom (*Lentinus* sp.) as well as to evaluate the biological efficiency of *Lentinus* sp. grown on sawdust substrate.

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