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THE EFFECT OF NITROGEN SUPPLEMENT ON MYCELIAL GROWTH RATE AND FRUITING SUBSTRATE OF *SCHIZOPHYLLUM* COMMUNE (SPLIT GILL MUSHROOM)

NURUL JANNAH ABDULLAH

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NURUL JANNAH BINTI ABDULLAH

FACULTY OF AGRICULTURE
UNIVERSITI PUTRA MALAYSIA
SERDANG, SELANGOR
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The Effect of Nitrogen Supplement on Mycelial Growth Rate and Fruiting Substrate of *Schizophyllum Commune* (Split Gills Mushroom)

By

Nurul Jannah Binti Abdullah

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CERTIFICATION

This project paper entitled, "The Effect of Nitrogen Supplement on Mycelia Growth Rate and Fruiting Substrate of *Schizophyllum commune*" is prepared by Nurul Jannah Binti Abdullah 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.

Student's name: Student's signature:

(Nurul Jannah Binti Abdullah) …….

Certified by: Date:

…….. …….

(Dr. Sumaiyah Binti Abdullah)

(Project Supervisor)

Plant Protection Department

Faculty of Agriculture

Universiti Putra Malaysia

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ABSTRACT

Schizophyllum commune or commonly known as split gill mushroom is a type of widely distributed wood-decaying basidiomycetes that have been acknowledged for their medicinal properties. *S. commune* has been extensively cultured on the sawdust substrates which are common commercially used as fruiting substrate components for the cultivation of edible mushrooms in Malaysia. However the most suitable supplement of sawdust substrate to increase the growth rate of spawning and yield performance of *S. commune* is yet to be identified. In view of such issue, this research was conducted to investigate the effect of supplementation of nitrogen-sources for fruiting substrate of *S. commune*. Rice bran at different levels (0, 10, 20, 30, 40, and 50 %) was used as a supplement to evaluate the yield and biological efficiency of *S. commune* production. The experimental design used was Randomized Complete Block Design (RCBD) in which each treatment has four replicates. The mycelial growth rate, days required to fully colonize substrate bags, days for primordial formation, yield, and biological efficiency of the fruiting bodies of *S. commune* were evaluated. The result indicated that the 30 % of rice bran level was effective for producing viable fruiting bodies. The result indicated that increasing the supplementation level may resulted in less biological efficiency but throughout this experiment, it show that there was no significantly difference between 50 % and 30 % of rice bran. Thus, 30% of rice bran level was used as the best supplement in sawdust substrate due to the low quantity that were used to supplement the sawdust substrate compared to 50 % of rice bran level.

ABSTRAK

Schizophyllum commune atau lebih dikenali sebagai cendawan Sisir ialah sejenis pereput kayu Basidiomycetes yang terbesar yang sememangnya diakui kandungan perubatannya. *S. commone* dikultur secara meluas dalam habuk kayu yang merupakan komponen yang biasa dikormersialkan sebagai substrat berbuah untuk penanaman cendawan yang boleh dimakan di Malaysia. Namun, bahan tambahan yang sesuai untuk habuk kayu supaya terdapat peningkatan dalam kadar pertumbuhan oleh benih dan prestasi hasil *S. commune* masih belum diketahui. Melihat kepada isu tersebut, penyelidikan ini dijalankan bagi mengetahui kesan daripada penambahan sumber nitrogen ke atas substrat berbuah *S. commune.* Kadar perbezaan dedak padi (0, 10, 20, 30, 40, dan 50 %) digunakan sebagai penambahan untuk menilai hasil dan kecekapan biologi pengeluaran *S. commune.* Rekabentuk experimen yang digunakan adalah Rekabentuk Penuh Rawak Berblok (RCBD) dimana setiap rawatan mempunyai empat replikasi. Kadar pertumbuhan miselia, hari yang diperlukan untuk penjajahan penuh bag substrat, hari untuk pembentukan primordial, hasil, dan kecekapan biologi oleh penghasilan janabuah *S. commune.* Keputusan menyatakan bahawa tahap 30 % dedak padi adalah efektif untuk mengeluarkan hasil janabuah yang berdaya maju. Keputusan juga menyatakan bahawa peningkatan melalui tahap penambahan kebarangkalian menyebabkan pengurangan dalam kecekapan biologi namun melalui experiment ini, ia menunjukan tiada perbezaan ketara antara tahap 30 % dan 50 % dedak padi. Dengan itu, tahap 30 % dedak padi yang digunakan sebagai penambahan dalam substrat habuk kayu disebabkan oleh kegunaan kuantiti yang rendah untuk penambahan substrat habuk kayu berbanding dengan tahap 50 % dedak padi.

CHAPTER 1

INTRODUCTION

The cultivation of edible mushrooms has now become popular all over the world. There are over 200 genera of microfungi that contain species of use to people and usually commonly grown across tropical and temperate zone (Marshall *et al.*, 2009). Edible mushrooms are also a good source of some vitamins and minerals, although fat, carbohydrate, and dietary fiber contents are comparatively low. Hence, mushroom can supplement a good diet especially for the diabetic patients due to the low calories and high protein value contained in edible mushrooms. Furthermore, previous research works acknowledged the medicinal attributes of edible mushrooms in several species, such as antiviral, antibacterial, antiparasitic, antitumor, antihypertension, antiatherosclerosis, hepatoprotective, antidiabetic, anti-inflammatory and immune modulating effects (Martinez-Carrera *et al.*, 2000).

Schizophyllum commune or commonly known as split gill mushroom is one of the edible mushrooms that belong to the phylum Basidiomycetes, order Agaricales and family of Schizophyllaceae. This split gill mushroom is quite a popular edible mushroom among the Malays in Malaysia (Mirfat *et al.*, 2014). This fungus usually grows abundantly during the rainy seasons and it frequently appears on dead woods and it can produce enzyme to decay the lignin in the woods causing the "white rot", because of the cellulose left behind on the decaying wood (Nasreen *et al.*, 2015). The fruiting bodies of the *S. commune* are produced each year where the stalk of its fruiting bodies are nearly

absent or very short that usually grows in cluster on decaying hardwood throughout the world (Nasreen *et al.*, 2015).

Furthermore, due to their fast growth and simple cultivation without need of any chemical fertilizers or pesticides, the cultivation of *S. commune* becomes a very popular cottage industry. This is due to the increasing demand for continuous and many types of good quality of various types of mushroom. High mass production of *S. commune* is required to meet the demand for polysaccharide schizophyllan which shows considerably medicinal properties (Aina *et al.*, 2013). For this reason, *S. commune* was selected to be evaluated as it is a popular edible wild mushroom among the Malay community in Malaysia (Mirfat *et al.*, 2010) that has not been commercialized throughout the country and extend to global level. Supplementing the substrates is a common method to increase productivity, which is evaluated by the biological efficiency and the yield performances of *S. commune* (Alam *et al*., 2010). This study was conducted to investigate the effect of supplementation of nitrogen-source for fruiting substrate of *S. commune*.

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