Performance of *Schizophyllum commune* (Fries), a Wild Edible Mushroom, on Saw Dust based Compost Media

DGA Namalee*, IP Manawadu and KLW Kumara

Department of Agriculture Biology, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka

Abstract

Schizophyllum commune (Fries) is a naturally occurring wild edible mushroom valued for its high nutritional composition and unique taste. The domesticating and commercial cultivation opportunities of this mushroom have been left unexploited. An effort was made to domesticate and to develop technologies for artificial cultivation of this valued mushroom so that, it can be grown throughout the year. Effects of different bag sizes, composition (different types of saw dust media and saw dust: straw mixtures), compactness of the substrate and opening surface for cropping, on yield performances were studied. Results revealed that *S. commune can* be successfully cultivated under artificial conditions. Better mushroom yield was recorded in polypropylene bags (13") filled with 1.20-1.24 kg composts. Bag size below (13") influenced negatively on yield of mushroom grown in saw dust medium. Increasing opening surface of the bag had no effect on the mushroom yield. Mango as the saw dust substrate gave a significantly high yield (75% increases) as compared to the rubber saw dust which gave the lowest yield. Paddy straw and saw dust at different ratios, gave varying mushroom yields. This investigation showed that *S. commune* could be grown commercial scale under farmer's condition.

Keywords: Domestication, Lena hathu, *Schizophyllum commune,* wild edible mushroom

Introduction

Mushroom production based on microbial technology for large-scale recycling of agro-wastes, represents one of the most commercially important steps towards diversification of agriculture. Mushroom cultivation not only reduces the environmental impacts of wastes, but also provides an economically acceptable alternative for the production of food with high nutritional quality and taste. Although around 7000 species showing varying degree of edibility, only 100 species of mushrooms have been economically cultivated of which, only few species are being produced and marketed in sizeable quantities across the world (Chang and Miles, 2004). Considering the Sri Lanka's rich mushroom diversity, the number of unexplored species of edible mushrooms which may be artificially cultivated, could be high. *Schizophyllum commune* (Fries), a wild edible mushroom, is popular among local people for it's unique taste. This fungus forms small fruiting bodies on decaying wood and usually grows abundantly during the rainy seasons (Adejoye *et al.,* 2007). Though a few attempts have been made in Sri Lanka to explore the potential of cultivating wild edible mushrooms under artificial conditions (Udugama, *et al.,* 2005). There has been not developed a complete package for commercial cultivation and popularization of this mushroom among growers. To make mushroom cultivation an environmentally friendly and cost-effective enterprise, research must be focused to couple the basic biology of wild edible mushrooms with indigenous substrate formulations and locally adapted cultivation biotechnology under ambient climatic conditions (Obodai *et al.,* 2003). In view of the above, the current study was undertaken with the objective of

Corresponding Author: namalee.823@gmail.com

investigating cultivation potential of *S. commune,* under artificial conditions.

Materials and Methods

The young fruit bodies of *Schizophyllum commune* were collected from decaying wood of Mango at the Faculty of Agriculture, Mapalana and tissue culture technique was practiced to isolate the fungus on PDA medium. Finger millets were used as the spawn substrate and mixed with, 1% glucose and 0.5% calcium carbonate and sterilized to prepare mother spawns of *Schizophyllum commune.*

Changing bag sizes ranging from 8" to 13" and changing compactness of the medium by increasing weight of the compost per standard 13" size bag, were studied after inoculation of the bags with spawns. Bags were previously prepared with standard saw dust based medium (Anon., 2009) and sterilized, before inoculation with the mother spawns. The opening surface of bags was increased by making different number of 1" diameter size holes on each polypropylene bag prepared with the above procedure, after the spawn run in the dark.

Bags were prepared with various saw dust media along with other ingredients (ex: rice bran, green gram flour, $CaCO_3$, $MgSO_4$, *etc.*), sterilized, and inoculated with spawns, kept for incubation until fruiting. Similarly, straw and sawdust at different ratios were also used to prepare substrates with other standard ingredients and yield performance was recorded. All the treatments were arranged in a Completely Randomized Design (CRD) in the mushroom hut, unless, otherwise indicated in the materials and methods. SAS (SAS Institute, Cary, NC) software package (version 5.1.2600) was used to analyse the experimental data. Analysis of variance (ANOVA) was performed and the treatment means were compared using Duncan's multiple range test (DMRT).

Results and discussion

Schizophyllum commune fungus was able to isolate on PDA medium using tissue culture technique. Highest cumulative yield (24.7g) was recorded on weight range 1.20-1.24 kg/bag compactness, but not significantly different from the other treatments, except weight range of 1.25-1.48 kg per bag (Figure 1). The number of days taken (average = 21.7 days) for the first harvest was also not significantly different among bags having different compactness (data not shown).

Highest mushroom yield (20.76 g) was observed at 13" bag size which was significantly different from the other treatments (Figure 1). When increasing bag size, the cumulative yield also increased. The 13" bag size is the currently recommended size for cultivation of oyster mushrooms in Sri Lanka (Anon., 2009). It is also important to study the performance of this mushroom when growing on polypropylene bags with length longer than 13". Increasing opening surface in polypropylene bags allowing fruiting of the mushroom did not change the mushroom yield significantly. In fact, increasing opening surface in different places on polypropylene bags increased the contamination of bags by other fungi.

Among different saw dust substrates, Mango saw dust supported highest yield (47.66g) which was significantly higher than the other types of saw dust ($P<0.05$). Rubber based compost medium recorded lowest (6.64g) mushroom yield. In Mango saw dust medium, mushroom yield increase was 75.5% compared to rubber. There are no reports on yield performance of this fungus on different saw dust based media. However, Mango would have provided better avenues for the fungus to utilize ligno-cellulitic substrates (Obodai *et al.*, 2003). The average yield of four treatments *viz.* paddy straw: saw dust @ 1:1, saw dust alone, paddy straw alone and paddy straw:saw

dust@2:1, increased 68.73% mushroom yield compared to paddy straw:saw dust @ 1:2 in 4 flushes. The reason why the mushroom behaved differently on tested compositions, is difficult to explain with the current knowledge.

Conclusion

The experiment showed *Schizophyllum commune* can be successfully cultivated on saw dust based media. Increasing bag sizes although, increased mushroom production, changing opening surfaces of the bag had no direct effect on the mushroom yield. Mango saw dust based medium can be used to obtain higher yield when *S. commune* is grown for commercial purposes.

Acknowledgments:

Authors gratefully acknowledge "Project on Transforming University of Ruhuna into International Status (RU/DVC/Pro124)", Agriculture Faculty Research Grant-2012 and Commonwealth of Learning Lifelong Learning for Farmers (COL's L3 Farmers) for the financial assistance.

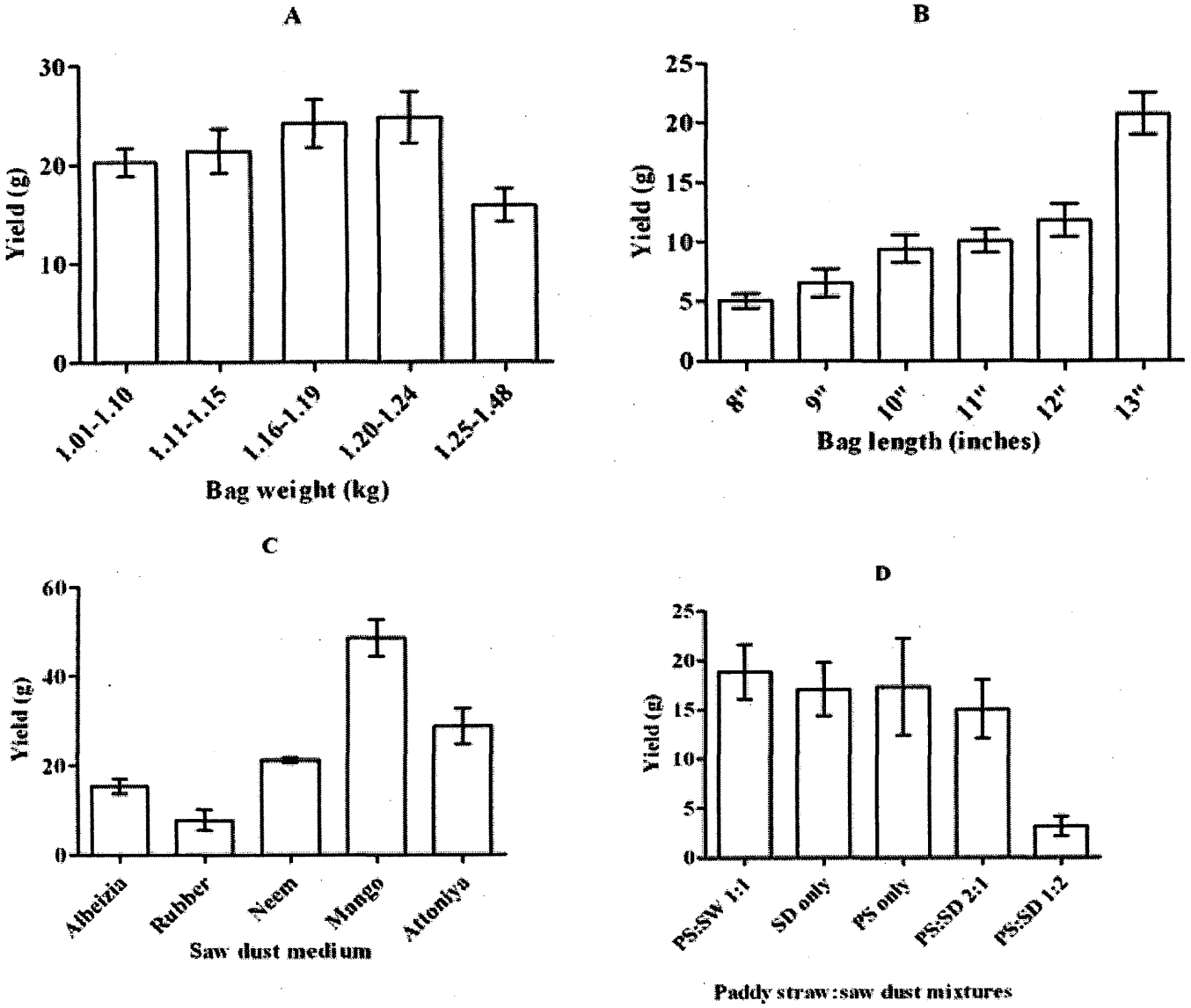

Figure 1. Cumulative yield (g) of *S. commune* grown on substrates having different compactness (A), changed bag length (B), different saw dust media (C) and different paddy straw [PS]: saw dust [SD] compost mixtures (D). Error bars represent standard error of the mean (SEM)

References:

Adejoye OD Adebayo-Tayo BC Ogunjobi AA and Afolabi OO 2007 Physicochemical Studies on *Schizophyllum commune* (Fries) a Nigerian Edible Fungus. World Applied Sciences Journal 1(2):73-76.

Anonymous 2009 Mushroom cultivation (Sinhala). Department of Agriculture Extension and Training Division Peradeniya Sri Lanka

Chang ST and Miles PG 2004 Mushrooms: Cultivation nutritional value medicinal effect and environmental impact. 2nd ed CRC Press Boca Raton FL

Obodai M Cleland-Okine J Vowotor KA 2003 Comparative study on the growth and yield *of Pleurotus ostreatus* mushroom on different lignocellulosic by-products. Journal of Industrial Microbiol Biotechnol 30:146-149.

Udugama S Atempawala S Liyanage S and Seneviratne EMRN 2005 Cultivation of Sukiri and Kankooria mushrooms for preparation of delicious dishes. Annuals of the Department of Agriculture Sri Lanka 7:399-400.