Suitability of Water Hyacinth, Rice Straw and Sunflower Residues for the Production of the Edible Mushrooms *Coprinopsis cinerea* and *Volvariella volvacea* in Thailand

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**ABSTRACT**

*Coprinopsis cinerea* and *Volvariella volvacea*, both fungi are worldwide used for model organisms and also their nutritional and medicinal benefits throughout the subtropical and tropical region of the world. An existing variety of lignocellulose agricultural wastes after harvesting and supply plant weeds in Thailand can be used for mushroom production. We determined suitability of solid substrates such as water hyacinths, rice straw and sunflower residues for growing these edible mushrooms. Substrate preparations were provided the fermented raw materials for 2 months. Cultivation substrates were mixed with the culture strains for cultivation in a pot shape: 11 cm in diameter, 10 cm height and 2 cm of thickness. The physical properties of all substrates were evaluated: the mean of pH, moisture content and volume of open pores. The range of suitability for both mushroom productions were determined. pH was from 7.6±0.1 to 8.9±0.3, moisture content was from 80.7±0.5 to 82.9±0.9%, volume of open pores was between 124.6±4.0 and 223.4±5.6 cm³, growing temperatures were between 32.4±0.1 to 40.3±0.0°C, relative humidity was between 70.2±0.2 to 89.1±1.1% and light intensity was between 0.0±0.0 to 26.7±0.0 lux. A Randomized Complete Block Design experiment with 3 replicates per treatment was used to determine mushroom yield of *C. cinerea* and *V. volvacea* on the different types. The results showed that *C. cinerea* grew well on the containers containing a mixture of rice straw residues, and the yields were significantly higher on rice straw residues than on sunflower residues (P ≤ 0.01). The best substrate for *V. volvacea* was water hyacinths where the yield was significantly higher (P ≤ 0.05) than in the other substrates.

**Key words:** *Coprinopsis cinerea*, *Volvariella volvacea*, Sunflower, Water hyacinths, Rice straw

INTRODUCTION

Mushroom consumption has been increasing worldwide when their abundant nutritional contents and the values of medicinal discovery (Zakhary et al., 1984; Belewu and Belewu, 2005). Cultivation of edible mushrooms present an economically increasing business that has expanded all over the world (Marshall and Nair, 2009). Both tropical mushrooms, *C. cinerea* or Hed-conenoi; in Thai name and *V. volvacea* or Hed-fang; in Thai name and also commonly known as straw mushroom were studied nutritional analysis in Tansania (Mshandete and Cuff, 2007).

*C. cinerea* and *V. volvacea* have been used as organic model to study such as fruiting body formation, fruiting body development, molecular mechanism, molecular genetics and the potential application of biotechnology in Basidiomycetes. *C. cinereus* was introduced early as an object for studies of development mainly because of its relatively short life cycle, which can be completed in the laboratory within 2 weeks (Kües, 2000; Kües and Liu, 2000; Kües et al., 2007; Srivilai et al. 2005a,b). The hyphae of the initial stage development eventually differentiate to form a primordium that is essentially an embryonic fruiting body. At this stage, structures composing the stipe and cap (pileus) of the immature fruiting body are clearly discernible (Bouliannea et al., 2000). The straw