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Short communication

Adopting stick spawn reduced the spawn running time and improved mushroom yield and biological efficiency of *Pleurotus eryngii*

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ABSTRACT

Pleurotus eryngii is a commercially important edible mushroom cultivated widely in Asia, Europe, and North America. We developed a new type of solid spawn (stick spawn) to cultivate *P. eryngii*. Adopting stick spawn in *P. eryngii* cultivation reduced spawn running time and improved the yield and biological efficiency (BE). The spawn running time of artificial logs inoculated with stick spawn was only 29.9 days, whereas that of the artificial logs inoculated with sawdust spawn was 53.2 days. The use of stick spawn reduced the spawn running time by 23.3 days (43.8%) compared with the use of sawdust spawn. In addition, adopting stick spawn increased the mushroom yield by 11.5% compared with the use of sawdust spawn. In conclusion, the use of stick spawn resulted in shorter spawn running time and higher mushroom yield and BE.

1. Introduction

Pleurotus eryngii, known as the king oyster mushroom, is a commercially important edible mushroom cultivated widely in Asia, Europe, and North America (Rodriguez Estrada and Royse, 2007). Given that *P. eryngii* is a wood-rotting saprobe, it could be grown on a variety of lingo-cellulosic materials, such as sawdust and agricultural residues (Stajic et al., 2009). In China, *P. eryngii* is mainly cultivated on artificial logs in plastic bags. The artificial log substrates are made from cotton seed hulls, sawdust, sugar cane bagasse, soybean stalks, and corn cobs, supplemented with wheat bran, maize powder, soybean meal, lime, etc. The cultivation involves the (1) preparation of spawn and the manufacture of artificial logs, (2) inoculation of substrates, (3) spawn running, and (4) fructification. Solid and liquid spawn are used in *P. eryngii* cultivation. The spawn type may affect spawn running and mushroom yield.

Solid spawn was developed since edible mushrooms were cultivated artificially with pure cultures. Solid spawn could be made using various grains (rye, millet, and sorghum, supplemented with gypsum) or lingo-cellulosic materials (sawdust and cottonseed hulls supplemented with wheat bran and lime). Different types of spawn reportedly affect mushroom productivity (Mamiro and Royse, 2008). Solid spawn is widely used in *P. eryngii* cultivation because it is easy to manufacture without specific fermentation equipment. The purity of solid spawn could be evaluated through visual inspection before inoculation. Solid spawn could be transferred and inoculated into artificial logs under clean conditions in a regular room or bench. Solid spawn has a shorter lag time on new substrate and faster initial colonization on artificial logs (Kawai et al., 1996), but longer spawn running time than liquid spawn.

Liquid spawn (Leatham and Griffin, 1984), which could be more uniformly distributed in the substrate (Friel and McLoughlin, 2000), was then developed (Leatham and Griffin, 1984; Friel and McLoughlin, 2000). The incubation period needed for harvesting sufficient amounts of good quality mushrooms (*Lentinula edodes*) is greatly reduced when the liquid mycelial spawn is inoculated into artificial sawdust substrate (Kawai et al., 1996). Another advantage of liquid spawn is that it allows the automation of inoculation for industrial scale production. However, the manufacture, purity assay, and inoculation of liquid spawn are relatively complex; liquid spawn technology also requires additional more expensive equipment and more stringent sterile conditions than solid spawn technology (Friel and McLoughlin, 2000). Thus, adopting liquid spawn for the small-scale farms in less developed regions is difficult because of the poor technology. Solid spawn is still widely used in most farms in China.

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