

## Studies on the Effect of Vinyl Mulching on *Pleurotus* Cultivation - Bunch Formation on *Pleurotus sajor-caju* (III) -

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(Received February 19, 2003)

Perforated vinyl mulching technique was performed on *Pleurotus sajor-caju* beds to assess fruitbody formation. Individual fruitbody of *P. sajor-caju* was transformed into bunch type on vinyl mulching bed. It was effective to grow the mushroom without waterlogging and abortion of small pins on the beds as well as hygienical bed management. A bunch showed 79 fruitbodies and 225 g of weight. Available site for fruiting was reduced up to 20% in comparison of 100% for conventional bed. The color of fruitbody turned on brownish white from treated vinyl mulching bed.

**KEYWORDS:** Abortion, Bunch, Individual fruitbody, *Pleurotus sajor-caju*, Vinyl mulching, Waterlogging

*Pleurotus* spp. have been cultivated and developed as one of edible mushrooms which are important and rich sources of vegetable protein and mineral salts in eastern countries. *Pleurotus sajor-caju* grew to produce sporophores during summer hot season ranged from 30 to 35°C (Hong *et al.*, 1984). Among the various sub-tropical edible mushrooms, *Pleurotus sajor-caju* could be grown on rice straw at the temperature ranged from 19 to 30°C and relative humidity of 65 to 85% (Singh, 1981). *Pleurotus ostreatus* which produced fruitbodies at low temperature ranged from 5 to 15°C (Park *et al.*, 1975; Hashimoto, 1974) grew normally at the relative humidity ranged from 75 to 85%, but produced abnormal sporophores over 95% (Block *et al.*, 1959; Jandaik and Kapoor, 1974). Of various agricultural by-products, banana pseudostem had a possibility of available substrate for *Pleurotus sajor-caju* (Jandaik and Kapoor, 1974). In the experiment of effect of cultivation technique on the yield of *Pleurotus sajor-caju*, polythene bag technique got the best yield (Singh, 1981). A container cultivation system resulted in more mushroom yields compared to polythene bag cultivation on *Pleurotus sajor-caju* (Sangitrao, 2000). *Pleurotus sajor-caju* strain produce single fruitbody and dense population on the mushroom bed. It takes a lot of time to pick the mushroom due to occurrence of compact fruitbodies. In an effort to reduce labor input in picking and enhance the mushroom quality, an attempt has been tried to produce a bunch type mushroom through hybridization between *Pleurotus ostreatus* strains and *Pleurotus sajor-caju* strains in breeding, and operation of related genes on bunch in genetic field. However, the experiment has been failed to succeed in mating among different species and protoplast

fusion in mushroom mycelium. Oh *et al.* (1999, 2000) reported quality and productivity of crop (I) in "the studies on the effect of vinyl mulching on *Pleurotus ostreatus* cultivation". Based on this vinyl mulching technique, possibility of bunch formation of *Pleurotus sajor-caju* strain was tried. The result of artificial bunch formation obtained from *Pleurotus sajor-caju* cultivation by applying vinyl mulching method is reported in this paper.

**Culture.** Hybrid variety of *Pleurotus sajor-caju* (ASI 2333) was delivered from Div. of Applied Microbiology, National Institute of Agricultural Science and Technology (NIAST), RDA. 441-707 Korea. The culture was incubated on Potato Dextrose Agar (PDA) at 25°C.

**Spawning.** Spawn was produced on poplar sawdust mixed with rice barn 20%. The spawn lump was homogenized by means of macerating machine, and then inoculated with waste cotton substrate in the proportion of 50% for mixture, 10% for surface, and 40% through the hole in total amount of spawn. Spawn running was maintained under 35°C for 15 days.

**Cultivation.** Waste cotton substrate used was 3 tons of dry weight. The substrate was pasteurized at 65°C for 2 days, and then was fermented at the temperature ranged from 52 to 55°C for 10 days in the cultivation room structured by steel pipe-framed where each bed area was 24.7 m<sup>2</sup>. The spawn was inoculated at around 28-30°C. *Pleurotus sajor-caju* was incubated in the same room with the treatments of conventional and vinyl mulching method (Table 1). Polythene tunnel covering was removed immediately after formation of pinhead on the bed, and watering was managed daily until final flush. After pinhead

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**Table 1.** Treatment between conventional and vinyl mulching method for oyster mushroom cultivation

	Cultivation method	
	Conventional	Vinyl mulching
Mulched area (%)	0	80
Applied spawn (kg/m <sup>2</sup> )	3.9	3.9
Spawn run (days)	15	15

initiation, the mushroom was grown under controlled temperature of 25~30°C and humidity of 75~85%. The number of fruitbody from a bunch was recorded. Other items on the vinyl mulching method were described on the previous papers (I, II).

**Effect of vinyl mulching on *Pleurotus sajor-caju*.** The characteristics of *P. sajor-caju* which appeared individually on the bed was transformed into bunch type mushroom in case of treating vinyl mulching growing method. The result from this study brought several effects on growing *P. sajor-caju* such as quick picking, no waterlogging and no abortion of small pins (Table 3). There were few differences in total mushroom yield in both cultivation methods, and a bunch showed 79 fruitbodies and 225 g of weight (Table 2). Individual appearance of fruitbody took so much time to pick the mushroom on the bed that most growers might be reluctant to cultivate this mushroom in the summer season. The whitish fruitbody also intend to cause less marketable due to Korean taste on oyster mushroom. The color of *P. sajor-caju* could be changeable depending on room temperature such as whitish color over 30°C and grey around 18 to 25°C. Factors involved in *Pleurotus sajor-caju* cultivation were improved by means of vinyl mulching growing method, where

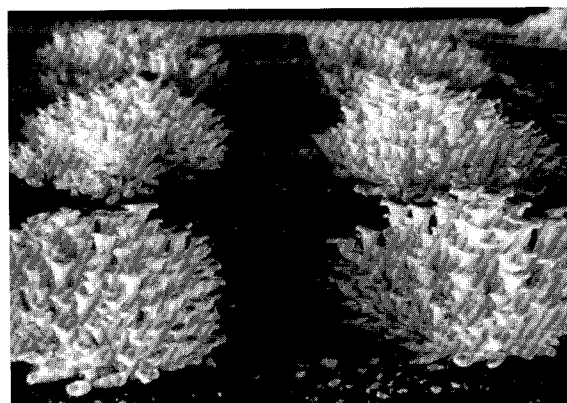
**Table 2.** Comparison of fruitbody of *Pleurotus sajor-caju* between conventional and vinyl mulching growing method

	Cultivation method of <i>Pleurotus sajor-caju</i>	
	Conventional	Vinyl mulching
No. of fruitbody	1	79±12.8
Weight of bunch (g)	2.5	225±27.8
Weight of a fruitbody (g)	2.5	2.5±1.4

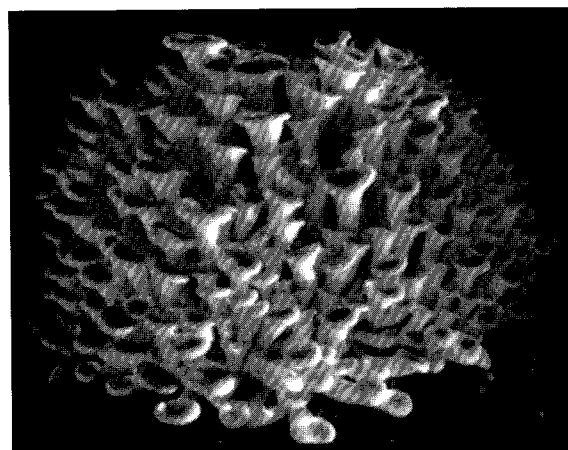
**Table 3.** Growing characteristics between conventional and vinyl mulching cultivation on *Pleurotus sajor-caju*

	Cultivation method	
	Conventional	Vinyl mulching
Appearance of fruitbody	scattered/single	orderly/bunch
Bunch type	non	yes
Abortion of small pin	many	a few
Picking	troublesome	easy

available area for fruiting was reduced up to 20% in comparison of 100% for conventional method, and it was efficient to keep hygienical bed management without waterlogging on the bed surface. Oh *et al.* (1999, 2000) reported quality and productivity of crop and picking efficiency on *P. ostreatus* using vinyl mulching cultivation method. Aborted small pins after picking made additional bed works in conventional growing method, and color of the fruitbody grown by vinyl mulching method slightly turned on brownish white (Table 3). When initiating fruitbody, *P. sajor-caju* formed bunch type on the mushroom bed just like *P. ostreatus* in the treatment of vinyl mulching cultivation method showing no abortion of small pins (Fig. 1). Above all, it was successful in bunch type of *P. sajor-caju* using vinyl mulching cultivation method (Fig. 2). Quit a few labor input was reduced in *P. sajor-caju* and *P. ostreatus* cultivation compared to conventional growing method (Oh, unpublished). Additional effect in this experiment was to eliminate the site of bacterial pathogen

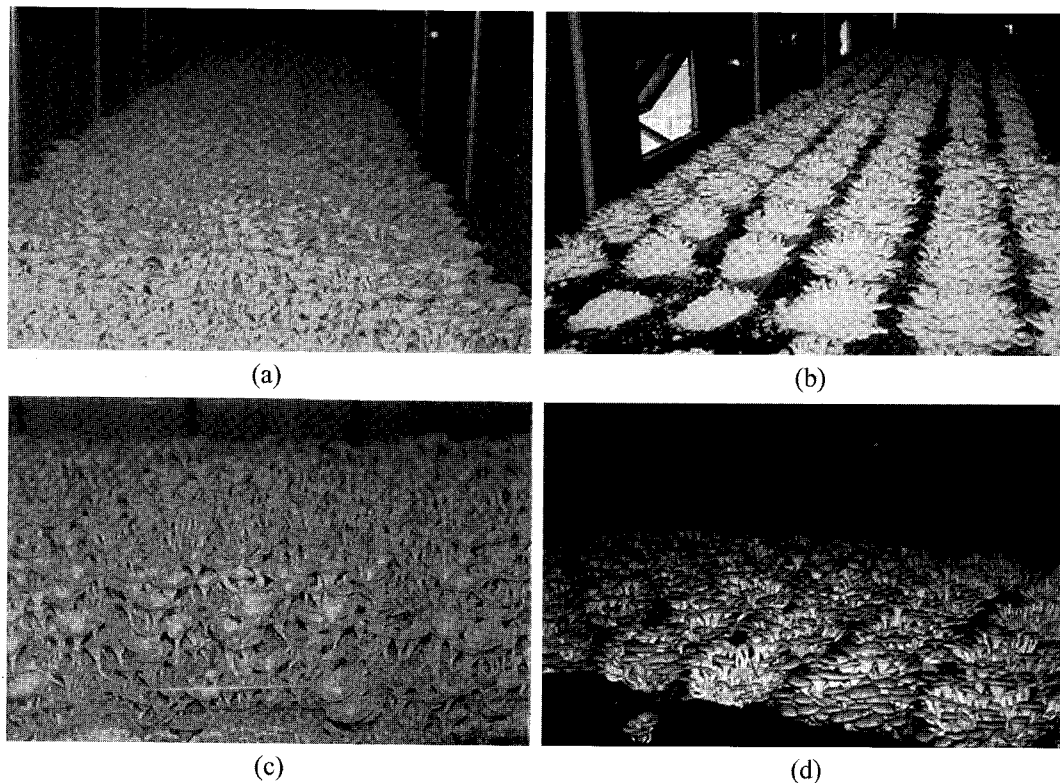


(a)



(b)

**Fig. 1.** Bunch types of *Pleurotus sajor-caju* formed by applying vinyl mulching method. a, early stage of *P. sajor-caju* bunches on vinyl mulching bed; b, close-up of early stage of a *P. sajor-caju* bunch on vinyl mulching bed.



**Fig. 2.** Comparison of *Pleurotus sajor-caju* between conventional and vinyl mulching cultivation method. a, *P. sajor-caju* growing in conventional cultivation method; b, *P. sajor-caju* growing in vinyl mulching cultivation method; c, close-up of *P. sajor-caju* bed in conventional growing method; d, close-up of *P. sajor-caju* bed in vinyl mulching growing method.

source by keeping the bed surface clean. Oh *et al.* (2002) reported control of mushroom diseases on *Pleurotus ostreatus* by using vinyl mulching cultivation method. This technique applied to *P. sajor-caju* cultivation gave us several effects in bed cultivation. So, it is recommended that *P. sajor-caju* be easily grown by mushroom growers in the summer hot season.

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