https://doi.org/10.29321/MAJ.10.A02152

Madras Agric. J 74 [2] 70—75 February, 1987

EFFECT OF CONTAINERS AND SUBSTRATES ON THE SPOROPHORE PRODUCTION OF *Pleurotus sajor-caju*

K. SIVAPRAKASAM F. SALAL RAJAN and R. JEYARAJAN

Efficacy of poly-bag, wooden box, earthern seed pan and bamboo basket as containers using paddy straw as substrate on the sporophore production was assessed. Poly-bag recorded the maximum yield of 319 g followed by bamboo basket which recorded 219 g per bed of 500 g paddy straw.

Several substrates namely paddy straw, wheat straw, maize stalks, sorghum stalks, pearl millet stalks, cotton waste, finger millet stalks and pigeonpea stalks were tried as bedding material following poly-bag method of cultivation. Paddy straw, cotton waste and wheat straw recorded higher yields with 254, 252 and 237 g respectively as against 72 g per bed of 500 g substrate in pigeonpea stalks. Bag size was found to have no effect on the yield of *P. sajor-caju*

Pleurotus spp. are delicious mushrooms grown in several parts of the world. Several types of containers and substrates have been employed for cultivating *Pleurotus* by various workers. Trays and jars have been employed for raising *Pleurotus* spp. in Japan, the Philippines and U. S. A. (Hashimoto and Takahashi, 1974; Quimio, 1977, Kurtzman, 1978). Zadrazil (1973) filled the substrate in plaster foils and pressed into rectangular blocks for the cultivation of *Pleurotus* spp. Kalberer (1974) wrapped the substrate in polythnee foil for the cultivation of *P. ostreatus* In India. Kaul and Janardhan (1970) and Jandaik and Kapoor (1974) used wooden trays while nylon nets were used by Chakravarty and Sarkar (1978). Zinc trays were used by Kandaswamy and Sivaprakasam (1980) while other workers made use of polythene bags (Bano and Nagaraja, 1976; Bhaskaran *et al.*, 1978; Sivaprakasam and Kandaswamy, 1980).

Successful cultivation of *P. sajor-caju* was reported on several substrates like banana pseudostem, a mixture of paddy straw, wheat straw and hulled maize cobs and cotton stalks (Jandaik, 1974; Rangaswami *et al.*, 1975; Sivaprakasam *et al.*, 1979; Mark Platt *et al*, 1982). The present study was aimed at comparing the suitability of different containers and substrates for the cultivation of *P. sajor-caju*

MATERIALS AND METHODS

Strain :

P. sajor-caju TNAU strain was used in the present study.

Department of Plant Pathology, Centre for Plant Protection Studies, Tamil Nadu Agricultural University Coimbatore - 641 003, India.

Spawn :

Spawn raised on *Sorghum vulgare* grain according to the method described by Sivaprakasam and Kanda swamy (1983) was used. The substrate was inoculated with the spawn at 20 per cent of the dry substrate.

Substrate preparation :

The substrate was chopped into small bits (2-5 cm. long) subjected to hot water treatment at a temperature 65 $\pm$ 5° C for 30 minutes to eliminate the undesirable competit ing microorganisms and to create favourable conditions for the growth. of *P. sajor-caju*. The substrate was removed and extra water drained off. The final moisture content of substrate was about 80 per cent. Filling of the straw and spawning in poly-bags were carried out as described by Sivaprakasam and Kandaswamy (1980).

Substrates :

Eight substrates viz., paddy (*Oryza sativa*) straw, wheat (*Triticum vulgare*) straw, maize (*Zea mays*) stalks, sorghum (*Sorghum vulgare*) stalks, pearl millet (*Pennisetu - typhoides*) stalks, finger millet (*Eleum cine coracana*) stalks, pigeonpea (*Cajanus cajan*) stalks and cotton waste were tried as bedding materal for the cultivation of *P. sajor caju* following poly-bag method of cultiation

Containers :

Four types of containers viz., poly-bag, wooden box earthern seed pan and bamboo basket were used for cultivation. Poly-bags of four sizes viz., 60 x 30 cm, 75 x 38 cm, 88 x 38 cm and 88 x 44 cm were used

RESULTS

The appearance of sporophore was found earlier in the beds prepared with earthern seed pan, wooden box and poly-bag than the bamboo

Table 1 Effect of containers on sporophore production of *P. sajor-caju*

Container	Days taken for the the appearance of pinheads	No. of sporophores	Weight of sporophores	Bioefficiency (%)
Poly-bag	24.0	161	319	63.8
Bamboo basket	25.0	133	219	43.8
Dealwood box	23.7	138	189	37.8
Earthern seed pan	23.7	61	151	30.2
C. D. (P=0.05)	1.0	92	112	

Crop period : 45 days
Amount of dry paddy straw/container : 500g

Table 2 Effect of substrates on sporophore production of *P. sajor-caju*

Substrate	Days taken for the appearance of pinheads	No. of sporophores	Weight of sporophores [g]	Bioefficiency [%]
Paddy straw	25.7	120	254	50.8
Cotton waste	25.0	118	252	50.4
Wheat straw	25.7	147	237	47.4
Finger millet stalks	26.7	92	113	22.6
Maize stalks	25.7	68	112	22.4
Pearl millet stalks	25.0	61	87	17.4
Sorghum stalks	26.0	59	77	15.4
Pigeonpea stalks	32.0	50	72	14.4
C. D. [P=0.05]	5.1	55	58	

Crop period : 45 days
Amount of dry substrate/bag : 500g.

basket. Sporophores were more in number when poly-bag, dealwood box and bamboo basket were used as containers. Poly-bag recorded the maximum yield of 319 g followed by bamboo basket which recorded 219 g per bed of 500 g paddy straw (Table I).

The sporophores appeared later in the pigeonpea stalks than the beds prepared with other substrates. Sporophores were more in number in wheat straw followed by paddy straw and cotton waste. Paddy straw, cotton waste and wheat straw, recorded higher yields with 254, 252 and 237 g respectively as against 72 g per bed of 500 g substrate in pigeonpea stalks (Table II).

Bag size was found to have no effect on the yield of *P. sajor-caju* (Table III). The results revealed that the adoption of poiy-bag as a container system and use of any one of the substrates namely paddy straw, cotton waste and wheat straw as bedding material were suitable for enhancing the yield of *P. sajor-caju*

DISCUSSION

The method of cultivation of mushroom is known to influence the production of sporophores (Smith, 1980). In the present study poly-bag method recorded the highest yield of sporophores followed by bamboo basket method. The utility of poly-bag method was also observed by

Table 3 Effect of size of poly bags on sporophore production of *P. sajor-caju*

Bag size cm	Days taken for the appearance of pinheads	No. of sporophores		Weight of sporophores [g]		Biceffici-ency (%) (%)
		Per bag	Per 500g dry substrate	Per bag	Per 500g dry substrate	
60 x 30	21.2	120	120	188	188	37.6
75 x 38	22.0	229	115	375	188	37.5
88 x 38	21.8	321	107	532	177	35.4
88 x 44	21.8	303	76	521	130	26.1
C. D. [p=0.05]	N. S.		N. S.		N. S.	

Crop period : 45 days

Amount of dry paddy straw/bag :

60 x 30 cm = 500 g
75 x 38 cm = 1000 g
88 x 38 cm = 1500 g
88 x 44 cm = 2000 g

Bano and Nagaraja (1976), Bhaskaran *et al.*, (1978) and Sivaprakasam and Kandaswamy (1980). The higher yield in the poly-bags could be due to the prevention of evaporation rate and accumulation of carbondioxide, the factors very important in the early stages of mycelial growth. Zadrazil (1975) emphasized the important role of carbondioxide on the growth of edible fungi.

Yield of sporophore also depends upon the nature of substrate used as bedding material (Zadrazil, 1978). Paddy straw, cotton waste and wheat straw were the highly suitable substrates for the cultivation of *P. sajor-caju* Previous workers reported successful cultivation of *P. sajor-caju* on several substrates like banana pseudostem' a mixture of rice straw, wheat straw and hulled maize cob, waste paper and sugarcane bagasse (Jandaik, 1974; Rangaswami *et al.*, 1975; Sivaprakasam and Kandaswamy, 1981). The yield of sporophore was related positively with cellulose content and cellulose: lignin ratio and negatively with the ligin and orthodihydroxy phenolics (Sivaprakasam and Kandaswamy, 1981). In India, the total quantity of agricultural by-products or wastes which are cellulosic in nature accounts for nearly 25 million tonnes (Ghose and Ghosh, 1978) which assured the perennial source of raw material for mushroom cultivation.

Bag size had little effect upon the bio-efficiency and hence the small sized bags can be used to achieve same percentage of biological efficiency thereby effectively utilising indoor space and facilitating easy handling.

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Madras Agric. J. 74 [2] 75—83 February, 1987

EFFECT OF RECURRENT SELECTION AND SELFING ON THE NUMBER OF SEEDS/LOCULE AND SEED INDEX IN INDUCED MUTANT LINES OF DESI COTTON (*Gossypium arboreum* L.,)

U. DAMAYANTHI SWAMI and U. B. S. SWAMI*

The germinating seeds of gaorani-46 (*Gossypium arboreum* L., race *indicum*) were subjected to 5000 *r* per min of CO^{60} gamma rays and 0.001 - 0.007. M. sol. of DES separately. Breeding of the selected M_1 plants was done through selfing and recurrent selection. Some mutant lines with stablised high mean number of seeds per locule and seeds index were obtained in M_4 generation. It is inferred that recurrent selection after selfing in successive generations is useful in developing improved lines in the mutants.

The primary aim of mutation breeding is to add a useful characteristic to the delicate system of genic balance (Mackey 1956). Keeping this in view, Damayanthi Swami and Swami (personal communication) attempted to improve the plant type and yield in gaorani - 46 desi cotton (*Gossypium arboreum* L., race *indicum*) through mutation breeding involving recurrent selection after selfing.

The present paper deals with the number of seeds per locule and the seed index that contribute to the

Department of Botany, University College for Women, Kothi-Hyderabad-(500001) A. P. (India).
* Retired Professor and Head Department of Botany, Osmania University, Hyderabad-A. P. (India).