

## PHYSICAL AND NUTRITIONAL FACTORS IN RELATION TO GROWTH OF *PLEUROTUS SAJOR-CAJU* (FR.) SINGER

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Maximum growth of *Pleurotus sajor-caju* (Fr.) was observed on potato dextrose agar medium in both solid as well as liquid medium. A temperature of 25°C and pH 6.0 were found to support maximum growth of this fungus. Among the various carbon sources tried sucrose proved to be the best for the growth of *Pleurotus sajor-caju* (Fr.). Urea treatment exhibited maximum growth when it was used as nitrogen source. Good yield of sporophore was obtained when wheat straw was treated with Bavistin+Formalin.

**Keywords :** Bavistin; Formalin; Growth; Media ; *Pleurotus sajor-caju* (Fr.); Sporophore.

Food values and usefulness of mushroom have been recognised by Munjal and Seth<sup>1</sup>. *Pleurotus sajor-caju* first collected from nature by Jandaik and Kapoor<sup>2</sup>, is yet to attain industrial dimensions in India. Since information about its cultivation practices are lacking, the present work is an attempt in this direction.

The *Pleurotus sajor-caju* (Fr.) Singer culture obtained from National Centre for Mushroom Research and Training, Chambaghat, Solan (H.P.) was used in the present investigation. The culture was maintained by transferring to fresh potato dextrose agar slant at an intervals of 8 to 10 days.

For physical studies, five media were taken such as potato-dextrose agar, Richard's agar, Sabouraud's agar medium, Nutrient glucose agar and Czapek's medium. In case of solid media 20 ml of medium was poured in each petridishes. For liquid media 20 ml of medium was taken in 100 ml conical flasks. Media were sterilized at 15 lb/inch<sup>2</sup> for 20 minutes at 121.6°C temperature. Inoculated media were incubated at 25 ± 1°C for 10 days. In solid media studies, the growth was determined by measuring the colony diameter. In liquid medium, the mycelial mat were harvested, dried and weighed.

The effect of pH on growth of *Pleurotus sajor-caju* was determined by adjusting the pH of potato dextrose medium from 5.0 to 8.0 before sterilization. To study the effect of temperature on the growth of

*Pleurotus sajor-caju* potato dextrose medium in conical flasks were inoculated at different constant temperature at 15, 20, 25, 35 and 40 °C. The incubation of flasks was done in incubators.

To find out the effect of various carbon sources, potato dextrose medium was used as basal medium and dextrose was substituted by adding different sources of carbon on equivalent carbon basis. The carbon sources used were glucose, fructose, maltose, lactose, starch, dextrin, mannitol and sorbitol. Similarly for studies on nitrogen, various nitrogen sources were added to potato dextrose medium and mycelial growth was observed.

**Sporophore production :** *Preparation of spawn* : For spawn preparation 5 kg of wheat grains were boiled in 7.5 litre of water for 20 minutes and further soaked in hot water for another 15 minutes which given moisture content of about 50 per cent of grain after sterilization. Next day 33.75 gram calcium carbonate (6.75 g/kg wheat grain ) and 8.75 gram calcium sulphate (1.75 g/kg wheat grain) were mixed with boiled grains. The grains were filled in glass bottles (450 g each bottle). The bottles were sterilized at 1.54 kg/cm<sup>2</sup> for 2 hours. These bottles were inoculated with mycelium bits and incubated at 25 ± 1°C.

*Substrate preparation for cultivation of Pleurotus sajor-caju* : Wheat straw was used for cultivation of *Pleurotus sajor-caju*. The

straw harbours a number of organisms which compete for nutrition during spawn run and may also secrete toxic metabolites which ultimately affects the spawn run and yield. To kill or inactivate undesirable organisms from the substrate, it was subjected to various treatments separately. These included Bavistin (50%) 50ppm, Formalin (35% formaldehyde) 100 ppm, Bavistin (50 ppm) + Formalin (100 ppm) and Control.

*Pleurotus sajor-caju* was capable of growing on different media but variation in growth was observed on solid as well as liquid media. The study indicated that potato dextrose agar medium supported maximum growth. Similar findings were also reported in *Pleurotus sajor-caju*<sup>2</sup> and in *Pleurotus eryngii*<sup>3</sup>. However, Singh<sup>4</sup> observed maximum growth of *Pleurotus eryngii* in brown's media. The *Pleurotus sajor-caju* was grown on a wide range of temperature from 15 °C to 40 °C. Results revealed that maximum growth was observed at 25 °C while no growth was observed at 40 °C. These results are in conformity with the work of Jandaik and Kapoor<sup>2</sup> and Rawal and Singh<sup>5</sup> who conducted studies on the same fungus.

In the present investigation *Pleurotus*

*sajor-caju* tolerated wide range of pH (5.0 to 8.0) for mycelial growth. Maximum growth of the fungus was observed at pH 6.0 and it had moderately good growth at pH 5.5 to 7.5. These results are in conformity with those obtained by Srivastava and Bano<sup>6</sup>. Ranged and Jandaik<sup>7</sup> also observed good growth at pH ranging from 6.0 to 6.5 in various species of *Pleurotus*.

In the present investigation sucrose proved to be best source for the growth of the fungus and it was closely followed by starch. Mannitol, sorbitol and dextrin were found to be poor source of carbon. However, Jandaik and Kapoor<sup>2</sup> observed starch as best supporting carbon source followed by maltose. Voltz<sup>8</sup> reported urea as the best nitrogen source for the growth of the *Pleurotus ostreatus* which is in conformity with the present investigation, Jandaik and Kapoor<sup>2</sup> have shown urea as second best nitrogen source for the growth of *Pleurotus sajor-caju*.

Commercial cultivation of *Pleurotus* species is generally not successful on untreated substrate due to occurrence of various competitor moulds. In the present study the Bavistin, formalin and Bavistin + formalin treated substrate exhibited

**Table 1.** Growth of *Pleurotus sajor-caju* on different solid media as well as liquid media incubated at 25 ± 1°C for 10 days.

S. Solid media No.	Avg. colony diameter (mm)	Liquid media	Avg. dry weight of mycelial mat (mg)
1. Potato dextrose agar	72	Potato dextrose medium	265
2. Richard's agar	62	Richard's medium	247
3. Sabouraud's agar	47	Sabouraud's medium	205
4. Nutrient Glucose agar	38	Nutrient Glucose medium	191
5. Czapek's agar	29	Czapek's medium	108
CD for mycelial growth at 5% level	3.715	CD for mycelial growth	5.482
S. Em ±	1.224		1.807

**Table 2.** Effect of temperature and pH (Hydrogen ion concentration) on the growth of *Pleurotus sajor-caju* incubated for 10 days at different temperatures.

S. No.	Temperature (°C)	Average dry mycelial weight (mg)	pH	Average dry mycelial weight (mg)
1.	15	156	5.0	184
2.	20	175	5.5	204
3.	25	280	6.0	248
4.	30	233	6.5	225
5.	35	150	7.0	215
6.	40	-	7.5	194
7.	-	-	8.0	176

CD for mycelial growth

at 5% level

4.107

6.150

S. E. ±

1.354

2.080

(Avg. of three replications)

**Table 3.** Effect of carbon source on the growth of *Pleurotus sajor-caju* incubated at 25 ± 1°C for 10 days.

S. No.	Carbon source	Average dry mycelial weight (mg)*
1.	Fructose	230
2.	Glucose	241
3.	Lactose	204
4.	Sucrose	254
5.	Starch	246
6.	Dextrin	190
7.	Sorbitol	180
8.	Mannitol	166
9.	Control	-

CD for mycelial growth at 5% level

5.102

S. EM ±

1.744

\*Average of three replications.

successful spawn run while in control no spawn run was exhibited. Similar findings were also observed by Vijay and Sohi<sup>9</sup>.

Maximum growth of *Pleurotus sajor-caju* was observed on potato dextrose agar medium in both solid as well as liquid medium (Table 1). A temperature of 25°C was found optimum for growth and sporophore production, while pH 6.0 showed maximum growth of *Pleurotus sajor-caju* (Table 2). Among the various carbon sources used, sucrose proved to be the best source for mushroom growth (Table 3). Urea exhibited

maximum growth when it was used as nitrogen source (Table 4). Maximum sporophore yield was obtained when wheat straw was treated with Bavistin + formalin (Table 5).

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**Table 4.** Effect of nitrogen sources on the growth of *Pleurotus sajor-caju* incubated at  $25 \pm 1$  °C for 10 days.

S. No.	Nitrogen sources	Average dry mycelial weight (mg) *
1.	Potassium nitrate	246
2.	Ammonium nitrate	163
3.	Ammonium phosphate	204
4.	Ammonium sulphate	191
5.	DL-tryptophan	131
6.	L-Aspartic acid	144
7.	DL-Serine	171
8.	DL-Valine	224
9.	Urea	266
10.	Control (without nitrogen source)	37

CD for mycelial growth at 5% level 3.770

S. EM  $\pm$  1.300

\*Average of three replications.

**Table 5.** Effect of steeping to wheat straw in Bavistin and formalin solution at spawn run and yield of *Pleurotus sajor-caju* recorded upto 30 days.

S. No.	Treatment	Concentration (ppm)	Day required for pin head formation	Yield g/kg straw dry wt.*
1.	Bavistin	50	22	465
2.	Formalin	100	20	508
3.	Bavistin + formalin	50 + 100	20	577
4.	Control	-	-	-

CD for mycelial growth at 5% level = 19.97

S. E.  $\pm$  = 6.244

\*Average of three replications.

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