

Effect of contamination on the yield of *Calocybe indica*

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When the inoculum of contaminants viz., *A. flavus*, *A. niger* and *T. harzianum* was introduced @ 5 g per bed into the spawned substrate at casing and 2,4,6,8,10,12 and 14 days after casing, the yield of *Calocybe indica* increased with the increasing number of days. After casing at 14 days after introduction of contaminants the yield loss was minimum.

Key words : Yield loss, *Calocybe indica*, *Aspergillus flavus*, *Aspergillus niger*, *Trichoderma viride*

INTRODUCTION

Rajaratnam *et al.* (1984) reported that *Sclerotium rolfsii* did not produce any visual abnormalities on the mushroom (*P. flabellatus*) but reduced the mushroom yield from 40-100 per cent. Vijay *et al.* (1986) reported severe incidence of *Trichoderma* on wheat straw compost resulting in low yields. Complete crop failure was also noticed when the infection takes place early. Sharma and Vijay (1994) conducted a study to assess the loss in yield of *A. bisporus* due to incidence of three contaminants viz., *Chaetomium olivaceum*, *Trichoderma viride* and *Coprinus fimetarius*. Sharma (1995) reported up to 70 per cent yield loss when the contamination occurred at early stages. Sharma and Vijay (1976) observed the yield of *Pleurotus sajor-caju* by inoculating steam pasteurized and chemically sterilized substrate with *Trichoderma* spp.

MATERIALS AND METHODS

Paddy straw soaked in water for over night was steam-pasteurized ($85\pm 2^\circ\text{C}$) for 45 minutes and spawned with fresh sorghum grain spawn of *Calocybe indica* @ 5 per cent on wet weight basis. Inoculum of contaminants multiplied on sorghum grains was inoculated @ 5 g/bed into the spawned substrate at casing and 2, 4, 6, 8, 10, 12 and 14 days

after casing. Uninoculated spawned beds served as control. The above experiment was conducted for *A. flavus*, *A. niger* and *T. harzianum*.

RESULT AND DISCUSSION

Effect of *A. niger*

From the Table 1 it was evident that all the treatments significantly reduced the yield of *Calocybe indica*. When *A. niger* was inoculated during casing, and on 2nd, 4th, 6th, 8th, 10th, 12th and 14th day, the mean yield obtained was 142.88, 151.75, 165.36, 170.72, 180.69, 217.27, 232.53 and 291.75 g/bed respectively with yield loss per cent 59.57, 51.74, 47.42, 45.71, 42.54, 30.91, 26.05 and 7.22 respectively.

Effect of *A. flavus*

It was seen from the Table 2 that all the treatments significantly reduced the yield of *Calocybe indica*. When *A. flavus* was inoculated during casing and on 2nd, 4th, 6th, 8th, 10th, 12th and 14th day, the mean yield obtained was 127.91, 137.97, 151.55, 162.49, 185.54, 207.78, 242.81 and 280.88 g/bed respectively with yield loss per cent 59.33, 56.13, 51.81, 48.33, 41.00, 33.93, 22.79 and 10.68 respectively.

Effect of *T. harzianum*

The results indicated from the data in Table 3 that all treatments significantly reduced the yield of *Calocybe indica*. When *T. harzianum* was inoculated during casing and on 2nd, 4th, 6th, 8th, 10th, 12th and 14th day, the mean yield obtained was 136.23, 145.85, 164.64, 174.11, 191.43, 221.92, 268.21 and 290.53 g/bed respectively with yield loss per cent 56.68, 53.62, 47.65, 44.63, 39.13, 29.43 and 7.61 respectively.

If the contaminants were inoculated at early stages, it resulted in severe yield loss (Vijay *et al.*, 1986). As the days of inoculation of contaminants in spawned beds increased, contaminants were placed in the negative side because *Calocybe indica* had covered some portion of straw in beds and inhibited the growth of contaminants to a greater extent. Pandey and Tewari (1988) reported similar findings. *Aspergillus* are known to produce enzymes especially cellulases at higher rate and used for industrial production of cellulases (Alexopoulos and Mims, 1979) which helps them to colonize the substrate easily. *Aspergillus* spp. are known to produce acids in culture (Turner, 1971). The pH of the culture filtrate of *Aspergillus* spp. was below 3 and it was inhibitory to growth of mushroom (Vijay and Sohi, 1987). The production of acids and enzymes are the advantageous factors for the higher growth and establishment of *Aspergillus* spp. in the beds thereby reducing the yield of mushroom.

Table 1 : Effect of *Aspergillus favus* on the yield of *Calocybe indica*.

Treatments	Average yield* (g/bed)	Loss (%)
Inoculated at casing	127.91(11.30)a	59.33
After 2 days	137.97(11.74)b	56.13
After 4 days	151.55(12.31)c	51.81
After 6 days	162.49(12.74)d	48.33
After 8 days	185.54(13.62)e	41.00
After 10 days	207.78(14.41)f	33.93
After 12 days	242.81(15.58)g	22.79
After 14 days	280.88(16.75)h	10.68
Uninoculated	314.49(17.73)I	--
SED	0.30	
CD (P = 0.05)	0.51	

* Mean of three replicates.

Figures in parentheses are square root transformed values.

Values with different alphabets differ significantly.

Trichoderma spp. are known to produce cellulases

in larger quantities (Alexopoulos and Mims 1979). This might be responsible for higher growth rate and colonization of *Trichoderma harzianum* that reduced the yield of mushroom.

Table 2 : Effect of *Aspergillus niger* on the yield of *Calocybe indica*.

Treatments	Average yield* (g/bed)	Loss (%)
Inoculated at casing	142.88(11.95)a	54.57
After 2 days	151.75(12.31)b	51.74
After 4 days	165.36(12.85)c	47.42
After 6 days	170.72(13.06)d	45.71
After 8 days	180.69(13.44)e	42.54
After 10 days	217.27(14.74)f	30.91
After 12 days	232.53(15.24)g	26.05
After 14 days	291.75(17.08)h	7.22
Uninoculated	314.44(17.73)I	--
SED	0.34	
CD (P = 0.05)		0.57

*Mean of three replicates.

Figures in parentheses are square root transformed values.

Values with different alphabets differ significantly.

The inoculated beds were incubated in mushroom house and yield from the beds were recorded.

Table 3 : Effect of *Trichoderma harzianum* on the yield of *Calocybe indica*.

Treatments	Average yield* (g/bed)	Loss (%)
Inoculated at casing	136.23(11.67)a	56.68
After 2 days	145.84(12.07)b	53.62
After 4 days	164.64(12.83)c	47.65
After 6 days	174.11(13.19)d	44.63
After 8 days	191.43(13.89)e	39.13
After 10 days	221.92(14.89)f	29.43
After 12 days	268.21(16.37)g	14.71
After 14 days	290.53(17.04)h	7.61
Uninoculated	314.44(17.73)I	--
SED	0.25	
CD (P = 0.05)		0.38

* Mean of three replicates.

Figures in parentheses are square root transformed values.

Values with different alphabets differ significantly.

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