

cropping room. Fruit bodies were harvested periodically and the yield of each species was recorded for 4 weeks.

Amongst all the *Pleurotus* species, *P. membranaceus* gave the highest yield with a biological efficiency of 48% followed by *P. sapidus* (40%), *P. ostreatus* (39%), *P. flabellatus* (36%), *P. sajor-caju* (32%) and *P. fossulatus* (10%). It was 20% in *Auricularia mesentrica*. The mycelial growth on pomace was very profuse and thick as compared to wheat straw substrate with larger and thick fruit bodies weighing up to 15 to 20 g each, especially in case of *P. ostreatus*.

Apple puree was used by Molliard<sup>6</sup> for the artificial cultivation of *Morchella esculenta* while Chu and Ho<sup>7</sup> could induce sporophore formation in tissue cultures of mushroom by the addition of cooked apple extract in the medium.

Various agricultural and industrial waste materials including wheat and paddy straw; maize, sorghum and pearl millet stalks and leaves; cotton stems and leaves; shelled maize cobs; dried stems of *Euphorbia royleana* and *Sesbania* and dried haulms of peas, french beans and brassica<sup>8</sup>; cassia substrates after extracting laxatives from fruit and leaves<sup>9</sup>; fibrous mill sludges<sup>10</sup> and coffee by-products and citronella bagasse<sup>11</sup> have been used for the cultivation of oyster mushroom. Apple pomace was found suitable for the cultivation of *Pleurotus* species with a biological efficiency ranging between 30 and 40%.

The present study offers a viable alternative use of apple pomace for mushroom cultivation along with its effective disposal avoiding pollution.

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## A NEW BROWN SPOT DISEASE OF OYSTER MUSHROOM CAUSED BY *PSEUDOMONAS STUTZERI*

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MUSHROOMS are considered as delicious vegetables rich in protein and vitamins<sup>1</sup>. Oyster mushroom (*Pleurotus sajor-caju* (Fr.) Singer.) is becoming popular in Southern India especially in Karnataka and Tamil Nadu. Oyster mushroom is cultivated on a variety of undecomposed organic substrates and generally using paddy straw<sup>2</sup>. Alan *et al.*<sup>3</sup> reported a *Pseudomonas* yellow blotch disease on the heads of oyster mushroom. The occurrence of severe dark brown patch on paddy straw which produced Brown Spot on the substrate during spawn running stage was observed in the mushroom bag (figure 1). This caused considerable damage to the mushroom crop. Therefore, a study was conducted to determine the economic loss due to the disease.

The study was conducted in four mushroom farms, viz., Lingiah Mushroom Farm, Gangenahalli, Bangalore; Main Research Station, UAS, Hebbal, Bangalore; Varanasi Mushroom Farm, Adyanadaka, South Kanara; Vikky Mushroom Farm, Anandnagar, Bangalore, to determine the average per cent infection and yield loss in Karnataka. The study indicated that infection ranged from 27 to 37% and a maximum in the case of Lingiah Mushroom Farm (table 1). Variation in the severity of the disease in different mushroom farms is attributed to the management practices in the mushroom houses. The Brown Spot infection of the substrate during spawn running stage caused significant yield loss ranging from 27 to 61% (table 1) which was maximum in Lingiah Mushroom Farm. The mushroom farms which maintained better hygienic conditions and production technology harvested higher yields.

Further, isolation and identification studies of the microorganism causing this Brown Spot disease

Healthy  
bagDiseased  
bag**Figure 1.** Brown spot disease symptom.

indicated that the possible source of infection was from partially sterilized paddy straw. The organism causing this disease was identified based on the morphological, physiological and biochemical studies suggested by Heinz Stolp and Dilip Gadkary<sup>1</sup> as a saprophytic soil bacterium *Pseudomonas stutzeri*. The present study is the first report of *Pseudomonas*

*stutzeri* causing Brown Spot disease of oyster mushroom.

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**Table 1** Per cent infection and yield loss caused by 'Brown Spot' disease of oyster mushroom

Disease sample source	Total no. of bags examined	No. of healthy bags	No. of bags infected by 'Brown Spot' disease	Per cent infection	Per cent yield loss
Lingiah Mushroom Farm	223	140	83	37	61
Main Research Station, UAS	26	19	7	27	27
Varanasi Mushroom Farm	1844	1199	645	35	59
Vikky Mushroom Farm	34	23	11	32	54

Note: Per cent infection =  $\frac{\text{Number of bags infected by Brown Spot}}{\text{Total number of bags observed}} \times 100.$

Per cent yield loss =  $\frac{\text{Total mushroom yield in normal bag} - \text{Total mushroom yield in Brown spot infected bag}}{\text{Total mushroom yield in normal bag}} \times 100.$



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### TRICHODERMA PSEUDOKONINGII RIFAI—A NEW RECORD OF LIGNOCELLULOLYTIC FUNGUS FROM INDIA

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A fast growing green fungus which exhibited high lignocellulolytic activity frequently occurred as a contaminant during solid state fermentation of lignocellulosic materials like cassava starch factory waste and paddy straw for protein enrichment. The fungus was isolated into pure culture and maintained on Martin's Rose Bengal Agar medium. The fungus was identified as *Trichoderma pseudokoningii* Rifai.

Mycelium forms sparse hyphal network—Branched septate, smooth walled and colourless. Hyphae 1–10  $\mu$  in diameter. Chlamydospores globose, smooth-walled, hyaline-6–10  $\mu$  in diameter. Long conidiophores, with numerous main branches which are also relatively long and are 4–5  $\mu$  in diameter. Phialides measure (5.5–8)  $\times$  (2.7/3.5  $\mu$ ). Phialospores are produced singly and successively and accumulate into a globose conidial head at the tip of each phialide. They are shortly subcylindrical or almost oblong and somewhat angular or ellipsoidal, usually rounded distally and attenuated below into a short and truncate conical base. The phialospores are green in mass but appear much paler when viewed singly, perfectly smooth-walled and measure (3.4–4.6)  $\times$  (2–2.5  $\mu$ ). Rifai<sup>1</sup> described the characteristics of *T. pseudokoningii* in detail.

This is the first record of the occurrence of *T. pseudokoningii* in India on lignocellulosic substrates.

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### A NEW SPIDER SPECIES FROM GUJARAT, INDIA

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DURING extensive surveys for exploring the spider fauna of Gujarat, a peculiar member belonging to the genus *Poltys*, Koch, C. L. (Family: Araneidae) was noticed on a tree near Bhavnagar. This family comprises of typical orb-weavers spinning true webs of great geometrical precision and beauty<sup>1–4</sup>. Our collection showed marked differences from the known species<sup>5–7</sup>, and hence it is designated as a new species and named *Poltys bhavnagarensis* sp. nov. after the place of collection. Though the members of the other genera of this family are reported to be abundant in our country, only scanty information is available about the distribution of species belonging to the genus *Poltys*.

*Poltys bhavnagarensis* sp. nov.:

#### General

Cephalothorax and legs light brown, abdomen yellowing with black patches. Total length 13 mm. Carapace 4.50 mm long, 4.30 mm wide; abdomen 9.50 mm long, 8.40 mm wide.

#### Cephalothorax

Longer than wide, clothed with whitish pubescence. Cephalic region elevated, conical and anteriorly projecting; thoracic region provided with fovea; median cephalic region yellowish with white pubescence extending up to the ocular quad. Ocular quad wider than long, wider behind than in front; posterior medians rounded, laterals widely separated from each other than to medians. Sternum heart-shaped, pointed behind, light brown in the middle, clothed with greyish pubescence and brown hairs; labium wider than long, brown in colour; maxillae brownish, broad with white inner margin, provided with distal scopulae as in figure 1c; Chelicerae strong, yellowish brown with prominent boss, inner margin of chelicerae armed with three teeth and outer margin with two teeth. Legs moderately long and strong, clothed with hairs and spines; all patella and tibia are dorsally flattened.