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iochemical changes in different agro-wastes due to cultivation of *leurotus* spp.

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Abstract: An experiment was conducted to see the effect of cultivation of different *Pleurotus* spp. on biochemical changes in different agro-residues. The results indicated that the nitrogen content of the different spent straws (substrates left after the cultivation of *Pleurotus* spp.) was found to be increased with reduction in carbon content and C:N ratio. The protein content of the different spent straws increased thereby making spent straws as a nutritious and quality cattle feed.

Key words : Agro-wastes, Biochemical changes, Pleurotus spp.

troduction

Pleurotus spp. were known to decompose d utilize various agricultural wastes. Their ltivation on cereal straw has been suggested r recycling of agricultural wastes as food uit bodies) and feed as the straw substrate ft after the cultivation (spent straw) has better imen digestibility and is enriched in minerals. . lot of biological waste is generated in rural reas and this waste could be utilized directly arough mushroom cultivation converting them nto protein rich palatable food. Agricultural ctivity generates large amount of biomass rich n cellulose, lignin and pentosans. One of the implest ways to recycle it for human consumption s through mushroom cultivation.

During colonization of substrates by *P.sajor-caju*, alternations in chemical components *viz.* carbon, nitrogen, cellulose, lignins, hemicelluloses, water and benzene: ether soluble matter occurs. Wood (1979) and Moorthy (1981) worked out he biochemical changes in substrates colonized by mushroom and concluded that mushrooms utilize cellulose, hemicelluloses and lignin to a large extent. Alteration in carbon, nitrogen and C:N ratio have been reported earlier (Moorthy, 1981; Quimio and Uraporon, 1981 and Rangaswamy *et al.* 1975).

Materials and Methods

The mushrooms *viz. P. sajor-caju, P.eous, P. flabellatus, P. florida* and *P. sapidus* were cultivated on different agro wastes i.e. soybean, wheat, paddy, cotton and their combinations (1:1) on dry weight basis in Department of Plant Pathology, College of Agriculture, M.A.U., Parbhani. The biochemical analysis of agro wastes before cultivation of *Pleurotus* spp. was carried out in Department of Biochemistry and Human nutrition, College of Technology, M.A.U., Parbhani during Sept.99 to Jan. 2000.

The different agro-wastes were collectd and chopped into pieces of 5-8 cm length. The chopped material was filled in gunny bags and soaked in fresh tap water for 12 h. Excess water was then allowed to drain off and substrates were pasteurized by dipping in hot water at 70°C. The beds were prepared by using polythene bags of 30 x 20 cm. One kg dry substrate was used in each bag. The spawning was done in five layers at the rate of two per cent of net weight of substrates. These bags were incubated at room temperature (20 to 28°C) for period upto completion of spawn run. After incubation, the bags were cut open and kept on wooden racks. The beds were watered daily. The humidity inside the room was maintained between 80 to 90 per cent. The beds were given diffused light during day time. The watering was withheld a day before harvesting and the harvesting was done before spore shading. After the harvesting of flushes successively, straw samples were collected from each of spent substrate, air-dried, dehydrated (110°C for 4 hrs), ground to fine size powder and used for estimation of organic carbon, total nitrogen and C:N ratio as suggested by Jackson (1973).

Table 1. Chemical changes in different agro-wastes due to *Pleurotus* cultivation

Agro wastes	Organic carbon (%)						Nitrogen (%)						C:N ratio					
	Auto-claved straw	Spent straws					Auto-claved straw	Spent straws					Auto-claved straw	Spent straws				
		P. sc.	*P. e.*	*P. fb.*	*P. fl.*	*P. sp.*		*P. sc.*	*P. e.*	*P. fb.*	*P. fl.*	*P. sp.*		*P. sc.*	*P. e.*	*P. fb.*	*P. fl.*	*P. sp.*
Soybean	32.10	22.72	24.66	22.12	24.16	22.22	0.39	0.92	1.02	1.09	0.98	0.89	82.30	24.69	24.17	20.29	24.65	24.96
Wheat	29.16	25.00	21.65	22.32	21.66	20.80	0.45	0.88	0.79	0.92	0.87	0.83	66.58	28.40	27.40	24.26	24.89	25.09
Paddy	30.75	23.23	22.72	22.76	22.44	21.60	0.40	0.94	0.87	0.86	0.92	0.78	76.87	24.71	26.11	26.46	24.39	27.69
Cotton	30.89	23.70	22.57	23.84	23.58	22.09	0.50	1.18	1.28	1.06	1.16	0.90	61.78	20.08	17.63	22.49	20.32	24.54
Soybean + Wheat	31.52	22.44	22.42	20.42	20.00	19.40	0.46	1.04	1.11	0.99	1.04	0.76	68.52	21.57	20.20	20.62	19.23	25.52
Soybean + Paddy	31.47	20.85	20.74	20.78	18.68	19.36	0.33	0.83	0.82	0.96	0.99	0.88	95.36	25.12	25.29	21.64	18.86	22.00
Cotton + Paddy	30.97	22.50	21.20	21.36	20.00	18.14	0.45	0.98	1.24	0.98	1.09	0.83	68.82	22.95	17.09	21.79	18.34	21.85
Cotton + Wheat	30.68	22.74	21.32	21.26	20.26	19.76	0.49	1.08	1.21	1.09	1.02	1.01	62.61	21.05	18.79	20.84	17.71	19.56
S.E. ±	0.13	0.18	0.23	0.38	0.18	0.23	0.12	0.05	0.04	0.08	0.05	0.07						
CD at 5%	0.40	0.54	0.71	1.17	NS	0.69	0.37	0.17	0.14	0.26	0.17	0.21						

Where : *P.sc. : P. sajor-caju* *P.fb. : P. flabellatus* *P.sp. : P. sapidus* *P.e. : P. eous* *P.fl. : P. florida*

Results and Discussio

It could be obse
ved (Table 1) that a
overall reduction in p
cent organic carbon an
increase in nitroge
content of different spe
substrates were observe
due to cultivation
various *Pleurotus* spp. Th
maximum reduction i
organic carbon was notice
in soybean and paddy stra
(31.47 to 20.85%
followed by soybean stra
(32.10 to 22.72%) wil
P.sajor- caju cultivatio
It was the highest wi
soybean + paddy (31.
to 20.74%) followed t
cotton + paddy stra
(30.97 to 21.20%) wi
the cultivation of *P.eou*
The maximum reductio
in organic carbon w
noticed in soybean + whe
(31.52 to 20.42%) follo
wed by soybean + padd
straw (31.47 to 20.78%
with *P. flabellatus* cult
vation. The maximu
reduction in soybean
wheat (31.52 to 20.00%
followed by soybean
paddy straw (31.47 t
18.68%) with cultivatio
of *P.florida* and soybea
+ paddy (31.47 t
19.36%), followed b
soybean straw (32.10 t
22.22%) due to cultivatio
of *P.sapidus*. The highe
increase in nitroge
percentage was observe
in cotton (0.50 to 1.28;
cotton + paddy (0.40 t
1.21) with the cultivatio
of *P.eous*. However, th
lowest increase in nitroge
percentage was observe
in soybean + wheat (0.4

).79) and paddy straw (0.40 to 0.78) respectively. nilar results were reported earlier by Madan *al.* (1987) and Prabhu Desai and Shethy)91). They reported decreasing trend in carbon ıtent and increasing trend in nitrogen content paddy straw and coir dust during cropping i after harvest of *P.sajor-caju*, thereby reducing N ratio.

The C:N ratio of different agro-residues er cultivation of different *Pleurotus spp.* was nificantly reduced. An initial ratio of soybean paddy straw was 95.36% reduced to 18.86% e to cultivation of *P.flabellatus*, followed soybean straw (82.30 to 20.29%) and paddy aw (76.87 to 24.39%) with the cultivation *P.florida*. Similar observations were recorded rlier by Bisaria *et al.* (1987) who reported ss in weight of substrate might be due to ss of carbon in the form of carbondioxide oduced by respiratory activity of *P.sajor-caju* ring its growth.

With an increase in nitrogen component the substrate, a proportionate decrease in rbon was observed. These results are in cordance with those reported by Shetty and oorthy (1981), Thilagavathy *et al.* (1991) id Theradimani and Marimuthu (1991). They ported that the C:N ratio of coir pith could narrowed down due to cultivation of mushroom. idhav *et al.* (1998) also reported that the oncentration of nitrogen in spent substrates icreased with reduction in C:N ratio and thus owed possibility of using spent mushroom a quality cattle feed.

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