

DURATION OF WATERSOAKING OF SUBSTRATE AFFECTING GROWTH AND YIELD OF MUSHROOMS

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Soaking of paddy straw in water for 24 h exhibited maximum colonisation and yield of *Pleurotus sajor-caju* and *Volvariella volvacea* but for *Tricholoma lobayense* it was 72 h. The aqueous extract of straw had inhibitory effect on growth of *Tricholoma lobayense* but not on *Pleurotus sajor-caju* and *Volvariella volvacea*. Presoaking of straw in water for 72 h released inhibitory substances and rendered the soaked straw more suitable for colonisation by *Tricholoma lobayense*.

INTRODUCTION

For mushroom cultivation the substrate must be properly processed to make it suitable for spawn run. In case of mushrooms using nonfermented substrate, this processing is done by soaking the substrate in water for different durations. There is always an optimum period of soaking for achieving optimum spawn run and yield for different mushrooms. A preliminary study has been done on the bases for optimum duration of water soaking of substrate in three mushroom species viz. *Pleurotus sajor-caju*, *Tricholoma lobayense* and *Volvariella volvacea*.

MATERIALS AND METHODS

The cultures of *Pleurotus sajor-caju*, *Tricholoma lobayense* and *Volvariella volvacea* were received from the culture collection of Mushroom Research Unit, Bidhan Chandra Krishi Viswavidyalaya, Kalyani.

The method of cultivation followed were earthen tray culture in case of *Pleurotus sajor-caju* and *Tricholoma lobayense* (Chakravarty and Sarkar, 1978) and disc method for *Volvariella volvacea* (You and Chang, 1970).

RESULTS

(A) Effect of periods of soaking of paddy straw

To find out the optimum period of soaking of paddy straw for best colonisation and yield of *P. sajor-caju*, *T. lobayense* and *V. volvacea*, straw was soaked for different periods ranging from 0 to 120 h and used as substrate for cultivation of mushrooms. The results in Table 1, show that 24 h soaking of straw produced highest yield of *P. sajor-caju* and *V. volvacea*. In case of *T. lobayense*, however, for best colonisation and yield paddy straw needed soaking for 72 h. However, there was no significant difference of moisture in straw soaked for 24 h and 72 h.

Table 1. Effect of periods of soaking of paddy straw on the colonisation and yield of *P. sajor-caju*, *T. lobayense* and *V. volvacea*

Period of soaking (h)	Moisture content of substrate (P. C. Wt./ dry wt. of substrate)	Colonisation of substrate (g of mycelia/ 100 g of substrate)	Yield (g)/ kg of substrate	Colonisation of substrate (g of mycelia/ 100 g of substrate)	Yield (g)/ kg of substrate	Colonisation of substrate (g of mycelia/ 100 g of substrate)	Yield (g)/ kg of substrate
0	0	1.95	175	2.95	205	2.76	63
12	195	6.16	552	3.52	238	5.29	122
15	223	7.19	645	3.19	280	5.95	135
24	259	9.35	805	4.57	324	6.5	145
48	261	8.20	735	5.95	409	3.17	76
72	265	4.56	409	9.2	621	2.53	61
96	265	2.42	217	8.39	576	1.16	31
120	269	2.06	185	7.56	524	1.01	30

Data are average of five separate determinations.

Effects of paddy straw leachates

To find out the effect of paddy straw leachates on the mycelial growth of three mushrooms 200 g of chopped straw was soaked in 1000 ml distilled water for 24 h. The extract was collected and mixed with equal volume of potato dextrose broth (PDB), dispensed in flask, sterilized and inoculated separately with different mushrooms and incubated for 15 days at 30°C. PDB mixed with equal volume of distilled water served as control. The results are presented in Table 2.

Table 2. Effect of paddy straw leachates on the mycelial growth of *P. sajor-caju*, *T. lobayense* and *V. volvacea*

Treatment	Dry weight of myceli (mg)		
	<i>P. sajor-caju</i>	<i>T. lobayense</i>	<i>V. volvacea</i>
* PDB + D.W. (1 : 1)	228	221	171
PDB + straw leachates (1 : 1)	266	190	188

* PDB = Potato Dextrose broth. DW = Distilled water.
Data are average of five separate determinations.

The straw leachates was not growth inhibitory for *P. sajor-caju* and *V. volvacea*. Significant reduction in mycelial growth was obtained in case of *T. lobayense*.

Loss of water soluble substances from paddy straw

Ten g chopped straw was soaked in 100 ml of water. The dry matter contents of the straw before and after soaking for different periods were determined. The loss of dry matter after different periods of soaking indicated the loss of water soluble substances from the straw. This loss of water soluble substances was expressed as percentage of original dry matter content of straw. The results are presented in Table 3. The results indicate that duration of soaking from 12 h to 48 h, showed no significant difference in the loss of water soluble substances. However, considerable reduction (20%) in the loss of water soluble substances was recorded after 72 h soaking in water.

Table 3. *Loss of water soluble substances from paddy straw after different periods of soaking*

Period of soaking (h)	Loss of water soluble substances (g)	Percentage loss of water solubles
12	1.040	11.8
15	1.050	11.9
24	1.050	11.9
48	1.050	11.9
72	1.750	19.79

Data are average of five separate determinations.

DISCUSSION

It was found that soaking of paddy straw for 24 h produced highest colonisation and yield of *P. sajor-caju* and *V. volvacea*. But for *T. lobayense*, best colonisation and yield were obtained in straw soaked for 72 h. An analysis of moisture content of the straw soaked for 24 h and 72 h did not show any significant difference. So water content of straw did not play any role in the differential colonisation of straw by the different mushrooms.

During soaking of straw for different periods, water soluble substances composed of small molecules were released from the straw in water which was drained out later. Though soaking was necessary primarily for softening of the straw, it helps in leaching of water soluble substances from the straw. It was also evident from the results that relatively more water soluble substances were released from straw due to longer presoaking of 72 h. When the straw leachates was mixed with the culture media and the mushrooms were grown in them, it was found that aqueous leachates of straw had inhibitory effect on the growth of *T. lobayense*, but not on *P. sajor-caju* and *V. volvacea*. So paddy straw contained substances inhibitory to

T. lobayense. A longer presoaking of straw in water for 72 h released the inhibitory substances in the water and rendered the well drained soaked straw suitable for colonisation of *T. lobayense*. No such longer presoaking was necessary for *P. sajor-caju* and *V. volvacea*, as the straw leachates did not have any inhibitory effect on these mushrooms.

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