RESEARCH NOTE

Low Cost Technology of Drying of Oyster Mushroom *(Pleurotus ostreatus)*

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ABSTRACT

The production and drying process of Pleurotus ostreatus fruiting bodies were investigated in this work. Mushrooms were grown on paddy straw substrate and fresh fruiting bodies (1000 gm) were dried at 38-40oc with relative humidity 78-80 per cent. In same drying period (3 consecutive days) the best colour was observed in chemical methods followed by blanching methods. The highest storage period (12 month) and B:C ratio was observed in chemical treated samples of P. ostreatus. The acceptability of sensery characteristics of dried oyster mushroom were extremely on 9 Hidonic scale. The all technical observations were observed, in experimental data of improved technology of drying of mushroom, under farmer practice.

Key words: *Pleurotus ostreatus, Production, Drying, Temperature*

The acceptance of cultivated mushrooms such as Milky white mushroom (*Calocybe indica*), Oyster mushroom *(Pleurotus ostreatus)*, Kumm and Button mushroom (*Agaricus bisporus*) is well established worldwide as a delicacy. Due to the unique and subtle flavor, probiotic properties, several proteins, minerals (Ca, P, Fe, Mg), low carbohydrate and fats, *Pleurotus ostreatus* is considered as special diet worldwide. *Pleurotus spp.*, commonly known as Oyster fungi, is a common primary degrader of wood and vegetables residue. It can be found in tropical and subtropical regions and in rain forest, and also be artificially cultivated. The mushrooms of the *Pleurotus* genus are more dedicated and sensitive than the *Agaricus* genus and they start deteriorating immediately within one day after the harvest due to its high moisture content and delicate nature. After harvest, changes like browning, loss of moisture and texture occur. Once deteriorated, these fruiting bodies can cause severe gastrointestinal discomfort. Therefore, it is necessary that they are either marketed soon after harvesting or preserved with special care using processes such as drying and storing in cold or controlled environmental storage. Drying is an effective method of preserving edible mushrooms because it preserves the mushrooms by removing enough water to inactivate the enzymes and micro-organisms. Mushrooms, preserved by drying, have a pleasant flavor. Moisture content of fresh mushrooms is 70-95per cent, depending upon the harvest time and environmental conditions, while that of dried mushrooms is close to 10per cent (*Kim et.al., 2004*). Under ideal climatic condition, shelf life of these mushrooms is about 10 days, their quality being affected predominantly by storage temperature. Dehydration is classical method of food conservation, based on the principal that the reduction of water activity of product must be conducted until defined levels that guarantee the microbiological and physicochemical stability (*Cao el al.2003; Lewicki and Jakubczyk, 2004).* The dehydrated mushrooms can be rehydrated by water immersion before the consumption. The rehydration characteristics of dried products are used as a quality parameter and indicate if physical and chemical changes occurred during the drying process due to process conditions, pre-treatments and sample composition. Based on the above discussion, this work dealt with the evaluation of a conservation process for *Pleurotus ostreatus* fruiting bodies.

METHODOLOGY

Chemical method and environmental condition for spawn run and fruiting body formation (Oyster mushroom): Paddy straw was used as substrate for

production of oyster mushroom. Paddy straw were cut in to 2-4 cm size, soaked in water and mixed with chemicals (Bevistin @10 g/100 liter and Formaldehyde solution @100 ml/100 liter) for 8-10 hours. Chemical treated paddy straw were dried under proper sunlight up to moisture level 65-70 per cent judged by following thumb rule i.e. pressing the treated straw with hand and no water should drain between two fingers nor moisture sticks in hand. For bagging, 150gm oyster mushroom spawn are arranged in four layers for 2kg dry paddy straw in pp bag (50µ thick).Small holes were made in bottom and side of the bags and transferred to the cultivation room for spawn run and fruiting body production (25°C, light deviation between 500-100 lux, 12 hours in a day, and air humidity equal to 85-87 per cent), After 25th day fruiting bodies were harvested by rotating and pulling in clockwise direction.

Drying : 1000 gm of freshly harvested oyster mushroom *(Pleurotus ostreatus),* cultivated on paddy straw substrate, were taken. The brown and affected portions of the mushroom were discarded and quality mushrooms were washed with potable water to remove dirt and foreign materials, so as to reduce the initial microbial load, and given various pre-treatments such as:

Technology option I (TO_1): After harvesting, mushrooms were dried under sunlight at 38-40°C and 78 - 80 per cent relative humidity for 3 consecutive days (Farmer practice treated as control).

Technology options II (TO_2): Blanching: It was done in boiling water for 2-3 minutes. Immediately, the blanched mushrooms were cooled under running tap water for 10 minutes and dried under sun light at 38-40°C with relative humidity 78-80 per cent for 3 consecutive days.

Technology options III (TO_3): Chemical treatment: After harvest, pieces of 1000 gm of mushrooms were soaked for 6-7 hours in preservatives (0.6g potassium metabisulphide and 10g citric acid /Kg fresh mushroom diluted in one litre normal water) and dried under sun light at 38-40°C and relative humidity 78-80 per cent for 3 consecutive days.

RESULTS AND DISCUSSION

Drying: The effect of drying techniques of mushrooms under sunlight are presented in figure 1,2,3 and Table 1&2 and it clearly shows that the colour of untreated samples, dried under sunlight at 38-40°C and relative air humidity 78 to 80 per cent in 3 consecutive days, were half black (3.7). However, it was light black (2.3) and natural (1.3) in blanched and chemical treated samples, respectively. The flavor of dried samples, without pretreatment, was off (3.7). It was less off (2.3) in blanched and on flavour (1.2) in chemical treated samples. The storage period of dried samples of farmer's practice was found 3 months but chemical treated dried samples were found 12 months. The storage period of blanched dried samples was intermediary (8 months). The general acceptability was extreme (1.3) in case of chemical treated samples and very much (2.3) in blanched dried samples. It was moderate (3.7) in without pretreated dried samples. The taste was moderate (3.7) in control and very much (2.2) in blanched and dried mushroom. However, it was extreme (1.3) in case of chemically treated and dried mushroom on 9 Hedonic scales. The B:C ratio was found to be highest (3.9) in chemical treated samples; however, it was lowest (3.3) in control and intermediate in case of blanched dried samples (2.5).

The differences among treatments may be attributed to difference in bound moisture content,

Table1: Improoved technology of drying mushroom under farmer practice

Technology options	Days(Sun drying)	Dry weight(gm/kg)	Storage period(month)	B:C ratio
TO_1	03	100	03	2.5
TO_2	03	100	08	3.3
TO_3	03	100	12	3.9

Table 2: Acceptability of sensery Characteristics of dried oyster mushroom

Technology options	Colour	Flavour	Taste	Texture	General acceptability
TO_1	3.7(66.25)	3.7(66.25)	3.5(68.75)	3.7(66.25)	3.7(66.25)
TO_2	2.3(83.75)	2.3(83.75)	2.0(87.5)	2.2(85.0)	2.3(83.78)
TO_3	1.3(96.25)	1.2(97.5)	1.2(97.5)	1.3(96.25)	1.3(96.25)

TO_1 **TO_2** **TO_3**

Figure 1 :Technical observation of colour under options (TO_1-farmer practice with sun dry), (TO_2-blanching method with sun dry),and (TO_3-chemical method (o.6 gms /kg pottassium meta bi sulphide and 10 gms/kg citric acid with sun dry).

developed due to different treatments. The blanched samples had shown relatively low acceptability of sensery characteristics compared to chemically treated samples but relatively better than the samples which were dried without giving any pretreatment.

This is attributed to the moisture which might have been more strongly bound in the blanched samples than chemically treated samples. Even though blanching increases the permeability of cell walls, higher shrinkage of volume occurs during subsequent drying, this causes resistance to water movement in the cells. However, chemicals stop enzymatic action and prevent mushrooms from turning into mush.

CONCLUSION

Mushroom is most protienous food with high medicinal and nutritive values. Generally, mushroom grower does not preseve mushroom whole the year scientifically but preserve it for 2-3 months only by following traditional method of drying i.e. sun drying without giving pretreatments. The drying of mushroom under solar light takes three days to reach the required final moisture content.

The storage period and tempreture are the most importent variables in mushroom drying. The best storage period (12 months) for *P. ostreatus* were observed in case of pretreatment of fruting bodies done by chemicals. Most of the grower accepted chemical methods followed by blanching methods. Farm women and mushroom grower can preserve and earn money the whole year by following drying of mushroom from low cost technology (chemical method). Dried mushroom can also help in prevention of malnutrition in rural areas.

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