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RESEARCH ARTICLE

STUDY OF NUTRIENT LOSS IN OYSTER MUSHROOM AFTER DRYING BY DIFFERENT METHODS

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ABSTRACT

Drying is the process of removal of moisture from the product to such a low level that microbial and biochemical activities are checked due to reduced water activity, which makes the products suitable for safe storage and protection against the attack by microorganisms during the storage. Drying was done by three different methods that is Air Drying (45^0 C), Sun Drying ($12\text{-}25^0$ C) and Oven Drying (65^0 C) till complete drying. This was done to find out the better drying method, by comparing the nutritive value after biochemical analysis. From storage point of view oven drying is better than sun drying because moisture content decreases at the level of 4.4% that is in higher magnitude. Air drying was found to be the best method of drying, as the highest nutrient value was found in this case; whether it is the matter of protein, lipid, ash or carbohydrates content. However, moisture content in the samples subjected to this method of drying was higher, as compared to the other two methods.

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INTRODUCTION

Mushrooms are fungus that found all over the world and have been a time honored food in many cultures (Chang and Buswell, 1996). They have been in use not only for consumption but also for medicinal purposes (Bobek *et al*., 1997; Chocksaisawasdee *et al*., 2010; Yang *et al.* 2001). China produces 64 % of all edible mushrooms in the world and 85% of all oyster mushrooms all over the world (*Pleurotus* spp.) is also produced in China (Chang, 1999). Oyster mushrooms is the third largest (Obodai, 2003) commercially produced mushroom in the world. According to Sanchez (2010) reported that *P. ostreatus* is the second largest next to *Agaricus bisporus* in the world market. The increased production of mushroom demands proper processing to increase shelf life and marketability. Long-term preservation methods such as canning, drying, pickling etc can make the availability of mushroom of a good quality throughout the year at reasonable cost. The consumption of mushrooms throughout the year, particularly of species harvested in natural habitats, is made possible through the use of appropriate processing methods (Arora *et al*., 2013). Preserving mushroom in dried form can reduce the postharvest loss and extends their shelf life (Muyanja *et al*., 2012).

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To prolong shelf life of mushroom, appropriate drying temperature should be applied. Apati *et al*. in 2010 suggested that the best temperature for *Pleurotus ostreatus* fruiting bodies drying process was around 40ºC. On the other dehydration method, drying mushrooms under the sun yields unhygienic and poor quality product (Gothandapani *et al.*, 1997). The major objective in drying is the reduction of moisture content to a certain level food depending on the type of food, which allows safe storage and preservation (Seiiedlou *et al.*, 2010). However drying methods play an important role in production of the dried vegetables and the bioactive compounds and their antioxidant capacity might be lost during drying process (Hung and Duy, 2012). Freeze drying yields excellent quality mushrooms but, the cost of removal of water is 10 times higher than the conventional air-drying. Removal of water from food helps preservation by preventing microbial spoilage (Kumar Devendra and Prakash Vijay, 2012). Dehydrated mushrooms are used as an important ingredient in several food formulations including instant soups, pasta, snack seasonings, casseroles, and meat and rice dishes (Tuley, 1996; Gothandapani *et al.,* 1997). Saxena and Rai (1990) reported that dhingri could be sundried during the days with high temperature (above 25°C), low humidity (less than 50 percent RH) and high wind velocity. The fruit body of the dhingri can be beaded in a thin wire or thread and hanged in the air in direct sunlight for efficient dehydration and freeness from dust. The weight of the end product of this method had 10-12

percent of its original weight. They also recommended that the sundried product should be oven dried at 55-60°C for 4-6 h before packing in air- tight packs. Arumuganathan *et al*. (2004) conducted the experiments on sun- drying of oyster mushroom and found that the treatment with 0.05 % KMS + 0.1 % citric acid yielded good quality dried oyster mushroom. Arora k.(2014) reported in her experiments with oyster mushroom that air drying method was most suitable method for drying as it shows less nutritional losses in comparisons to other methods like sun drying and oven drying. The proposed work based on using the different drying methods to find out suitable drying method for oyster mushroom that create the less nutritional loss in it.

MATERIALS AND METHODS

Fresh samples of Oyster Mushroom (*Pleurotus sajor caju*) were collected from the Department of Plant Pathology, Chandrashekhar Azad university of Agriculture and Technology, Kanpur. Drying was done by the three different methods: Air drying, sun drying and oven drying to find out better drying method by comparing its nutritive value after biochemical analysis.

RESULTS AND DISCUSSION

Drying was done by three different methods: Air Drying (45^0 C) Sun drying ($12\text{-}25^0$ C) and Oven Drying (65^0 C), till complete drying. This was done to find out the better drying method, by comparing the nutritive value after biochemical analysis. The results of oyster mushroom are expressed in the table and graphical presentation of the same is expressed in figure. All the values show standard deviation within the limit of 5%. From storage point of view oven drying is better than sun drying because moisture content decreases (4.4%) in a higher magnitude in this case. Air drying was found to be the best method of drying, as the highest nutrient value was found in this case. However, moisture content in the samples subjected to this method of drying was higher, as compared to the other two methods.

Table 1. Biochemical changes in dried samples when dried by different methods

Drying Methods/Nutrients	Air Dry(%)	Sun Dry(%)	Oven Dry(%)
Carbohydrate	54.9	25.1	21.9
Protein	30.1	24.8	19.3
Fat	2.5	0.9	1.3
Ash	14.4	11.5	9.8
Moisture	10.3	7.3	4.4

Figure 1. Photograph of completely dried *Pleurotus sajor caju*

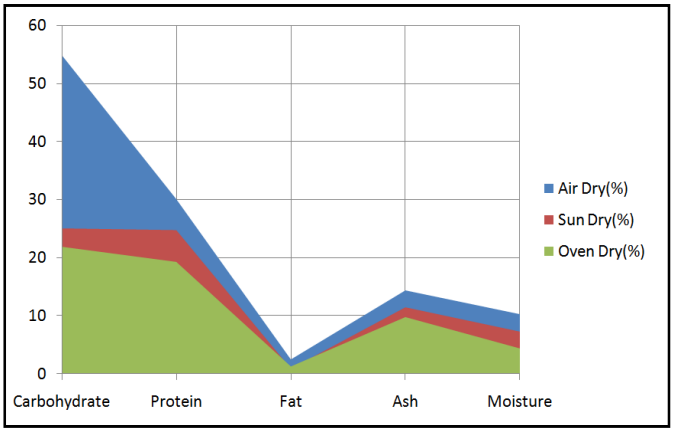

Figure 2. Graph showing biochemical changes after drying by different methods

Conclusion

As we know sun drying is the cheapest method but Air drying is the best method of drying from the nutrient point of view because it affect the least amount of nutrient content in the process of drying while from storage point of view, the oven drying was found to be the best, as it sustained least amount of moisture.

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