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Effect of process variables on mass transport data during osmotic dehydration of button mushroom (*Agaricus bisporus*) slices

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ABSTRACT : The preliminary experiment for mass transport data of button mushroom (*Agaricus bisporus*) were performed for fixing the levels of input variables for further experimentation such as kinetics and optimization of osmotic dehydration as well as air drying. After the preparatory steps, the preliminary experiment was studied for wide range of process variables such as duration of osmosis (30, 45, 60, 90, 120 min), salt concentration (5, 10, 15, 20, 25%), brine temperature (25, 35, 45, 55, 65°C) and brine to sample ratio (3:1, 4:1, 5:1, 6:1, 8:1 R). The response parameters were mainly water loss and salt gain.

KEY WORDS : Osmotic dehydration, Concentration, Water loss and salt gain

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In recent years, the use of mushroom for medicinal and food products has increased considerably. The high proteins, sterols, macro-elements and low calorie content make mushroom ideal food ever for patients, old people, pregnant ladies and children and also for prevention of cardiovascular diseases (Poongkodi and Sakthisekaran, 1995). Presence of more than 90 per cent moisture content, mushrooms are highly perishable and start deteriorating immediately after harvest. It can not be stored for more than 24 hours at ambient temperature (Lal Kaushal and Sharma, 1995; Giri and Prasad, 2007). They develop brown colour on the surface of the cap due the enzymatic action of phenol oxidase, this results in shorter shelf life. In view of their high perishable nature, the fresh mushrooms have to be processed to extend their shelf life for off season use.

There should be a technique to reduce the reliance on fossil fuels and challenges in fruits and vegetables drying are to reduce the moisture content of the product to a level where microbiological growth not occur and simultaneously keep the nutritive value high in final product. Hence, a new method osmotic dehydration is used to water removal, at low temperature with low energy consumption. Since this process cannot remove moisture to a level that will avoid microbial growth, it is a method suitable only for pre-treatment prior to drying (Torringa *et al*., 2001; Shukla and Singh, 2007). This partial dehydration of the fruit and vegetables with reduced energy consumption and heat damage has received attention in recent years as a technique for production of intermediate moisture foods and shelf-stable foods (Jayaraman and Gupta, 1992).

Many researchers studied osmotic dehydration of many fruits and vegetables, such as apple, banana, mango, guava, grape, citrus fruits, cherry, carrot, etc. (Pokharkar *et al.,* 1997; Sethi *et al*., 1999). Very few attempts have been made to study osmotic dehydration characteristics of button mushroom. Therefore, a preliminary experiment was proposed to investigate the wide range of process variables (such as duration of osmosis, salt concentration, brine temperature and brine to sample ratio) on mass transport data (such as water loss and solid gain) during osmotic dehydration of button mushroom to fix the levels of input variables for further experimentation (such as kinetics and optimization of osmotic dehydration as well as air drying).

METHODOLOGY

Selection of raw materials :

Mushroom of *Agaricus bisporus* variety, having about (89-91%) moisture content (w.b.), was procured on daily basis from All India Co-ordinated Research Project on mushroom, Rajasthan College of Agriculture, Maharana Pratap University of Agriculture and Technology, Udaipur, Rajasthan. Freshly harvested, firm, dazzling white, mature mushrooms of uniform size were manually sorted and medium sized were selected as