

A CASE STUDY ON DRYING CHARACTERISTICS AND QUALITY OF MUSHROOMS FROM NATURAL CONVECTION SOLAR DRYER AND OVEN DRYING METHODS

By

Ms.V.Kopika

Department of Agricultural Engineering, Faculty of Agriculture, Eastern University, Sri Lanka

ABSTRACT

The study was conducted at Agricultural Engineering Laboratory and Agro Technology park, Eastern University, Sri Lanka, during September 2017 to October 2017. Oyster mushrooms were used for drying in this study. Different sizes of mushrooms were used to evaluate the size of the mushrooms on drying processes in natural convection solar dryer. Effective temperature for drying mushroom was examined by drying mushrooms in hot air oven at temperatures at 30°C, 40°C, 50°C and 60°C. Full and half mushrooms were dried in a natural convection solar dryer until the samples reached desired moisture content of 8.2%. Air temperature inside the dryer and outside the dryer, wind velocity, relative humidity and moisture loss were measured at every 2 hours interval. Mushrooms were kept in the oven at different temperatures such as 30, 40, 50 and 60 °C until the samples reached desired moisture content. The moisture loss was measured at every 1 hour interval. The colour of raw and oven dried and solar dried samples were compared. The effect of drying air temperature on drying characteristics of oyster mushrooms were investigated.

The experimental results showed that the drying temperature and size of the mushroom had considerable effects on the moisture removal. In the study, average moisture content, average drying rate, drying duration, rehydration ratio and moisture diffusivity values of full mushrooms were found to be 3.79 %, 0.2 g min⁻¹, 22 hours, 2.4 and $-10.084 \times 10^{-9} \text{ m}^2 \text{ s}^{-1}$ respectively. In hot air oven, average moisture content, average drying rate, drying duration, rehydration ratio and moisture diffusivity values at 50 °C were found to be 13.44 %, 0.5 g min⁻¹, 6 hours, 2.33 and $-10.08 \times 10^{-9} \text{ m}^2 \text{ s}^{-1}$ respectively. The results revealed that among different sizes of mushroom, half mushrooms produced better quality product than full mushrooms during the drying process in the natural convection solar dryer. In oven drying, 50 °C can be considered as the effective optimum

temperature for drying process of full mushrooms with acceptable moisture loss, average drying rate and drying time.

Supervisor: Mrs. R. Bawatharani

Department of Agricultural Engineering

Faculty of Agriculture

Eastern University, Sri Lanka