

# **DRYING KINETICS OF RED CHILLIES UNDER NATURAL CONVECTIVE SOLAR DRYER AND OPEN SUN DRYING**

By

Ms. M. M. F. Najla

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

## **ABSTRACT**

The thin layer drying kinetics of chillies at different layers (*Capsicum annuum L*) were experimentally investigated in a natural convective solar dryer and in open sun drying. In both drying methods chillies with 1cm, 2cm and 3 cm layer thicknesses were used. The chillies were dried from an initial moisture content of about 81. 23% (w.b) to a moisture content of 7. 13% (w.b) and the moisture content of chillies were determined at 3 hours interval. The drying data were fitted with two thin layer drying models namely Page model and Henderson & Pabis model. The values of the drying constants for the models were determined. The performance of these models was investigated by comparing the correlation coefficient ( $r$ ), chi-square and root mean square error (RMSE) between the observed and predicted moisture ratios.

The dramatic moisture reduction of chillies took place during first day of drying process and the drying process followed a falling rate period. The effects of drying method and layer thickness of chillies on the drying characteristics and drying time of drying process were determined. The results showed that an increase in the drying layer thickness resulted in longer drying times. According to the moisture ratio predicted by both models, Page model and Henderson & Pabis model were suitable for drying chillies with 1 cm layer thickness in convective solar dryer. Both models satisfactorily described the drying rate of chillies with correlation coefficient of 0.814 in Page model and 0.852 in Henderson & Pabis model. Page model was found to be more suitable for open sun drying with the layer thickness of 3 cm as it satisfactorily described the drying rate with correlation coefficient of 0.989.

**Supervisor:** Mrs. R. Bawatharani

Department of Agricultural Engineering

Faculty of Agriculture

Eastern University, Sri Lanka