

Study of moisture depletion pattern of spinach in hot air oven

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SUMMARY : Now a day it is evident from previous works on drying of food, fruits and vegetables by different scholars are that there are no as such exact theoretical laws or theoretical equations have developed. That can explain explicitly or implicitly the drying behavior of these biodegradable substances because there are many variables in these products. The major variables are biological conditions *i.e.* geographical condition as well as atmospheric condition. That varies from place to place and time to time. Other variables are Relative Humidity (RH), moisture content, drying medium temperature, air or gas flow velocity, conduction, convection, radiation and mass transfer mechanism. Apart from these some other factors are liquid diffusion such as (capillary flow, surface diffusion, hydrodynamics mechanics), vapor diffusion (mutual diffusion, knudsen diffusion, effusion, slip flow, hydrodynamic flow, stepan diffusion, evaporation, poiseuille flow) etc. Still searches are going on and nobody could assure that at any instance of time transfer of moisture has caused by above known mechanism. Due to these difficulties, it can be easily concluded that for prediction about drying nature, need of an experimental setup and results and each result is unique one. In present work, spinach for drying in blanched and unblanched condition with loading densities 3kg/m^2 and 3.5kg/m^2 in a cabinet air dryer in which drying nature validates the exponential model of drying has been selected.

KEY WORDS: (M_e) Equilibrium moisture content (Me), Moisture content (MC), Moisture ratio (MR), Treated (blanched), Untreated (unblanched)

How to cite this paper : Upadhaya, A.K., Gupta, Bhupendra, Garg, Sanjeev and Singh, Mohan (2012). Study of moisture depletion pattern of spinach in hot air oven. *Internat. J. Proc. & Post Harvest Technol.*, 3 (2) : 278-282.

Research chronicle : Received : 08.06.2012; Revised : 07.09.2012; Accepted : 18.11.2012

In this, spinach with 3kg/m^2 and 3.5kg/m^2 loading densities in blanched and unblanched condition with temperature range 55°C , 65°C and 75°C , has been selected. Drying characteristic of spinach mostly controls by availability of moisture in it. For drying of spinach, a cabinet dryer with low Relative Humidity (RH), constant airflow and high temperatures has been selected. Blanching has done to improve final product quality and reduce process cost. It has observed that a temperature range in vicinity of 50°C - 70°C was suitable for drying of spinach. Increase in air temperature significantly reduces the drying time. The air velocity during drying has

taken 2.2 m/s^2 that is sufficient to keep relative humidity low inside the dryer. In our curves, drying occurs majorly in falling rate of drying.

EXPERIMENTAL METHODS

Materials :

Fresh spinach leaves procured from local market everyday prior to the experiment. They were washed with tap water, the moisture on the wet sample surface was removed with filter paper. The average value of moisture content 93.41 per cent (w.b.) which shows that spinach leaves can be grouped under highly perishable vegetables. Spinach leaves were pre treated by blanching with distilled water. Treated sample were placed over filter paper (Whatman filter paper .size 41 A) for 1 minute to absorb excess water.

Experimental methods :

Drying experiments were performed in cabinet dryer (hot air oven, tradelevel scientific industries, least count 1°C) and installed in Department of Post Harvest Process and Food Engineering, College of Agriculture Engineering (JNKVV,

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