OSMOTIC DEHYDRATION OF FRUITS

A thesis submitted in part fulfilment of the examination
requirements for the award of

MASTER OF SCIENCE
IN
FOOD TECHNOLOGY

Submitted by: Nicholaos P. Faradouris

Supervised by: Dr. Evangelos S. Lazos

UNIVERSITY OF HUMBERSIDE
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ACKNOWLEDGEMENTS

The author gratefully acknowledges everyone who was involved in the fulfilment of this particular Master of Science course, from the University of Humberside and Technological Educational Institution of Athens. Special thanks are extended to Dr. Evangelos S. Lazos for his helpful advice and discussion.

ABSTRACT

The osmotic dehydration as a method of intermediate - moisture fruits production, was studied.

The influence of the temperature, dipping time, fruit skin, calcium chloride addition and vacuum pressure on water loss and solute gain were investigated. The achievement of a prevailing dewatering effect with only marginal solute pick-up, proved to be related to an inverse relationship between the cross-flows of water and solute.

Vacuum osmotic dehydration led to a special behaviour of mass transfer due to an intensification of capillary flow function. Vacuum treatments enhanced the dehydration rate ,having a significant influence on sugar uptake. Moreover, the addition of small quantities of $CaCl_2$ to sucrose osmotic solution although managed to increase the driving force of the drying process, gave products with salty and unacceptable taste due to a high salt uptake.

A mathematical model was developed for osmotic water removal of whole and halved apricots in a 70 Brix syrup. The model calculates the water losses as a function of the temperature and dipping time of osmotic dehydration; equation $WL_w = [0.796+(680.3/T)-(3.934 \cdot 10^4/T^2)]\ t^{1/2}$ can be used for whole intact apricots, while equation $WL_h = [-3.217 +(1188/T)-(5.108 \cdot 10^4/T^2)]\ t^{1/2}$ for halved apricots. The predicted and experimentally measured water losses were found to be in close agreement.

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