

SORPTION CHARACTERISTICS OF PECTIN ISOLATED FROM PARSNIP (*PASTINACA SATIVA* L.) OF BULGARIAN ORIGIN

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Abstract

Modelling of sorption processes for foods of biological origin provides information about the choice of the regimes of their treatment, preservation and transportation. The equilibrium moisture content (EMC) is a main sorption characteristic of the product. The connection between the EMC and the water activity - a_w is represented through a sorption isotherm for a definite temperature. The monolayer moisture content (MMC) is a sorption characteristic influencing the food product stability. The aim of this research is to investigate the sorption characteristics of the pectin isolated from parsnip (*Pastinaca sativa* L.) of Bulgarian origin.

The analysis of the sorption characteristics of pectin extracted from parsnip (*Pastinaca sativa* L.) of Bulgarian origin is implemented for temperatures 10 °C, 25 °C, and 40 °C in water activities in the range from 0.11 to 0.85 respectively, for the processes of adsorption and desorption. The equilibrium moistures values for the both processes are increased with the higher temperatures with constant water activity. According to the Brunauer's classification the equilibrium isotherms of pectin extracted from parsnip are from II type. The modified models of Oswin, Halsey, Henderson and Guggenheim-Anderson-de Boer (GAB) are used for the sorption isotherms description. According to the commonly accepted criteria for evaluation of the models - average relative error, standard error of the mean and residues distribution, the modified model of Halsey is recommended for description of the sorption characteristics of the analyzed product. The linearization of the model of Brunauer-Emett-Teller (BET), based on the theory of polymolecular adsorption is used for the calculation of monolayer moisture content (MMC) in $a_w < 0.5$.

The received MMC for the three temperatures for the both processes as follows: adsorption - 10 °C - 6.54% dry mass, 25 °C - 5.93% dry mass, and 40 °C - 5.98% dry mass; desorption - 10 °C - 8.57% dry mass, 25 °C - 7.81% dry mass, and 40 °C - 7.07% dry mass. The equilibrium moistures values for the both processes are increased with the higher temperatures with constant water activity. According to the Brunauer's classification the equilibrium isotherms of pectin extracted from parsnip are from II type. According to the commonly accepted criteria for evaluation of the models - average relative error, standard error of the mean and residues distribution, the modified model of Halsey is recommended for description of the sorption characteristics of the analyzed product.

The present study determined the equilibrium and the monolayer moisture content of the pectin isolated from parsnip (*Pastinaca sativa* L.) of Bulgarian origin. Furthermore, this research proved the uniqueness of each food product and the need for individual determination of the sorption characteristics.

Key words: *Parsnip, Pectin, Sorption characteristics, Isotherms, Monolayer moisture content.*