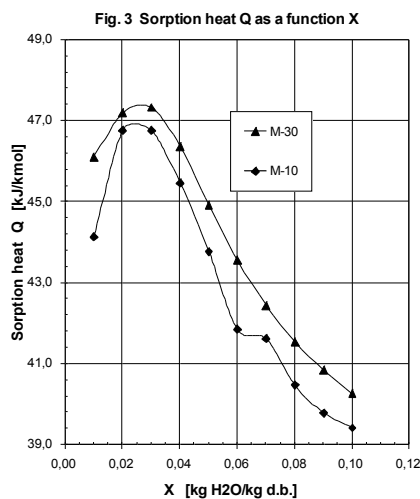
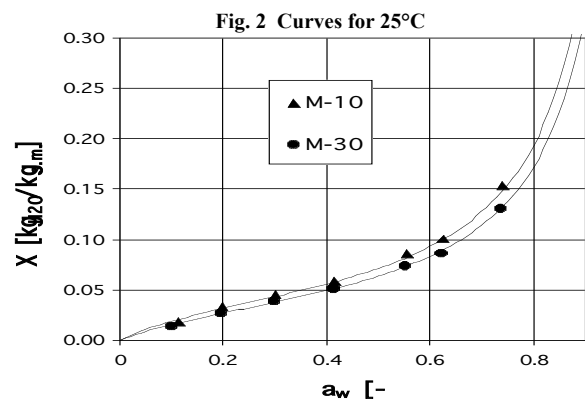
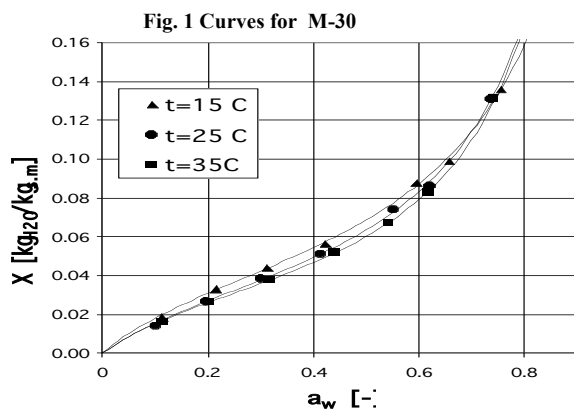


Influence of selected parameters on sorptivity of microencapsulated powders

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The state of water plays a crucial role in food preservation. Moisture content in food influences the physical or textural characteristics of a product as well as its chemical and microbiological stability. The extent of water sorption by the food product depends on the vapor pressure of water present in the food sample and in the surroundings. The relationship between the equilibrium moisture content (moisture content in the sample versus the vapor pressure of water in the surroundings) and corresponding relative humidity (or water activity) at a constant temperature is called a moisture sorption isotherm. A number of models have been proposed in the literature for the dependence between the equilibrium moisture content and water activity, but it is vital that the values of the characteristics constants in these models for each material be determined experimentally.



As a result of spray drying of a multi-component water solution (maltodextrin and an essential oil emulsion) the dry powder of encapsulated an essential oil was obtained. The quality of the obtained powder directly after drying and during storage was determined. Measure of equilibrium moisture content in the sample (e.g. water sorption isotherms) at various temperatures is focused on the determination of an influence of presents of essential oil entrapped in solid particles as well as temperature inside the measuring chamber on the characteristics of the equilibrium curves and thermodynamic parameters of water sorption.

The presented results concern the microencapsulation of a natural pepper mint oil by maltodextrin with the starting oil weight concentration in emulsion as 10, 20 and 30% ww. (in relation to the mass of maltodextrin dissolute in the water). The character of the sorption isotherms contributes to the fact that the powder of microcapsules with this oil may be attributed to the materials of the average hygroscopicity. In the range of the middle value of water activity (a_w about 0.4) the equilibrium moisture content attaining the values lower than 5% ww.

Thus, the physical and mechanical state of the powder is stable, and in this form is easy to be dosed and to prepare with other powders (e.g. food ingredients) the multi-component mixtures as a powder. An increase of participation of the essential oil in the powder contributes to a lower position of the equilibrium curve in the diagram (Fig. 2) and, analogously influence have an increase the temperature of determination (Fig. 1). Further analysis of the results allows to determine the parameters of the model equations. It is essential to notice that the equilibrium state may be best attributed to GAB model and the determined value of humidity, associated with a monolayer, decreases in parallel with the oil content. Hence, it may be proved that water molecules have a limited access to the structure of microcapsules which stems from an increased oil content. It is essential that a similar assay be performed for each dry product of microencapsulation. Fig. 3 presents sorption heat of water as a function moisture content X – maximum correspond to monolayer of water and it is dependent on the oil content in the powder.

