ABSTRACT

Glass transition temperature and water activity are consider as the most important parameters determined food stability during storage. According to the water activity concept, food product shows maximal stability when its water concentration is equal to monolayer moisture content (u_m). Because of many limitation of this theory and complex composition of the food materials, influence of the temperature factor has to be taken into account during planning of the shelf life. Dehydrated amorphous food products are the most stable stored at temperature above characteristic glass transition temperature (Tg) while frozen materials should be stored above glass transition of solid matrix temperature (Tg'), Both parameters can be appointed from state diagram.

The main objective of this study was to investigate possibility of application a response surface methodology and data appointed from state diagram for optimization of the compositions food concentrates based on biopolymers, green peas and pumpkin. Furthermore, optimal powders compositions were determined In reference to water activity and Glass transition temperature conceptions. Selection of the final concentates were chosen in order to retain maximal amount of the plant fraction and maximal replacement of maltodextrin by inulin. Physical stability were examinated in terms of storage in dried form at 25°C, frozen form at - 20°C and in water activity below 0.35.

According to the water activity concept optimal powder composition was mix contained 90% of pumpkin and 10% of inulin. Addition of the biopolymer was included because of the prebiotic properties of the fructans. For green peas concentates the most optimal composition contained 58% of peas, 0.5 % of inulin and 41.5% of maltodextrin. It was found that pumpkin was more stable material from the water activity concept point of view. Including combination of the water activity and glass transition temperature conceptions, optimal compositions contained 61% of pumpkin, 20% of inulin and 19% of maltodextrin for first concentrate and 90% of green peas and 10% of fructan for the second one. Assuming frozen storage of investigated powders determined optimal compositions of the powders were: 4% of pumpkin, 19% of inulin, 77% of maltodextrin and 10% green peas, 17% of inulin, 73% of maltodextrin. It was noticed that application of the parameters appointed from state diagram and response surface methodology can be used for composition optimization of the three components food powders. Depending on technological demands and type of feedstock,

developed methodology can be also used for designation of the proper conditions of food storage. Moreover, it was found there is possibility to replace part of maltodextrin by inulin in every investigated blends.