

Description for the general public

Fresh fruit due to the seasonality of harvest is processed by numerous technological methods prolonging its availability on the market. Among a wide range of fruit products, the powdered forms are becoming more and more popular, especially because of the many possibilities of their applications and easiness of their addition to food products. Fruit powders can be a component that improve the sensory profile of other food, cosmetic and pharmaceutical products, and due to the presence of natural bioactive compounds, they can additionally give new functional properties. This form of fruit processing can also be a new direction in the management of their excessive production, which often leads to the loss of these valuable raw materials. Fruit powders may constitute an alternative food additive to unbalanced and often dominant in diet processed foods due to ease, convenience of consumption and availability.

There are several ways to gain fruit powders, for instance they can be obtained from whole fruits, their parts and juices, purees, concentrates or extracts. Preparation of the latest is associated with the evaporation of a relatively large amount of water, which is possible due to the use of appropriate drying methods and their parameters. Another issue is the selection of a suitable carrier agent that guarantees powders obtention from juices. Appropriate selection of process parameters and development of the composition submitted to drying enables, to a large extent, the preservation of bioactive compounds naturally occurring in fruit juices, i.e. polyphenols. Due to the presence of sugars and organic acids in juices, the formation of compounds not present in the raw material can occur that is depended on the type of the processes applied. Such compounds are often potentially harmful to human health (products of Maillard reactions and caramelisation), the formation of which during heat treatment may also rely on their mutual interactions, as well as on their interactions with other juice components or carriers.

Fruit juice is a complex matrix composed of sugars, organic acids, vitamins, minerals, and polyphenols. The mutual interactions of mentioned above constituents caused by drying make it difficult to determine the impact of the directions of their transformation, including participation in the formation of potentially harmful compounds. Taking above into consideration, the goal of the project is to develop model compositions of fruit juices that will allow to examine the impact of its individual components, concerning the type of carriers and selected drying techniques on the quality of powders considered in terms of chemical and physical properties, including the formation of Maillard reactions and caramelisation products. The effect of the addition of natural food additives (including mineral salts, vitamins, plant extracts) on the formation/inhibition of the formation of harmful products of these reactions in fruit powders obtained from black currant (*Ribes nigrum* L.) and Japanese quince (*Chaenomeles japonica* L.) juices will be examined. Furthermore, their addition will also be analysed for the biological properties of fruit juice powders, and the storage stability will be made in order to verify the effect of storage conditions on preservation of these properties.

The results obtained in the project by the use of model systems will help to determine the impact of individual components present in selected fruit juices on the interactions between them and between them and natural additives, depending on the carrier agent and process parameters. The research will have a basic character that aimed at explanation of the processes caused by drying of model systems and fruit juices during powders obtention. Understanding of these changes can give a hint for designing of other foods with functional properties or with improved biological properties.