

## EXPLORATION OF DRYING PROCESS OF BEETS

**Marija Zheplinska<sup>1\*</sup>, Larisa Bal-Prylypko<sup>2</sup>, Mykola Nikolaenko<sup>2</sup>, Volodymyr Vasyliv<sup>1</sup>,  
Mikhailo Mushtruk<sup>1</sup>, Natalija Slobodyanyuk<sup>2</sup>, Liubov Shablii<sup>3</sup>**

**<sup>1</sup>Department of processes and equipment for processing products of the agro-industrial complex, Faculty of Food Technologies and Product Quality Management of the Agro-Industrial Complex, National University of Life and Environmental Sciences of Ukraine,  
15 Heroes of Defense nn, 03041 Kyiv, Ukraine**

**<sup>2</sup>Department of meat, fish and seafood technology, Faculty of Food Technologies and Product Quality Management of the Agro-Industrial Complex, National University of Life and Environmental Sciences of Ukraine, 15 Heroes of Defense nn, 03041 Kyiv,, Ukraine**

**<sup>3</sup>Department of Biotechnology, Faculty of Environmental Safety, Engineering and Technologies, National Aviation University, Huzar Lubomyr 1, 03058 Kyiv, Ukraine**

**\*e-mail: jeplinska@ukr.net**

### Abstract

Expanding the range of vegetable processing products by increasing the share and diversifying the range of dried vegetables today is expedient and promising. The aim of this study was to determine the best drying option for extending the shelf life of table beet powder using convective, chemoradiation and combined drying methods.

The scientific work presents the results of the process of drying beets by convective, chemoradiation, and combined methods. The method of pre-treatment of beets to stabilize the natural color, namely blanching in citric acid with a concentration of 3% when cut into cubes with dimensions of 10 x 10 mm. The kinetics of beet drying was studied by plotting drying curves. The combined (infrared irradiation of raw materials and simultaneous convective heat supply) method of beet drying was chosen, which allows for a reduction in the duration of the process and improves the quality of dried raw materials. The organoleptic and physicochemical parameters of beetroot powder obtained by the combined drying method, which has advantages over convective and chemoradiation drying methods, were studied. The study of the color of beets was carried out after dissolving in water on a KFK-3 photoelectrocalorimeter. To determine the color, an aqueous solution of beetroot powder was used in a ratio of 1 : 10. The temperature was 70 0C with a wavelength of 560 nm. In the obtained dried beets, the content of dry substances, the percentage of recovery and the dependence of the regeneration ability on the drying temperature were determined using a refractometer. During the drying of beets, the change in the mass of the raw material (that is, the removal of moisture) was constantly monitored every 5 minutes in order to determine the moisture content in raw materials. Conducted studies established the optimal degree of grinding table beets, which corresponds cutting into 10 x 10 mm cubes, which are pre-treated with citric acid at a concentration of 3%.

The results of research on chemoradiation drying made it possible to reduce the drying time and improve the quality of the dried product compared to convective drying, which is confirmed by the drying curves. When the heat carrier temperature increases from 50 to 80 0C, the drying time decreases from 95 to 70 minutes, which is 79% less than with the convective drying method. It was established that with the combined method of drying, the duration of the process is the shortest, and the intensity of the color of the beet particles is close to natural raw materials. The best temperature of the combined method of drying beets was established, which is 70 0C, with a duration of the process of 75 minutes.

Organoleptic and physicochemical parameters of the finished product - a powder obtained by the combined drying method, which has advantages over convective and chemoradiation methods - were determined. The change in organoleptic indicators of finished products during storage for 3 months was studied, which indicated excellent storage of beetroot powder.

**Key words:** *Beets, Convective Drying, Chemoradiation drying, Combined method.*