

# OPTIMIZATION OF THE PARAMETERS FOR THE PROCESS OF GRAIN COOLING

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Among the classical technologies, which apply elevated temperatures for preserving of grain and cereal products, there are two the most effective ones, currently used all over the world. They are effective from the standpoint of maximum possible preservation in terms of the indicators for nutritional value. The indicators are storage of cooled fresh raw materials in adjustable or modified gas environment and a long-term storage in a frozen state.

The study dealt the first technology which employed active ventilation by the flow of refrigerant. Cooling of food products with subsequent storage at appropriate low temperatures is one of the best methods for preventing or slowing down product damage, ensuring the most complete storage of their original natural properties. Qualitative parameters for optimization of the investigated process included the mass fraction of gluten, moisture in raw materials, volume of air supplied, and the product processing temperature. On the base of a rootable, central-composite planning of a multifactorial experiment, a mathematical model for the data distribution was obtained.

This enabled to build a bar cart to illustrate the distribution of qualitative and power characteristics of the investigated process. The obtained mathematical models, which are presented in the form of a multiple regression of the second order, allowed to describe the process of grain products storage adequately.

As a result, we determined the optimal technological parameters for the equipment operation while studying the humidity of the processed materials, volumetric flow of air as well as the temperature of the working agent.

To describe the investigated process of grain products storage adequately, we designed the mathematical models which included a multiple regression of the second order and employed the results of the multivariate experiment. The application of the presented models allowed to obtain optimal technological parameters for the considered equipment. The moisture content in the processed material was 12.5 ... 14%; volume of air supply made up 5200 ... 5700 m<sup>3</sup> / hour and the temperature of the heat agent was 7 ... 11 0C. According to the presented results, we could claim that gluten content during long-term storage would be 24% for power consumption of 9.15 kW / t under stated technological regimes.

**Keywords:** grain, optimization, cooling, storage, process, parameters

