

43. Investigation of the drying agent flow, trajectory, product span distance in the drying chamber of the A1-ARCH complex, as well as drying time.

Valentyn Tufekchi, Yana Okopna
National University of Food Technologies, Kyiv, Ukraine

Introduction. The milk serum contains up to 50% of dry milk substances, which is 36% of its energy value, therefore the issue of its use in food for non-waste milk processing became especially relevant. One of the most effective ways to reduce serum losses and maximize the use of all its components is to organize its processing into long-stored concentrates - dry and condensed.

Materials and methods. The most widespread occurrence of dehydration of liquid products has been the way of their drying in a sprayed state, which is characterized by high intensity.

The lack of information on the aerodynamic interaction of streams in centrifugal spray drying chambers has determined the need to find out, first of all, the physical picture of their movement. The disadvantage of existing techniques is that it is impossible to determine the amount of air recirculation in the volume of the drying chamber, which exceeds the value of the primary streams several times and has a decisive influence on the movement of the drying agent and the disperse phase.

Results A simulation and a series of investigations of changes in velocity, temperature and direction of flow of heat transfer fluid inside the drying chamber have been carried out. It has been shown in experiments that under conditions of compression and asymmetry of the volumes of "above" and "under" the root of the spark spark, there always exists a gradient of static pressure directed towards a smaller volume, which causes the deviation of the spray torch from the horizontal position.

With the help of the Ansys software system, the gidrodynamic flows near the spray device, the time of drying of the particle size from 5 to 150 microns and the spray path of the spray product in the drying chamber were investigated.

Conclusions At the present stage, the largest distribution in the dairy industry has been the drying of dairy products by spraying method. The application of this method allows to increase the contact surface of the interacting phases and thereby significantly intensify the drying process.

The existing methods of research on the general aerodynamics of drying chambers with the top feed of the coolant and centrifugal spraying of the product have been studied and the most optimal method for the given conditions is chosen.

The Autodesk Inventor and ANSYS CFX software packages simulate and investigate hydrodynamic flows and determine the influence of constructive factors on the parameters of the drying equipment.

References

1. Khramtsov AG, Nesterenko P.G. The technology of milk whey products. -M.: Delie Print, 2004.
2. Optimization of Process Parameters for Spray Drying of Milk A.M. Telang & B.N. Thorat Nov. 2010