

INFLUENCE OF DIFFERENT TYPES STEAM TREATMENT APPLES ON THE HEAT EVAPORATION OF WATER AND ON DRYING PROCESS

Husarova Olena, Dmitrenko N.V., Shapar R.O.

Institute of Engineering Thermophysics of the National Academy of Sciences of Ukraine

tel. +38(044)424-47-31, email: o.v.husarova@nas.gov.ua

Work purpose were determine the effect of steam treatment and in the citric acid solution of apples on the heat evaporation of water and the kinetics of the drying process.

Results.

Investigation the specific heat evaporation of water from apples was carried out on the differential microcalorimeter of evaporation “ДМКИ-1” at heating temperatures 40, 50 and 60 °C.

Objects of research were Reinette Simirenko apples. The apples were raw, blended with steam, blanched in a solution of citric acid.

On the basis of the data on the change in the mass of the sample m and the differential heat flux q , the current values of the specific heat evaporation of water r during the drying of the samples were determined from the time the thermodynamic equilibrium was established inside the working chamber. For greater clarity, the values of the specific heat evaporation of water r were brought to the table rows obtained in the conditions of evaporation pure water from the free surface and presented as dependences of the dimensionless parameter r/r_{tab} on the absolute moisture of the samples.

The analysis of the obtained graphic material showed that the curves of the specific heat evaporation of water of unprocessed apples have different angles of inclination and diverge, indicating enzymatic activity in plant tissues. Unlike the curves of specific heat evaporation of water from blanched in citric acid, the apples that run parallel to each other, the curves of blanched with a pair of samples, practically coincided with each other, their tangent to the angle of inclination goes to zero. The samples have retained their natural colour. This indicates the cessation of processes of enzymatic and non-enzymatic darkening in apples treated with a pair of tissues.

The results of research carried out on a convective experimental stand to study the processes of heat and mass transfer during drying materials showed that the duration of dehydration blanched apples, compared to untreated, is reduced to 20 %. Such an acceleration of the drying process can be explained by an increase in the permeability of cell membranes under the action of vapor, which is why the mass transfer is intensified.

Conclusions.

Studies have shown that blending apples with steam not only reduces the duration of the drying process, but also provides high organoleptic characteristics of the raw material.