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MATHEMATICAL MODELLING OF HEAT-MASS TRANSFER OF FROZEN BERRIES IN THAWING PROCESS

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Berries are impossible to preserve in fresh conditions for long time, we turned to frozen storage of these berries. In avoidance of food value decrease appropriate thawing regime is of great importance. The thawing regime is defined by several thermo-physical parameters of production. However, thermo-physical parameters of berries are still poor described in a scientific literature.

There has been developed mathematical model for mathematical description of thawing layered berries. Theoretical model considers, the first stage of defrostation, that is warming of frozen products until the melting point. Defrostation is unstationary process and unstationary thermal conductivity equation in an infinite layer was taken as basis. Using least square method and experimental data coefficient of heat conductivity and temperature conductivity of both surfaces of frozen berries layer have been determined. These coefficients are necessary to predict regimes of thawing berries.

Temperature changes depending on time are measured in different depth of the layers. The method of thawing in air or liquid was investigated. The effect of radius of spherical products such as berries on thawing time was linear. The temperature of the products surface at the completion of thawing of the centre was proportional to the square root of the radius of the product.

The obtained parameters will be used for further theoretical researches in order to argument processes taking place in structure of berries during thawing.

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