

DIFFERENT SPEED OF DIFFUSION OF MOISTURE INCAPILLARIES OF GRAIN AS FACTOR OF VARIABLE ENERGY OF DRYING

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Keywords: porous bodies, resistance of moisture diffusion.

Energy charges of drying exceed more than twice a calculation needed. Additional losses of heat are explained by the presence of resistance of internal moisture diffusion of capillary - porous bodies.

These researches set dependence of capillary - porous bodies on drying rate. Drying rate was changed by the temperature of drying agent and rate of its flow.

The size of capillary - porous bodies was set by volume of eaten up by grains gases after stopping of drying process. The dynamics of resistance changes was set by balanced pressure in a capsule with grain. For coverage of "deficit" of gases in a capsule gases of environment were used. Gases of environment were given into a capsule with a measuring capacity.

Dependences of volume data of gases absorption by grains on intensity of drying and kinetics of their absorption have been obtained.

Actual volume of the gases absorbed in directly by grains was set taking into account the change of volumes of grains ($dV_g/\delta\tau$), gases between grain-growing space ($dV_{z,unn}/\delta\tau$) and over grain-growing space of capsule ($dV_{aie}/\delta\tau$).

On the basis of results of researches conducted dependences of capillary - porous bodies data and their dynamics on drying rate (1) and the temperature of drying have been set (2) :

$$\delta_z = -1,8 \cdot \left(\frac{\partial W}{\partial \tau}\right)^2 + 4,6 \cdot \left(\frac{\partial W}{\partial \tau}\right) + 38,7 \quad (1)$$

$$\delta_z = 52 \cdot \ln(t_1) + 13,6 \quad (2)$$

where V_z – volume of eaten up by pores grains gases, - 10^{-6} m³/1kg grain; δ_z – specific part of eaten up by pores grains gases to the general volume of withdrawn moisture %; Θ – temperature of grains, °C; t_1 – temperature of drying agent, °C.

Conclusions:

1. Capillary - porous bodies is directly linked with its drying rate ($dW/\delta\tau$).
2. Duration of reduction of capillary - porous bodies is in direct dependence on drying rate ($dW/\delta\tau$), sizes of grain and is about 2 - 8 minutes for wheat grain and 7 - 18 min for corn grain.