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DETERMINATION OF DYNAMIC PROPERTIES OF GRAIN LAYER IN MICROWAVE-CONVECTION EFFECTS

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Implementation of energy saving process postharvest processing of grain associated with the construction of automatic control systems for the effective operation of which requires knowledge of the behavior of the material being processed under the influence of factors used. The absence of these data leads to a waste of energy, and reduce the quality of the final product. In this case, drying is often one of the most energy intensive processes in the production of cereals. This study aimed at obtaining the dynamic properties of the grain mass during drying by electromagnetic waves.

In carrying out the work carried out experimental studies of dense stationary grain layer subjected to microwave-convective action. Installation options include: the size of the convective zone of microwave exposure, filled with grain 200 × 200 × 300 mm, the magnetron power Pc = 900W, the filtration rate of air through the grain layer V = 0,6 m / s. Experimental conditions: outdoor temperature (drying agent) T = 18 S, processed crop - wheat, grain moisture content of the material W = 12 ÷ 20% in increments of 2%; Ventilation is carried out continuously, the impact of microwave field was carried out in a pulsed mode (5 microwave is turned on, 10 off). The specific power of the electromagnetic field at a particular point dissipated is determined depending on the initial moisture content of the material being processed. As the response function of the selected temperature of the grain material, Θ. Dynamic characteristics were obtained with the partition of the total grain mass layers 5 layers with a thickness of 40 mm.

During the processing of the experimental results obtained by regression models, Process Models, transfer functions.

As a result of this work:

- Dynamic properties of the grain material vary in thickness from moving in the direction of ventilation at equal values of specific power of the electromagnetic field.
- Carrying identification grain layer as the control object provides a wide range of characteristics: transition, polynomial, frequency, etc.
- In carrying out the identification of the object, you want to monitor a qualitative assessment, which determines the simplest dependence, with sufficient accuracy describes the process under study.
- In most cases, the qualitative description (error less than 5%) of the cereal layer behavior in the description of the transfer function using ARX-model requires third degree equation.