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IMPROVEMENT OF ACCURACY OF MEASUREMENT OF GRAIN HUMIDITY

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Formulation of the problem, analysis of recent research and publications. Ukraine is one of the world's largest grain producers, but it does not have modern systems for monitoring and controlling grain drying processes, which meet the necessary requirements and provide the ability to monitor grain moisture in real time. The use of imported grain moisture meters is not available due to the high cost.

The aim of research is to show the results of experimental studies of the influence of moisture exchange processes in a container-condenser filled with wheat grain on the relative dielectric constant and tangent of dielectric loss angle of a sample of experimental material.

Basic research materials. The existing dielcometric moisture meters give an estimate of the humidity of the test sample from the value of the modulus of its complex relative dielectric constant

$$\left|\dot{\varepsilon}\right| = C'_{measured} / C_0,$$

where $C'_{measured}$ - capacity of the container with grain, which is measured by moisture meter; C_0 – capacity of the empty container.

However, the results of measurements ε depend on the relationship between the amount of free and bound moisture in the material under study. After the sample is filled into the container with a capacitor-type sensing element, in the volume of the grain mass and at the boundary of the wall of the container and grain, moisture exchange processes occur both in the direction of release and in direction of moisture binding.

Dielcometric method of humidity measurement has significant advantages in comparison with the conductometric method. Dielcometric method is widely used in measurements of grain moisture in agriculture.

Conclusion. To increase the accuracy of measuring the complex dielectric constant of grain crops, it is convenient to use the time dependence of the change of the relative dielectric constant and dielectric losses of the experimental grain sample as an additional informative parameter.