

ANALYSIS OF GRAIN'S DRYING IN ATMOSPHERIC DRYER

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Natural and climatic conditions of Ukraine stipulate the role of primary drying for storage of agricultural products. At the same time, most convective dryers have low thermal efficiency (12-60%).

One way of saving energy within thermal drying is the use of solar energy in the atmospheric dryer.

The purpose of research is definition of drying's time for grain in atmospheric drying plant in Ukrainian climates.

Materials and methods of research. The construction of atmospheric dryer was considered in detail in [3]. Therefore, it was suggested multiple use of this installation [5], and with the main material, which is dried, selected grain. Methods of calculating drying process in atmospheric dryer set forth in [4].

Results. The calculation process of drying layer of *wheat* is done.

Main property of layer are: density - $800 \text{ kg} / \text{m}^3$; the initial moisture content $U_0 = 0,25 \text{ kg. w.} / \text{kg d.m.}$; the final - $U_k = 0.176 \text{ kg.w.} / \text{kg d.m.}$ The conditions in July (time active harvesting wheat in our latitudes): temperatures 19.8°C and the speed of its movement $0.37 \dots 0.47 \text{ m} / \text{s}$.

When the thickness of the layer is $\delta_m = 0.1 \text{ m}$ drying time is **30.73 hours** or about **1.28 days**.

During the harvesting of *sunflower seeds* (in September) outdoor air parameters are: $t = 13.9^\circ\text{C}$, $W = 1.0 \text{ m} / \text{s}$.

Main property of layer are: density - $350 \text{ kg} / \text{m}^3$; the initial moisture content $U_0 = 0,176 \text{ kg. w.} / \text{kg d.m.}$; the final - $U_k = 0.136 \text{ kg.w.} / \text{kg d.m.}$

When the thickness of the layer is $\delta_m = 0.1 \text{ m}$ seed drying time is **8 hours**.

When the layer thickness reduced to 0.05 m , seed drying time decreases to **4 hours**.

Conclusions.

Since the use of solar drying is considered appropriate during the duration of 1 to 3 days, we can recommend the use of atmospheric dryers for drying wheat and oilseeds in Ukraine climates.