MATHEMATICAL MODELING AND ANALYSIS OF INFLUENCE OF BIOFUELS DRYING PROCESS INPUT PARAMETERS ON ENERGY EFFICIENCY AND PRODUCTIVITY OF AERODYNAMIC DRYER

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The most energy-intensive and complex stage of production of composite peat briquettes is drying of raw materials in aerodynamic direct-flow driers. The mathematical model for high-temperature drying of peat and plant biomass polyfractional mixtures in an aerodynamic dryer is proposed in [1], it includes equation of kinetics of drying of the individual components of the mixture and dynamics of their movement. The numerical analysis of the influence of the input parameters on the dryer work was carried out: the ratio of raw material to the drying agent (m, kg dry matter / kg dry air), the initial moisture content of the raw material (W_0, kg moisture / kg dry matter) and the coolant velocity (V, m / s) (Fig.).

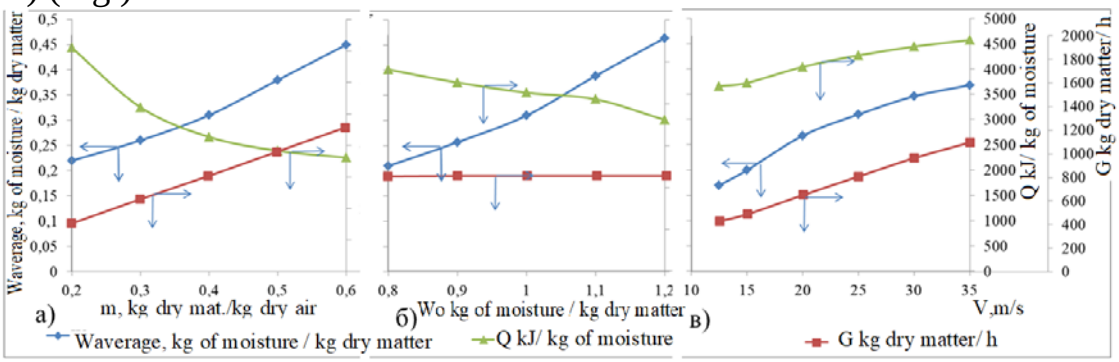

Fig. Dependence of productivity, energy consumption and final moisture content of biofuels from the initial parameters of drying.

In the calculations the input data corresponding to the production conditions of the peat briquettes production technology were adopted: moisture content of raw materials (peat and wood) 1.0 kg of moisture / kg dry matter, temperature of coolant T_0 = 800 °C, coolant velocity V_0 = 25 m / s, moisture content of coolant D_0 = 0.025 kg moisture / kg dry air, diameter of the dryer body D_{body} = 0.3 m, ratio of material to coolant m = 0.4 kg dry matter / kg dry air. The raw material for drying was formed from peat and wood pine biomass in the ratio of 60% to 40%.

Conclusions. The carried out numerical analysis showed that to ensure a final average moisture content within the limits of the conditional value is possible due to reducing the ratio *m*, and using the minimum coolant velocities for the stability of the hydrodynamic mode of the dryer.

References

1.Korinchuk D. N., Snezhkin Y. F. Simulation of the High-Temperature Drying of a Composite Mixture in an Air Drier for Production of a Biocombustible.

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