Production of Fuel Briquettes from Waste Biomass Organic Agriculture

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Abstract - The most energy-consuming process in technology produced by solid fuels is drying. At present, most enterprises use outdated and inefficient drying equipment, resulting in a high cost of fuel briquettes, and their manufacture and sale is a low-income business. Therefore, agricultural waste is used very limitedly and inefficiently.

Keywords – drying, briquettes, biomass, filtration drying, corn stalks.

Introduction

The biggest problem with the use of agricultural waste is the seasonal nature of their formation and initial humidity, which is much higher than it is necessary for the production of fuel briquettes. Of course this waste can be burned their natural moisture, however, with lower calorific value of the fuel is low, and the available moisture in the furnace gases adversely affect the solid fuel boilers, both in terms of their mechanical loading, and their intense corrosion in ultimately this type of fuel is ineffective, and in some cases economically disadvantageous. However, in order to prepare biomass for the production of fuel briquettes, it must be ground and dried to 6 to 12% humidity.

Presentation of the Main Material

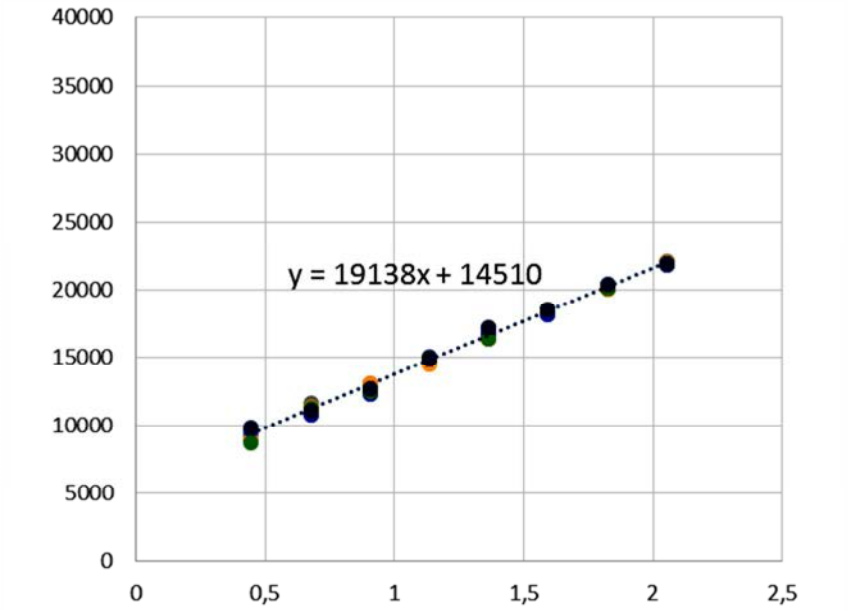
It is known that filtration drying [1,2] is one of the most intensive methods, and its application to drying agricultural waste will increase the competitive attractiveness of fuel briquettes production. The research is aimed at reducing the specific energy costs and environmental impact. One of the most effective drying methods is filtration drying. The subject of the study was filtration drying of crushed corn stalks. The advantages of this method are that the process takes place in a stationary layer, through which the thermal agent is filtered, and as a result, the presence of mechanical displacement of moisture, the maximum saturation of the thermal agent in the vapor, high coefficients of heat and mass return. For high-efficiency drying has been investigated and the optimum parameters such as temperature, heat flow agent, grain size and height of the layer of raw materials, since the change of each of which will change the drying time and the cost of thermal energy.

In the course of experimental studies, the hydrodynamics of the filtration of the thermal agent through a layer of crushed corn stalks was determined. To predict the loss of pressure in the stationary layer of crushed biomass, we used the modified binary Ergan equation, for which the unknown coefficients are A * and B *. To determine the coefficients A * and B *, the experimental results of pressure losses in a layer of ground corn were presented in the form of functional dependence $\frac{\Delta P \cdot e^2}{H \cdot u_0} = f(u_0)$ shown in Fig. 1.

Conclusion

The kinetics of filtration drying of crushed maize stems for the variable height of the layer, temperature and velocity of the thermal agent is experimentally investigated and it is recommended to realize the process at a temperature of 70 ° C at a flow rate of the thermal agent of 1.14 m / s, which provides high intensity of the process.

$$\frac{\Delta P \cdot e^2}{H \cdot u_0}, \frac{Pa \cdot s}{m^2}$$



$u_0, m/s$

Fig.1. On the graphic dependence of rice. 1 shows the experimental data that were approximated by a straight line, according to which the coefficient A * = 14510 and the coefficient B * = 19138 were determined.

References

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