Study of drying of solid peat residue and composite based on it

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Abstract - The transition from traditional energy sources to alternative ones is an urgent task. The purpose of the work is research on the creation and drying of a composite based on the solid residue of peat after extraction and nutritious residues of corn. The drying kinetics of the composite and solid peat residue were studied.

Keywords – peat, solid peat residue, nutritious corn residue, fuel, drying.

Introduction

The task of human development is to preserve the environment and rational use of raw resources. Hydrocarbon fuel and gas are limited and largely depleted raw materials, and their use pollutes the biosphere. The transition from traditional energy sources to alternative ones is one of the opportunities to renew the raw material base and preserve the ecological situation in the world. Sources of alternative fuel include peat, biomass, slag and waste from industry, agriculture, utilities and other enterprises.

An important source of humic substances is peat. Basically, peat is used for fuel and local fertilizers. If humic substances are removed from it, and the rest is burned, then this unique natural resource can be used more rationally. The main method of obtaining humic substances is an alkaline reaction with ammonia solutions or potassium and sodium hydroxides. Such processing turns them into water-soluble salts - potassium or sodium humates with high biological activity [1].

The purpose of the work is research on the creation and drying of a composite based on the solid residue of peat after extraction and nutritious residues of corn.

Discussion of results

Milled peat from the Chernihiv region with an ash content of 13.18% and corn stalks from the Vinnytsia region with an ash content of 9.8% were used for the research. According to the developed technology for extracting humic and humic substances, which consists in the preparation of a sample of peat, humic acids are extracted from a sample with the appropriate concentration of KOH or NaOH alkali, the solid residue of peat after extraction and humic substances are obtained [2].

A composite was created on the solid residue of peat and nutritious corn residue, it has an ash content of 10%, as well as volatile substances of 27% with a moisture content of 44.3%.

The created two-component mixture was dried on a convective drying stand with an automatic system for collecting experimental data and their processing [3].

Fig. 1 presents a comparison of the change in moisture content and drying temperature of the composite and solid peat residue after extraction. The material was on a pallet with a layer thickness of 10 mm. As can be seen from fig. 1 drying of the composition based on solid peat residues and nutritious corn residues intensifies the process, and the drying time is 2.5 times shorter and is 32 minutes, while the temperature rises to 43°C and the humidity decreases to 10%. Drying of the solid

residue of peat, as can be seen from the curves, when the same humidity is reached within 80 minutes, and the material is heated to 48°C.

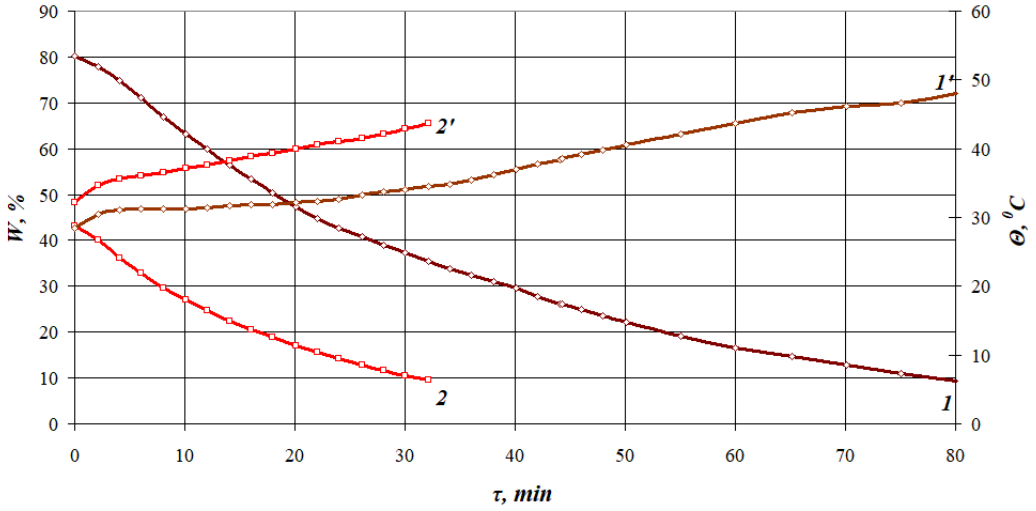

Fig. 1. Change in moisture (1, 2) and temperature in the middle of the layer (1′, 2′) of the composite and solid peat residue over time. Mode parameters: V = 3 m/s, t = 70°C, h=10 mm, particle size ≥ 0.5 mm: 1, 1′ - solid peat residue; 2, 2′ - a composite based on solid peat residue and nutritious corn residues.

During the drying period, the heating temperature of the composite and solid peat residue does not reach the temperature of the heat carrier, and is within 45-50°C.

Conclusion

The creation of the composite makes it possible to intensify the drying process by 2.5 times compared to the solid residue of peat after extraction.

References

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