

PROCESSING OF SHELLS OF PLUM SEEDS-FOOD WASTE INTO ACTIVE COALS

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Abstract

The Republic of the Union of Myanmar is a country with a predominant agricultural economy. Growing, harvesting and processing of cultivated crops is accompanied by the formation of large-scale waste, most of which do not find effective use, causing an ensemble of economic and environmental problems and requiring in this regard to find ways to use them rationally in the interests of the national economy.

In addition, the activities of numerous enterprises implemented in the country are associated with discharges and emissions that do not have proper treatment, most often provided by the use of active coals, due to the high cost of such adsorbents on the world market and the practical absence of their own production facilities. Along with this, one of the fruit crops that are widely grown in the country is plum. When canning, preparing various beverages and a number of other food products using plum fruits, significant masses (more than 5000 t/year) of practically non - recyclable waste are formed in the form of seeds of these fruits, and available literature sources indicate the possibility of processing such waste to obtain, in particular, sufficiently high-quality adsorbents-active coals. Thus, the above circumstances determine the relevance and expediency of organizing and performing an assessment of the effectiveness of using these national wastes as raw materials for producing active coals.

The degree of elaboration of the research topic: Information about the possibility of obtaining very high quality active coals on the basis of stone raw materials like the one mentioned above and a number of other types of compacted plant materials and, in particular, industrial waste, is widely covered in the analyzed sources of scientific and technical information. They indicate the use of various methods of thermal processing of these materials for this purpose. At the same time, the author has not found any publications on the expediency and efficiency of using these wastes of food production in Myanmar to produce active coals in the available literature, which indicates the need to organize and carry out research in this direction in the light of the above-mentioned circumstances. Moreover, the most rational approach for the country is to use a fairly simple and therefore affordable technology for pyrolysis (thermolysis) of these wastes and activation of its carbonized products with water vapor.

The present research work main goal: Establishing the rationality of using Myanmar's large-capacity waste in the form of plum seed shells as raw materials for producing active coals with the development of the basics of their technology and, thus, identifying the feasibility of involving practically non-efficient waste in material production with the production of adsorbents that are scarce in the country to solve the problems of cleaning and neutralization of industrial emissions and discharges of national enterprises.

Scientific novelty:

In this paper for the first time in relation to waste from food production in Myanmar in the form of shell plum seeds:

1. By thermographic analysis in the protective and oxidizing atmospheres of these wastes and the carbonized product obtained by pyrolysis the boundaries of the appropriate temperature effect on them during pyrolysis and activation by water vapor are justified;
2. By varying the values of the control parameters of the operations of pyrolysis of raw materials and activation of the resulting carbonizate with water vapor using experimental

installations of laboratory level, the regularities of their influence on the yield, porous structure and absorption capacity of the target products are established, which justify the rational conditions for the implementation of these stages;;

3. The kinetic and equilibrium dependences and features of the processes of purification of water solutions and air from pollutants obtained by active carbons are determined; the conditions for regeneration of saturated sinks and the possibility of cyclical use of these adsorbents are justified; their increased efficiency is revealed when extracting low-concentration phenol from water;

The practical significance of this research work

1. The basic possibility and expediency of their use for the production of active coals are substantiated and the basics of their production technology are developed by pyrolysis of raw materials and activation of the resulting carbonizate with water vapor;

2. The indicators of yield, composition and technical characteristics of the target and by-products of the key stages of this technology were evaluated, their material balances were reduced, and possible directions for the use and neutralization of by-products were discussed;

3. Using the method of low-temperature nitrogen adsorption-desorption, the parameters of the porous structure of the target products of both stages were determined and the nature of its evolution during the transition from carbonizate to active carbon was established;

4. An ensemble of comparative applied studies of commercial active coals based on wood raw materials and obtained sinks revealed the features and proved the effectiveness of the latter in cleaning and neutralization of a number of media, including industrial emissions and discharges;

5. The irrationality of using the chemical activation method for processing the characterized raw materials into carbon adsorbents is revealed;

6. Calculations of the approximate feasibility study of the developed technology, the technical originality of which is confirmed by a patent of the Russian Federation, were performed.