

UTILIZATION OF AGRICULTURAL WASTE AS AN ALTERNATIVE TO PETROLEUM AND COKE-CHEMICAL RAW MATERIALS FOR THE PRODUCTION OF AUTOMOTIVE GASOLINES

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The article examines the possibilities of utilizing agricultural waste as an alternative to petroleum and coke-chemical feedstocks for the production of automotive gasoline components in Ukraine. The resource potential of biomass is analyzed, particularly cereal straw, maize residues, husks, and other lignocellulosic wastes, which can be effectively used as a source of hydrocarbons for producing motor fuels, including automotive gasoline. It is established that the key stage is feedstock preparation, which includes sorting, cleaning, grinding, drying, and pelletizing, ensuring homogeneity and enhancing the efficiency of subsequent processes. Special attention is paid to biomass activation methods, particularly steam treatment, which promotes the breakdown of the lignocellulosic structure and increases the accessibility of polysaccharides for hydrolysis.

Two main pathways for biomass processing are considered. The first combines gasification, Fischer–Tropsch synthesis, and catalytic modification, while the second involves hydrolysis and fermentation. The first pathway allows the conversion of biomass into alkylates (RON: 92–98; MON: 84–89), isomerates (RON: 82–92; MON: 80–82), catalyates (RON: 90–98; MON: 82–85), and reformates (RON: 95–100; MON: 85–88). The second pathway enables the production of alcohols, such as ethanol (RON = 108–109; MON = 88–90) and butanol (RON = 94–96; MON = 78–82), with high yields (ethanol: 85–95 %; butanol: 60–65 %). The technological features of separating and purifying fermentation products are presented. It is shown that the obtained alcohols can be used either as direct gasoline components or as feedstock for further hydrocarbon synthesis.

The necessity of purification and finishing stages, including drying, hydrodesulfurization, and adsorption-based cleaning, is justified, ensuring compliance with modern environmental and operational requirements for automotive gasoline. It is concluded that an integrated combination of biomass preparation, activation, and processing allows the creation of an efficient technology for producing automotive gasoline components from renewable feedstocks, representing a promising direction for enhancing Ukraine's energy independence and environmental security.

Keywords: agricultural waste; biomass; petroleum and coke-chemical feedstocks; automotive gasoline; gasification; synthesis; catalytic modification; hydrolysis; fermentation; ethanol; butanol.

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