

EFFICIENCY OF CYCLIC RECTIFICATION FOR ETHANOL PRODUCTION

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Abstract:

The efficiency of the ethyl alcohol rectification process depends on the degree of purification of the final product from organic impurities and the heating vapour flow rate in the distillation unit. Studies of the efficiency of the technology of cyclic rectification of ethyl alcohol, providing for the implementation of controlled cycles of liquid delay on the column plates and its overflow without interruption of heating vapour supply have been carried out. The design of the rectification column for its realization is developed. Hydrodynamic modes of operation of sieve and flake plates in cyclic mode are established: vapour velocity in the free section of the column and plate openings for mass exchange between liquid and vapour and liquid preflow. The research results obtained in production conditions proved the advantages and feasibility of using the innovative technology: in the process of separation of alcohol-containing fractions in full measure head impurities of alcohol are allocated, the degree of extraction of the higher alcohols of sivush oil increases by 38%, methanol – by 15,6%, the multiplicity of concentration of head impurities increases by 25%, higher alcohols – by 40%, methanol – by 34%, acrolein – by 36%, isopropyl alcohol – by 42%. At the same time vapour consumption in the impurity concentration column is reduced by 40% in comparison with typical units operating in the stationary mode and does not exceed 12 kg/dal of absolute alcohol (a.a.) introduced with feed.

Increasing the contact time of vapor and liquid on each plate up to 30–40 s allows increasing the degree of purification of rectified alcohol from volatile impurities and reducing energy costs by at least 40%.

Key words: *alcohol, column, distillation, energy, extraction, impurity*