EXTRACTION OF ETHYL ACETATE FROM SECONDARY RAW MATERIALS OF THE ALCOHOL INDUSTRY

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An important task facing the Republic of Uzbekistan is mobilizing secondary resources and fully reusing them. This issue should be considered a component of environmental protection, since it will be waste and will contaminate the biosphere.

For Uzbek scientists and engineering experts, the development of environmentally friendly technologies in waste-free chemical industries, recovery into new production processes, and processing of industrial waste continue to be critical problems.

Ethyl ether of acetic acid is used as a raw material in organic synthesis and is used as a solvent in various industries. Ethylacetate nitrocellulose, acetyl cellulose, tar oil varnishes, waxes, oils, and a mixture of alcohol are used in the production of artificial skin.

Ethylacetate is one of the important solvents. It is used in natural rubber, varnishes, paints, and synthetic fibers, as a solvent, as well as a plasticizer.

Etherification can be done in the liquid or vapor phase. In the liquid phase, the bottom of the process is carried out in a column with a plate heated by hot steam. An etherification mixture and sulfuric acid are introduced into the column. In steam-based etherification, a mixture of acid and alcohol (in excess amounts) is transferred over a solid catalyst (ThO_2, TiO_2, and others) at 28-300 ^oC. Lower carbonic acid esters reach 95% of the total in both phases.

Optimal conditions for an etherification reaction: consists of the excess of a component and the rapid extraction of the resulting product in the presence of acid or alkali from the reacting zone.

Research objects-etheroaldehyde fraction (EAF) - biochemical industrial waste, ice-cold acetic and sulfuric acids.

EAF is a colorless liquid with a specific odor. EAF includes methyl and ethyl alcohols, aldehydes, esters, and other mixtures, with an 80-95% ethanol content.

For the purpose of conducting research on the treatment of EAFs of alcohol enterprises (obtaining ethyl acetate in the etherification of acetic acid), the amount of EAF in the composition of samples of waste products of "Kokonspirt" JSC, Andijan "Biokimyo" JSC, Yangi yul "Biokimyo" JSC plants was determined in laboratory conditions.

The amount of the main substance is 90-95%. Methanol, aldehydes, and ketones – are volatile compounds; water, acids, and civet oils are difficult volatile compounds.

In order to study the influence of the number of catalysts on the yield of ethyl acetate, the mass of added sulfuric acid was increased from 0.25 to 2.0% compared to the mass of acetic acid.

It was found that when the mass of sulfuric acid is increased to 1.75%, the yield of ethyl acetate reaches the maximum value.

A further increase in the amount of catalyst does not affect the yield of ethyl acetate. Based on this, the amount of sulfuric acid was equal to 1.75% of the mass of acetic acid in subsequent experiments.

In order to determine the optimal technological parameters of ethyl acetate synthesis, the process temperature and the molar ratio of the initial components were studied. Catalyst-sulfuric acid was always added at 1.75% by mass of acetic acid. The molar ratio of purified EAF to acetic acid is 1.1:1.

The table shows the effect of temperature on the composition of the catalyst.

Effect of temperature on the composition of the catalyst

№	Temperature, °C	Catalyst composition, volume %		
		Ethyl acetate	Ethanol	water
1	68,4	74,0	16,0	10,0
2	71,2	93,4	6,0	0,6
3	75,4	86,0	11,0	3,0
4	80,0	72,0	21,0	7,0
5	85,0	65,0	24,0	11,0

It can be seen from the table that the composition of the tertiary component changes as the catalyst-driving temperature increases. The lower the driving temperature, the lower the amount of ethanol and water in the catalyst. The highest ethyl acetate yield of 93.4% was observed at a driving temperature of 71.2 ºC. In this case, the amount of ethanol and water in the catalyst is 6% and 0.6%. A temperature of 70º-80 ºC was chosen.

The molar ratio of EAF to acetic acid was varied from 2:1 to 1:1.1. At a catalyst concentration of 1.75% by mass of acetic acid and a driving temperature of 70 ºC, the yield of ethyl acetate depends on the EAF: acetic acid mass ratio and passes through a maximum. It was found that when the molar ratio of EAF: acetic acid is large, it contains 50% ethyl alcohol, which is difficult to separate and increases the cost of the final product. When the EAF: acetic acid ratio is 1:1, a lot of acetic acids is left over in the vaporizer. The optimal value of the EAF: acetic acid ratio is 1.2:1.0 and the temperature is 70-75 ºC. The obtained ethyl alcohol is 92% higher than the theoretical.

Ethyl acetate removed from the catalyst was isolated by washing with water, drying with calcium chloride, and rectification. The obtained ethyl acetate purity is 99-99.5%.

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