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Obtaining Pacs from Cellulose of Sunflower Plants, Saflor and From Waste of The Textile Industry

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Abstract; At the end of the cellulose synthesis, sedimentary NaOH contains lignin, which contains various functional groups such as phenol, benzene, hydroxide, carbonyl, and functional groups that absorb heat. These functional groups in the composition of lignin have been used as an inhibitor in the preparation of the PAC ether, and positive results have been obtained.

Keywords; Cellulose, Na-CMC, product, PAC, polyanionic cellulose, obtaining

Introduction

Currently, the country is implementing a number of measures for the development of the chemical industry, as well as the development of new technologies and its replacement based on existing technologies. There are several enterprises for the production of cellulose and its ethers in the Republic of Uzbekistan. Cellulose ethers have now acquired great practical importance [2]. The advantages of cellulose ethers include: resistance to chemical reagents, water resistance, frost resistance, light resistance, low flammability, the ability to dissolve in common organic solvents, good film-forming and thermoplastic properties, etc. Some cellulose ethers with a certain degree of substitution can dissolve not only in organic solvents, but also in dilute aqueous solutions of alkalis and even in cold water, which is of great importance for their practical application.

The most widespread in industry are found: ethyl- carboxymethyl- methyl- and hydroxyethyl cellulose. Cellulose ethers are produced by alkylation reactions. The original cellulose is pre-activated by mercerization [2].

The process is carried out at elevated temperatures under pressure. The alkylation reaction is irreversible. The degree of substitution (DS) of the cellulose ether will depend on the excess reagent, the amount of alkali, and the reaction conditions. The processing of cellulose fibers with concentrated alkali solutions is one of the oldest industrial processes. Currently, treatment with aqueous solutions of sodium hydroxide is used in the textile industry, in the refinement of cellulose for chemical processing in the cellulose production, as well as as an intermediate stage of cellulose activation in the production of viscose fibers and films and in the production of cellulose ethers.

Cellulose treated with alkali is called alkaline cellulose (alkaline cellulose). Cellulose after washing the alkali with water is called mercerized cellulose. "Obtaining ethers from cellulose suitable for chemical processing obtained from annual plants and fibrous waste of textile enterprises (TKTCH) describes the development of a technology for obtaining ethers of Na-CMC, PAC from cellulose obtained from stems of sunflower, safflower, as well as fibrous waste of textile enterprises, research and analysis of the peculiarities of anionization of natural polymer during the process, identification of physicochemical regularities of chemical processes at the main stages of obtaining polyanionic cellulose from cellulose obtained from the stems of annual plants, research and analysis of the characteristics of experimental anions obtained on their basis [2].

Based on the experiments and studies carried out, it was scientifically substantiated for the first time that the technological modes of the main stages of PAC are not inferior in quality anionization to cellulose based on sunflower, safflower, TKTCH. Polyanionic cellulose is produced by several countries with a developed chemical industry.

Among them are such Russian companies as NORDEN, Cellulose Ethers, its distribution companies Ashland Specialties Ingredients, Momentive, Pinova Ine, MAS ALBION, the Turkish company BAERAKLER manufactures the brand PAC-LV TECH 2A -100 BY in unmatched quality. Until now, cotton or wood pulp was used as raw material for the production of PAC. In accordance with the task set,

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sunflower was used to obtain PAC, some of the requirements of which meet GOST 3818.0-72. The process of obtaining PAC includes several stages of processes, such as; merging cellulose in a known concentration of NaOH. The recovered alkaline cellulose undergoes an esterification reaction by the action of sodium monochloroacetate - CH_3COON and is sent to the ripening process. At the end of the ripening process, carried out as a result of an exothermic reaction, the finished product is dried in special drying chambers and passed through crushers - mills and packed with different weights and sent to the warehouse, to the storeroom [3].

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At the end of the cellulose synthesis, sedimentary NaOH contains lignin, which contains various functional groups such as phenol, benzene, hydroxide, carbonyl, and functional groups that absorb heat. These functional groups in the composition of lignin have been used as an inhibitor in the preparation of the PAC ether, and positive results have been obtained. As a result of the dissertation research, wastewater disposal measures were considered separately. Below is a comparison table of the results. Comparison of physicochemical parameters of PAC samples obtained on the basis of experiments and TSh-39.3-268: 2010.

Table 1.1.

№	Indicators	Safflower PAC	Sunflower PAC	* Cotton PAC
1	Degree of polymerization and (PD)	870	680	1050
2	Exchange rate for carboxymethyl groups (AD)	0,99	0,101	115
3	The amount of the main substance,%	61	57	64
4	Viscosity of a 2% aqueous solution of CMC, cP	128	119	148
5	Water solubility,%	98,8	98,9	99,2
6	pH of the medium	10,8	10,9	11,2

* Cotton PAC-PAC obtained on the basis of cotton cellulose

From table 1.1. it can be seen that the quality indicators of PAC obtained from local raw materials meet the requirements set out in the regulatory documents. Here is the sequential addition of lignin at different consumption rates, i.e. from 0.5 to 3.0%, when obtaining a simple ether PAC from three cellulose objects. That the heat released during the merging process as a result of strong concentration, as well as mechanical processing of the fiber or as a result of an exothermic reaction during the esterification process, as well as ripening, a heat source leading to destructive consequences absorbs several functional groups of the lignin structure, and thereby significantly reduces the destruction of the elementary link in macromolecule of a natural polymer.

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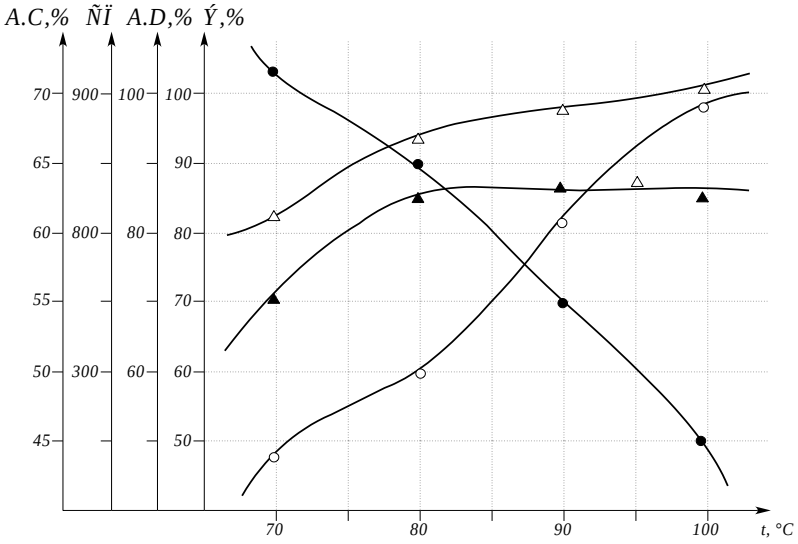

SP - degree of polymerization
○ - O.V,% -basic substance,
▲ - C3,% - degree of substitution,
∆- Er,% - solubility,

Rice. 3.1. Influence of the temperature of the ripening process on the quality indicators of sodium carboxymethyl cellulose obtained on the basis of cellulose of a sunflower plant

During the synthesis of sodium carboxymethylcellulose, various factors have a negative and positive effect on its quality indicators. One of them is the ripening process at the final stage of the ether synthesis period [3].

Usually, the process of maturation of alkaline cellulose with the help of MHA (sodium monochloroacetate) takes place in the phase towards the esterification process. When the temperature of the ripening process rises above 50C, chemical destructive processes occur. In view of the above, it is required to determine the temperature in the optimal ripening process [133]. At the same time, the temperature of 80C was chosen as the optimal parameter of the maturation process as a result of the exothermic reaction. In this case, the volume of the basic substance formed by sodium carboxymethylcellulose is 60%, the exchange rate is 86%, the degree of polymerization is 800, and the solubility is 99.2%.

While the ethylation process reached 90-100C, the amount and solubility of the basic substance sodium carboxymethylcellulose and the exchange rate were positive, and the degree of polymerization dropped sharply, which led to an increase in temperature, which led to the cleavage of elementary units in the ether macromolecule. These indicators are the basis for determining the temperature of 80C as the optimal temperature parameter for the ripening process.

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