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Innovative Technology Of Obtaining Cellulose From Local Raw Materials And Thereof Na-Kmts, Pats, As Well As High Purity N-Kmts For The Medicine, Perfumery And Food Industry As A Substitute For Imports Directed For Export

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Abstract

The need for cellulose and its simple and complex esters, as well as paper and paper products, as well as composite materials based on them, is increasing day by day. In order to eliminate this gap, the need to create innovative technologies and speed up the production system several times over before remains one of the urgent problems of today.

Keywords: α-cellulose, industrial enterprises, Alkaline, hypochlorite (NaOCl).

Introduction

The production of cellulose products in the world increased by 10% and the demand for it increased by 11%. At the same time, the demand for composite polymer materials based on cellulose and paper and paper products increased by 7%, and their export increased by 16.3%. In particular, the export of writing and toilet paper increased from 11,720,000 tons to 32,260,000 tons. The USA, Brazil, Japan, Finland, and Russia are the major producing countries.
In order to expand the reserves of cellulose and its esters, in addition to cotton lint, there are various types of fibrous waste from cotton ginning plants and fibrous waste from industrial enterprises. The main factors are the high molecular mass of the cellulose produced during their chemical processing and the high quality indicators of the composite polymer materials obtained on its basis. Processes aimed at eliminating the influence of various factors on its destructive states during the extraction of cellulose, the study of the influence of several parameters affecting them is considered the main basis of the research.

Reprocessing the fiber waste of the cotton ginning industry (lint, lint, lint, cyclone fluff and other waste) into high-quality cotton cellulose of various brands, which is a raw material of the chemical, light and textile industries, to increase the production efficiency of the cotton industry enterprises and to improve its impact on the environment in a positive way. The creation of innovative technology of improvement is considered one of the important tasks that must be solved. In the process of extracting cellulose from fibrous waste, it is distinguished by its high advantage over existing technologies, and by the fact that it does not differ from the physico-chemical and mechanical properties of sulfated, sulfide, bisulfide celluloses obtained from deciduous and coniferous trees.

On the basis of the research - the synthesis of the cellulose products obtained on the basis of the waste of cotton ginning enterprises into assortments according to different sectors is envisaged. The technology created on the basis of the project is distinguished by its simplicity and high precision control of its modes according to the required quality indicators, that is, by changing the concentration, time, temperature, it is possible to obtain cellulose brands suitable for chemical processing with the desired productivity, degree of polymerization and α-cellulose.

When obtaining cellulose and its products suitable for chemical processing on the basis of fiber waste, it is necessary to determine the modes of chemical processing. Because during the synthesis of cellulose from fibrous waste, it is required to use methods that do not affect its quality indicators and do not harm the environment.

Currently, cellulose is mainly obtained from cotton lint in the Republic. However, the vastness of the field of use of cotton lint, as well as its high cost, lead to an increase in the cost of cellulose and its products. Currently, only 10-12% of the production of cellulose, cellulose esters and paper products in the Republic meets the demand. In order for enterprises to work at full capacity, these raw materials are imported from countries with a developed pulp industry for a large amount of foreign currency. However, in addition to cotton lint, there are other types of annual and perennial plants, fiber wastes of various industrial enterprises, and the possibility of ensuring the operation of enterprises at full capacity.

Taking into account the above, the possibility of obtaining cellulose suitable for chemical processing based on the fibrous waste of industrial enterprises was studied.

According to the statistics of 01.07.2016, there are more than 420 state-registered textile enterprises in the Republic. 98 of them are located in Tashkent, 42 of them produce their products in textile, 83 in sewing-knitting and 6 in silk-textile industries.

Currently, in countries with developed cellulose industry, various researches are being conducted to reduce the participation of factors that cause various destructive conditions in the process of extracting cellulose from various plants containing natural polymers. Because the quality indicators of the obtained cellulose are required to be at a level that will allow it to be widely used in the future. Taking into account the above points, some simplifications have been made in the process of extracting cellulose from fibrous wastes of industrial enterprises containing cellulose. Fibrous waste was first separated into fractions and step-by-step mechanical crushing and chemical treatment were carried out in a boiler equipped with a special defibrator.

The table below shows the effect of alkaline digestion time on the pulping process.

Table -1 The influence of the time of alkaline digestion of fibrous waste on the quality index of cellulose (digestion rate 1000 m/min)

№	NaOH, g/l	I- stage		II- stage		Quality indicators of cellulose				
		crushing t, minutes	crushing, t^0C	Boiling t, minutes	Boiling t^0C	cellulose yield, %	humidity, %	ash content, %	α – cellulose, %	DP
1	20	10	98-100	60	98-100	-	-	-	-	-
2	20	20	98-100	60	98-100	-	-	-	-	-
3	**20**	**30**	**98-100**	**60**	**98-100**	**96.4**	**3.6**	**-**	**96.4**	**1200**
4	20	40	98-100	60	98-100	91.6	3.5	-	97.6	1050
5	20	50	98-100	60	98-100	87.1	3.6	-	98.4	890

It can be observed in the table that the alkaline digestion process from the first stage causes the reduction of various parameters in the next chemical treatment stage.

The first-stage fiber raw material sample was carried out at high speed with the presence of a fixed alkali concentration and a specific temperature for different grinding times. The presence of temperature and alkali in the stage allows chemical hydrolysis of fibers, i.e. delignification occurs, and high-speed grinding allows mechanical hydrolysis, i.e. separation of the natural semi-fibers in the fibers.

In parallel with the first stage, the parameters of the second stage are also given, and both stages are carried out sequentially in one system. In this case, the following parameters can be mentioned as the optimal conditions of the first stage in obtaining cellulose based on fiber, that is, the process of dissolving 98-1000C in 20 g/l alkali solution for 30 minutes.

In order to fulfill our task, we first collected information about the fibrous waste of several textile enterprises and their composition. In particular, the production productivity of "SAFF TEXTIL" LLC, "SOBIR TEXTIL" LLC enterprises and the amount of their fiber waste were studied. Fiber waste of these enterprises in one year is more than 1500 tons in total.

Initially, fiber waste of textile enterprises (TTCh) was divided into two brands, that is, A-1 brand is dyed in various dyes, V-1 brand is undyed fiber waste. Below, the process of obtaining cellulose by chemical processing of V-1 brand fiber waste was studied. Table 2 shows the effect of alkaline boiling time on the quality parameters of pulp based on V-1 fibrous waste.

Alkaline boiling process was carried out at different time intervals and NaOH concentrations, and alkaline boiling in 0.5 g/l NaOH solution for 10 minutes was chosen as the most optimal condition. The quality parameters of the cellulose formed at other time intervals, except for 10 minutes, did not change much. The difference in other different alkali concentrations is almost non-existent. Because in alkaline boiling, it was not observed that the temperature above the parameters that cause destructive conditions is exceeded. In it, the yield of cellulose is 91.6%, α-cellulose is 98.2%, and the degree of polymerization is 830, and the bending strength is 145 g.

Table – 2 The effect of alkaline boiling time on the quality parameters of TTCh-based cellulose

NaOH g/l	Boiling time, t, minutes	Cellulose yield, %	α - cellulose, %	Degree of polymerization, DP	Bendability, g
0,5	5	93,8	96,0	850	121
0,5	10	91,6	98,2	830	145
0,5	15	91,5	98,5	810	145
0,5	20	91,4	98,6	810	146
0,5	25	91,2	98,8	800	147
0,5	30	91,2	98,8	800	147

Cellulose is the most abundant natural polymer in nature. It is the main part of all plant cells. 40-60% of trees and plants consist of cellulose. And cotton, jute, and hemp fibers are mostly cellulose. In addition to cellulose, they contain 7-10% of other substances. In industry, cellulose is mainly obtained from several types of trees and is called wood cellulose.

Cotton lint contains up to 96 percent cellulose. To obtain cellulose from lint, a 1.5 percent solution of NaON is boiled for 3-6 hours under a pressure of 0.3-1 MPa. The resulting cellulose is bleached with hypochlorite solution or hydrogen N_20_2. Purity level of cellulose obtained as a result of this process is 98-99 percent. For quality paper products and for chemical processing purposes, the purity of pulp should not be less than 94 percent. The physical, chemical, mechanical and similar properties of cellulose, its degree of polymerization, depend on the arrangement of macromolecules and elementary rings in macromolecules relative to each other. The amount of industrial production of cellulose, as well as its application in various fields, is several times higher than the indicators of all synthetic polymers. Hydroxyl groups of cellulose undergo all the chemical reactions characteristic of ordinary lower molecular alcohols.

Below are the effects of NaOH concentration, hydrotreater treatment time, and hydrotreater water treatment time on the quality parameters of TTCh-based cellulose. From the first task of the research work, it is known that the process of mechanical shredding had a positive effect on the process of delignification of cellulose. Taking into account the above points, in the next work, a hydro-extractor was used in the process of extracting cellulose on the basis of TTCh. In the process, TTCh was treated with the help of a hydrotreater at a fixed temperature in several time intervals at the previously selected optimal alkali concentration. The obtained results are presented in Table 1 below.

As can be seen from table 3, when cellulose is treated with NaOH concentration, the yield of cellulose is 91.6%, α-cellulose is 98.1%, the degree of polymerization is 850, and when the treatment time in the hydrotreater is changed, the yield of cellulose is 91.7%, α-cellulose is 98.0 %, the degree of polymerization is 860, the yield of cellulose when treated with water in a hydrotreater is 91.8%, α-cellulose is 98.3%, the degree of polymerization is 860, and its flexibility is 144 g.

Table – 3 Effect of processing on the quality indicators of cellulose based on TTCh (M: 1-15, 1000 m/min, 70-80°C)

NaOH g/l	Hydrator processing time, t, minutes	Cellulose product, %	α-cellulose, %	Degree of polymerization, DP	Bendability, g
NaOH concentration					
0,5	10	91,7	98,0	860	144
1,0	10	91,6	98,1	850	144
1,5	10	91,5	98,3	850	145
2,0	10	91,4	98,4	830	147
2,5	10	91,3	98,6	830	147
3,0	10	91,3	98,6	830	148
Processing time in the hydrator					
0,5	5	91,4	98,0	860	140
0,5	10	91,6	98,1	850	144
0,5	15	91,5	98,3	840	144
0,5	20	91,3	98,5	830	145
0,5	25	91,2	98,6	830	145
0,5	30	91,2	98,6	830	145
Water treatment time in the hydrator					
+	5	94,8	95,1	870	127
+	10	93,2	96,2	860	132
+	15	91,9	98,0	850	144
+	20	91,8	98,3	840	145
+	25	91,7	98,4	840	147
+	30	91,7	98,4	840	147

It can be observed from Table 3 that regardless of the concentration of alkali and the time of digestion in the hydrotreater, the quality indicators of the resulting cellulose remain unchanged. This is due to the fact that various reagents used for mechanical processing of the fiber, i.e. finishing, did not form a complex on the surface of the fiber. This ensures that the reagents pass into the alkali solution during the treatment process at 70-80°C in a hydro-heater (1000 revolutions per minute).
In order to extract cellulose from various fillers and reagents on the basis of TTCh, it is enough to expose the cellulose to the required temperature in a certain period of time.

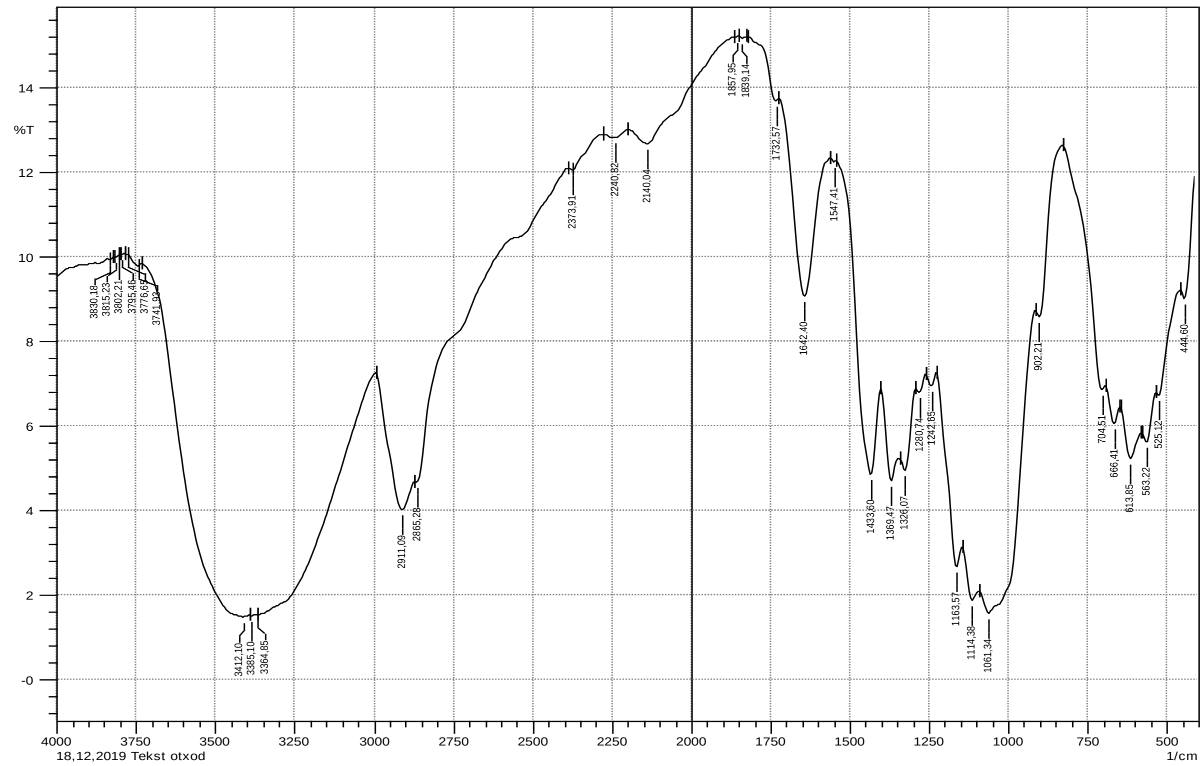
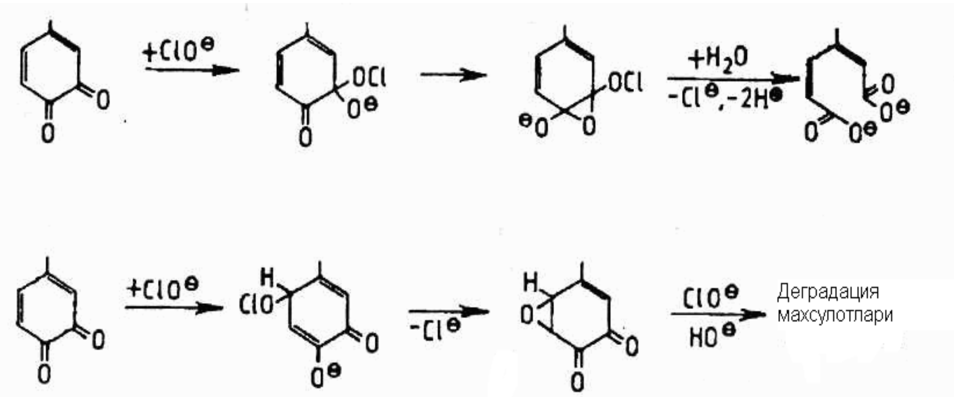


Fig – 1. IR-spectrum of natural fiber wastes of textile enterprises

The spectra have the following bands, i.e., 3750, 3500, 3250, 3000...1250, 750, 500 cm^{-1}. It can be seen from these sheets that all the structural structure of cellulose and its characteristics of tendency to amorphous and crystalline layers are almost no different from natural fibers synthesized on the basis of cotton or cellulose-containing plants - cellulose.
At the end of the period of synthesis of cellulose from fiber waste of textile enterprises, it should be said that as a result of the research, for the first time, cellulose suitable for chemical processing was obtained on the basis of fiber waste of textile enterprises.
The bleaching process changes several of the optical properties of cellulose. At this stage of the work, the bleaching of cellulose obtained in sodium hypochlorite and hydrogen peroxide and the effect of bleaching reagents on some quality indicators of cellulose were studied.
Initially, cellulose bleaching was carried out using sodium hypochlorite (NaOCl) at various concentrations.
The reactions of sodium hypochlorite (NaOCl) with cellulose can be divided into 2 types.:
1) oxidation of lignin and coloring substances;
2) oxidation of cellulose and hemicelluloses.
In both processes, ClO- anion is an active oxidizing and bleaching agent:
$NaOCl = Na^+ + ClO^-$
Sodium hypochlorite destroys the lignin complex according to the following scheme:



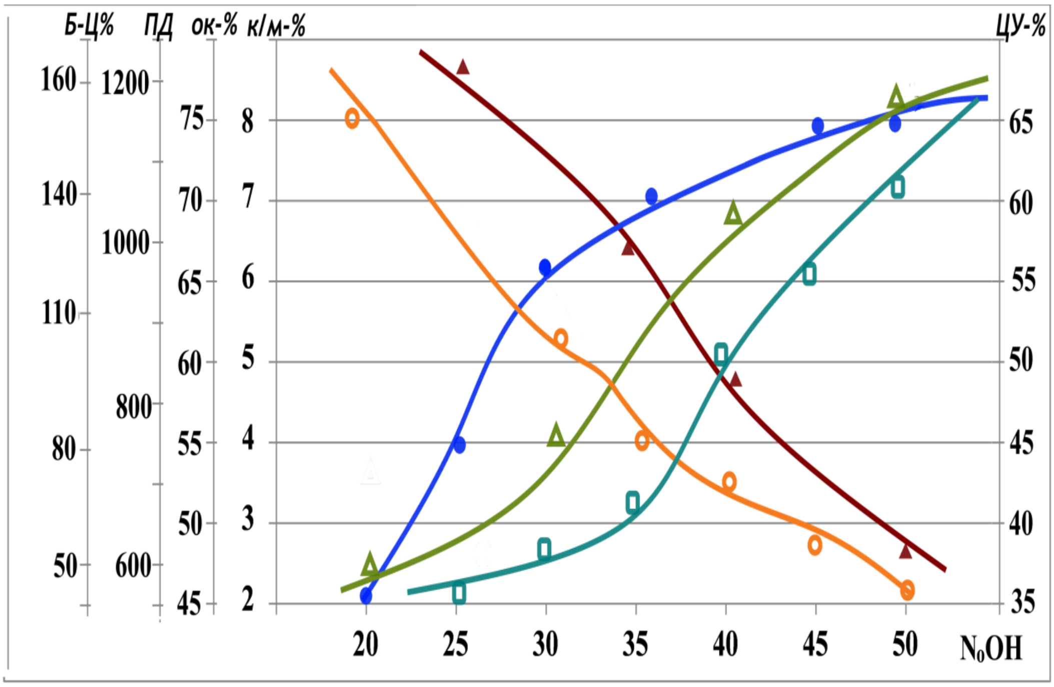
In the process of bleaching with sodium hypochlorite, the environment should be alkaline up to rN = 10-12, because in the environment below rN = 10, chlorine-containing acid is formed in the solution together with sodium hypochlorite and destroys the cellulose macromolecule.

Cellulose is the most abundant natural polymer in nature. It is the main part of all plant cells. 40-60% of trees and plants consist of cellulose. And cotton, jute, and hemp fibers are mostly cellulose. In industry, cellulose is mainly obtained from several types of trees and is called wood cellulose. Cotton lint contains up to 96% cellulose. The molecular weight of cellulose can be from tens of thousands to several millions. Cellulose occupies a special place among all polysaccharides due to the stereotypical structure of its macromolecule and the stability of the conformational state of its elementary units. It is distinguished from other polysaccharides by its positive physico-mechanical properties and resistance to various chemical effects. Cellulose fibers are strong due to the dense arrangement of cellulose macromolecules in the fibers. Such durable fibers are widely used in many sectors of the manufacturing industry and in life. Hydroxyl groups of cellulose undergo all the chemical reactions characteristic of ordinary lower molecular alcohols. There are many annual and perennial plants containing cellulose in the republic. They serve as the main raw material resources of wheat straw, rice straw, tapinambur plant stem, sunflower plant stem, secondary products of trees such as poplar, willow, etc., which are perennial plants. Based on them, a number of researches were conducted on the production of cellulose and its various ethers on an industrial scale.

The principle technological scheme presented in the picture is based on the extraction of cellulose from cellulose-containing plants and, on its basis, the simple ether of cellulose - carboxymethylcellulose (KMTs). KMTs are used for many purposes.
The sodium salt of KMTs is a white or yellowish solid. KMTs are hygroscopic compared to cellulose, absorbing up to 12 percent of water under normal conditions. In general, the properties of KMTs depend on its degree of etherification. For example, KMTs with a degree of esterification of 50 or more dissolve in a dilute solution of alkali.

KMTs are widely used in the production of plastics, in chemical technological processes, in the production of cellulose ethers and paper products, in the production of varnishes and building materials, in the field of pharmaceuticals, food and perfumery, as the main product in the oil and gas extraction industry. KMTs are used as stabilizers for the solutions used in oil well drilling. Since the ether salt is soluble in water, it is also used instead of starch for technical purposes. Ether salt solutions are widely used in the textile industry in the bleaching of spun yarns, in the enrichment of metals from precious ores, and in the production of glue. In addition, KMTs are widely used to obtain artificial soaps and to improve the quality of papers.

During the extraction of cellulose from the Pavlovnia tree, the effect of the hydrolysis process at different concentrations of HNO_3 solution on the quality parameters of the obtained cellulose was studied.
Figure 1 below shows some of the quality indicators of cellulose extracted from hydrolysis in 0.5% HNO_3 solution for 30 minutes at 95-100^{0}C, alkaline baking process at 40g/l NaOH concentration for 240 minutes. Hydrolysis before alkaline cooking in HNO_3 0.5% solution was carried out in special hydro pulpers, that is, in hydrometers. In this case, the fact that the hydrolysis process was carried out in an intensive hydro-mixer made it possible to accelerate the delignification process.
In this case, after intensive hydrolysis process in a 0.5% HNO_3 solution, the yield of cellulose isolated as a result of alkaline cooking is 51%, the degree of whiteness is 72%, the degree of polymerization is 900, the degree of swelling is 90%, and the amount of ash is 4.3%.

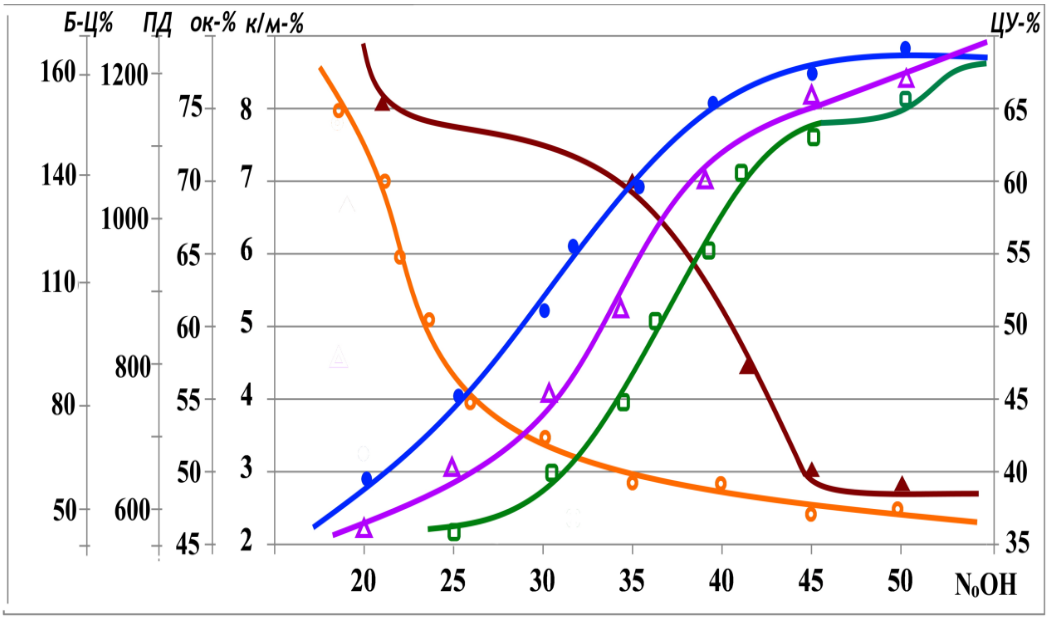


● - **Whiteness level;**
○- **amount of ash;**
▲- **degree of polymerization;**
∆ - **degree of swelling;**
□- **cellulose product.**

2-Fig: Some quality indicators of cellulose extracted from hydrolysis in 0.5% HNO_3 solution at 95-100^{0}C for 30 minutes, alkaline cooking process at 40g/l NaOH concentration for 240 minutes.

Figure 2 shows some quality indicators of cellulose extracted from hydrolysis in 1.0% HNO_3 solution for 30 minutes at 95-100^{0}C, alkaline cooking process at 40g/l NaOH concentration for 240 minutes. Hydrolysis process before alkaline cooking in 1.0% solution of HNO_3 was carried out in special equipment. The goal is to drastically reduce the high pressure consumption during the alkaline cooking period and to move the delignification process in a positive direction by breaking it down with the help of hydro-jets.

In this case, after intensive hydrolysis process in 1.0% HNO_3 solution by means of a hydrostatic device, the yield of cellulose extracted as a result of alkaline cooking is 56%, whiteness level is 73%, degree of polymerization is 850, viscosity is 130%, and ash content is 3.1%.



● - Whiteness level;
○- amount of ash;
▲- degree of polymerization;
∆ - degree of swelling;
□- cellulose product.

3-Fig: Some quality indicators of cellulose extracted from hydrolysis in 1.0% HNO_3 solution at 95-100^{0}C for 30 minutes, alkaline cooking process at 40g/l NaOH concentration for 240 minutes.

In the process of extracting cellulose from the secondary products of the Pavlovnia tree, the role of acid hydrolysis is important. It is known from the literature that the process of extracting cellulose from wood contains several difficult steps. Most importantly, under high pressure (6-8-11 atm), 2-4 stages - sulfate, sulfite, etc. are carried out. The use of the acid hydrolysis method in the process of extracting cellulose from the Pavlovnia tree eliminates the complicated processes mentioned above, especially the processes of extracting cellulose under high pressure. It is shown in Figures 1-2 - increasing the concentration of HNO_3 solution has both a positive and negative effect on the quality indicators of the released cellulose, that is, increasing the concentration of HNO_3 solution from 0.5% to 2.0% leads to a sharp decrease in the ash content of cellulose, a sharp increase in the whiteness level. increases, i.e. activation of the delignification process, a sharp increase in the viscosity of the polymer, on the contrary, it can be observed that it has a negative effect on the degree of polymerization and yield of cellulose.

In this section, researches have been carried out to obtain several brands of N-PATs (E-466) with high purity for pharmaceutical and medical industries from fiber wastes of cotton ginning plants and cellulose obtained from paulownia tree and banana stems.

The technical process of purified KMTs includes the following steps: Preparation of products and solutions; the extraction; squeezing and pinching; drying of the purified Na-KMTs; grinding; packaging of the finished product; cleaning of the used solution.

The main task of the technological process is to extract the additional compounds contained in Na-KMTs in an aqueous solution of ethyl alcohol, that is, to extract them using continuous equipment and to dry KMTs and squeeze the finished product in the equipment used using a continuous mechanism.

Purified Na-KMTs is a powder or fiber product that varies in color from white to yellow to clear brown depending on the brand of the product. Purified Na-KMTs are well soluble in aqueous solution of 40% ethanol in water and in acetone. Insoluble in other types of organic solvents. All quality indicators of purified Na-KMTs must comply with the requirements of TU 6-55-39-90 and Ts 22235949-003:2015 (internal Ts in the required production of "KARBONAM"). At the initial stage of the scientific work, synthesis processes were carried out based on Na-KMTs, PTKTCh, paulownia and banana cellulose.

It is known from the literature that Na-KMTs mainly include mercerization of cellulose (NaOH), alkylation of the obtained alkaline cellulose with sodium monochloroacetate, and the last step of oxidation (ripening) processes. Below is the principle technological scheme of the process of obtaining Na-KMTs and the technology for obtaining several brands of high-purity N-PATs (E-466) for the pharmaceutical and medical industries.

The principle scheme of the created innovative technology for obtaining composite materials and low-tonnage organic compounds for some industries from cellulose of Pavlovnia tree and carboxymethyl derivatives of starches

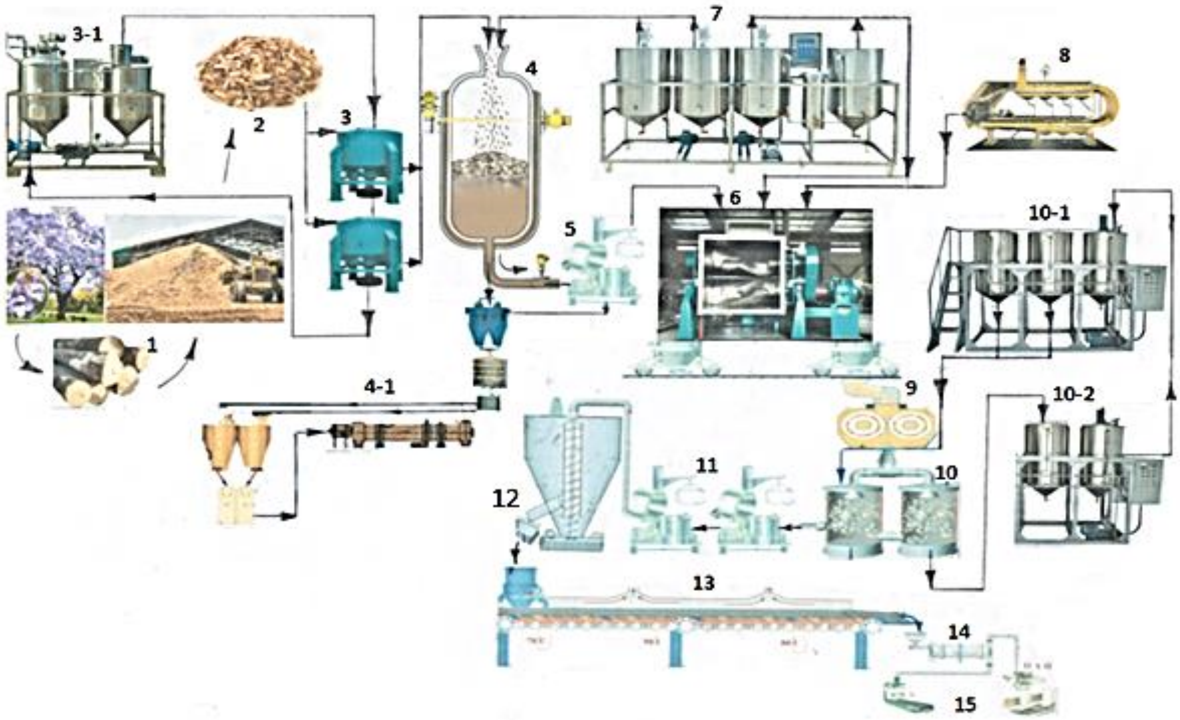


Fig-4: 1- Pavlovnia tree and its secondary products, 2-pavlon fiber, 3-hydropulper (pulper), 3-1-HNO3 (nitric acid) solution tank, 4-cellulose cooking pot, 4-1-alkaline lignin bending aggregate capacity set, 5-alkaline cellulose squeezing centrifuge, 6- monoapparatus, 7- NaOH (caustic alkali) solution preparation capacity, 8- $CH_2ClCOONa$ (sodium monochloroacetate) storage capacity, 9- semi-finished product unloading rotor rotating device, 10-1-ethyl alcohol storage capacity, 10- alcohol extraction section, 10-2-ethyl alcohol preparation capacity, 11-separated product compression device - centrifuge, 12-bending capacity, 13-drying unit, 14-finished product grinding mill, 15-finished product.

It can be seen from the table that there is a noticeable difference between the physico-chemical parameters of the KMTs samples. Because the difference between the proposed technology and other types of analogues can be explained by the intensification of the "Monoapparatus" construction in the process of producing alkaline cellulose, that is, the sharp reduction in the destruction of the macromolecules of the product produced as a result of the sharp reduction of various chemical and mechanical destructive processes due to the increase from 120 to 240 rpm.

5-Table Some physico-chemical parameters of samples of Na-KMTs obtained by the "INNO-CELL-MONO" method in the existing technology

Samples of Na-KMTs	Indicators of Na-KMTs						
	Moisture content, %	**Degree of substitution with carboxyl groups**	**The amount of the main substance, %**	**Dynamic viscosity of a 2% aqueous solution, mPas**	**Solubiliy in water, %**	**pH**	**DP**
Na-KMTs based on PTKTCh cellulose							
1*	11	81	45	109,3	97,2	12	420
2+	7	85	50	140,4	98,7	9	600
Na-KMTs based on paulownia wood cellulose							
1*	10	82	50	98,6	97,8	12	360
2+	8	85	55	124,2	98,8	9	550
Na-KMTs based on banana stem cellulose							
1*	11	82	52	120,2	97,9	12	500
2+	9	85	55	168,2	98,8	8	650

1*- Physico-chemical indicators of KMTs obtained on the basis of technology currently in production
2+- Physico-chemical parameters of KMTs obtained by the "INNO-CELL-MONO" method
The table shows the effect of the extraction time on the amount of the main substance of the innovative product E-466, which shows that increasing the extraction time, i.e., cleaning the various elements of technical KMTs by extraction in a 55% solution of ethyl alcohol, in the time interval from 10 to 70 minutes, has alternative parameters.

6-Table Effect of Na-KMTs obtained on the basis of fibrous wastes of cotton ginning plants and pulps of pavlovnia tree and banana stems in ethyl alcohol on the amount of the main substance.

№	**Na-KMTs obtained on the basis of cellulose of cotton TKTCh**		**Na-KMTs obtained on the basis of the cellulose of the Pavlovnia tree**		**Na-KMTs obtained on the basis of banana stalk cellulose**	
	The amount of the original main substance, 50%		**The initial amount of the main substance, 55%**		**The initial amount of the main substance, 55%**	
	Extraction time, minutes	The amount of the main substance, %	Extraction time, minutes	The amount of the main substance,%	Extraction time, minutes	The amount of the main substance, %
1	10	56	10	77	10	78
2	20	66	20	86	20	89
3	30	75	30	97	**30**	**98**
4	40	86	**40**	**98**	40	98
5	50	89	50	98	50	99
6	**60**	**96**	60	99	60	99
7	70	98	70	98	70	98

In particular, the extraction time for the innovative product N-PATs (E-466) obtained on the basis of PTKTCh cellulose is 60 minutes, the extraction time on the basis of paulownia tree cellulose is 40 minutes, and the extraction time of the innovative product N-PATs (E-466) obtained on the basis of banana plant cellulose is determined to be 30 minutes as the optimal parameter. - marked. The higher extraction time of the product based on PTKTCh compared to the products obtained based on paulownia and banana cellulose is due to the fact that the fibers of the cotton fiber are chaotic and tangled.

Because during the extraction period, it is precisely these fibers that cause the process of removing the additives located in the tangled parts to be slow. In particular, it can be observed that the extraction process is completed in a short period of time due to the absence of entanglements in the fibers of the product based on paulownia tree and banana plant cellulose.

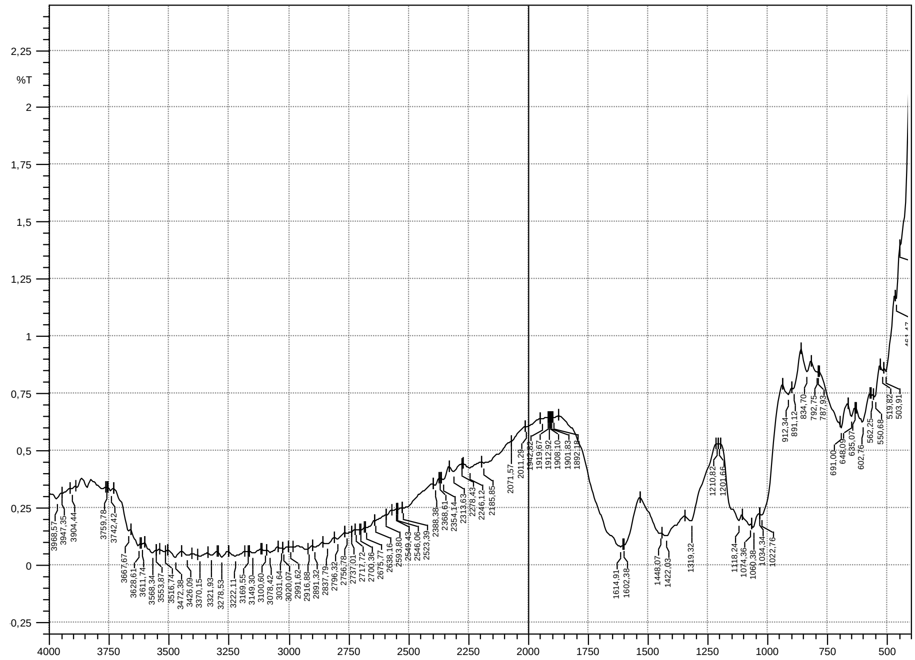


Fig – 4. IR-spectrum of technical KMTs

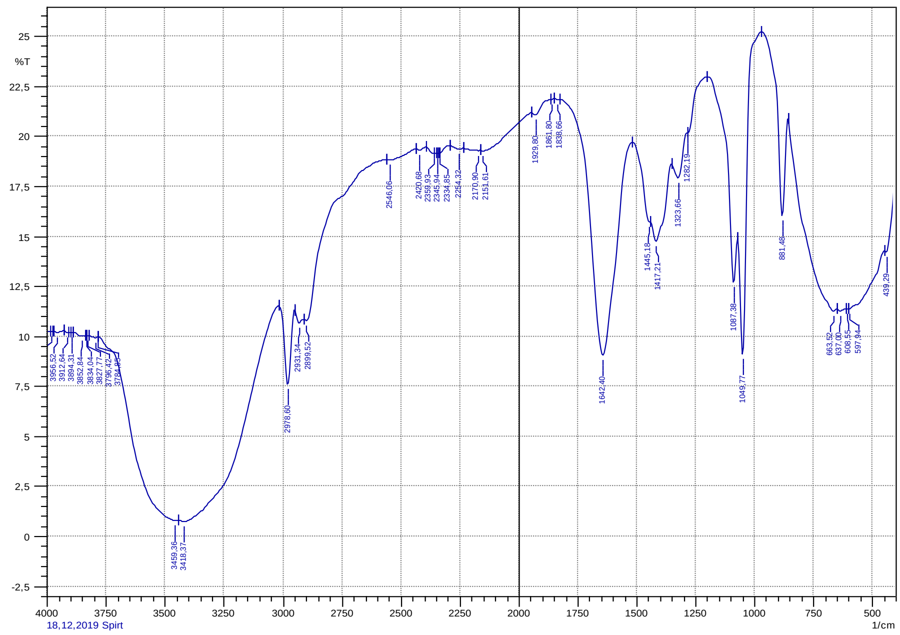


Fig – 5. IR spectrum of ethyl alcohol after extraction

In Fig. -4 spectrum, the following peaks are 3750, 3500, 3250, 3000...1250, 750, 500 cm-1. It can be seen from these peaks that the hydroxyl group of cellulose has changed to the carbonyl functional group. Since the material was not desalted, the peaks were not clearly visible.
The broad and clear appearance of the above corresponding peaks in the spectrum of Fig. 5 indicates that the KMTs have been purified from the formed table salt.

Monochloroacetate, sodium hydroxide, and salt, which did not enter into various reactions after the extraction of technical KMTs in ethyl alcohol, allow the KMTs drug to be used on a wide scale in various fields, including medicine, perfumery, and food industry.

In the fourth chapter, focused on "**use of E-466 modified composite brands with silver ion, used in several branches of household chemistry during the synthesis of E-466 obtained on the basis of local raw materials**", the composition of composite mixtures in household detergents and the processes of researching cellulose ethers into this composition were investigated. Below is a composite composition of washing powder obtained on the basis of local raw materials, according to which a brand of drug E-466 with a high exchange rate and high basic substance content and high viscosity was used in the composition of the composite:

7-Table The standard of the appropriate reagents added to the laundry powder based on the available and proposed composition in the production

№	**Chemical reagents**	**Available composition, reagent consumption rate, kg**	**Consumption norm of the proposed content, kg**
1	Na_2CO_3	20,2	28,8
2	Na_2SO_4	12,2	8,4
3	Na_2PO_4	4,6	4,2
4	LAS-80	7,25	5,4
5	Na_2SiO_3	1,8	-
6	NaCl	0,5	-
7	Na-КМЦ	0,450	0,280 (E-466)
8	H_2O	2,6	2,4
9	Glycerin	1,4	0,5
	Total	50,0	50,0

It can be observed from the table that due to the drastic reduction of consumption rates of the existing content in the production and the addition of the innovative product - E-466 to the new content, a positive result was achieved in making the washed clothes transparent and transparent under its influence.

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