

## PREPARATION OF NATURAL POLYMERS AND THEIR PROPERTIES

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**Abstract.** *As a result of the research, it was possible to obtain cellulose from the stems of several annual plants by the sodium method and to study various properties of the obtained cellulose. In addition, its areas of use were studied.*

**Keywords:** *paper, paperboards, annual plants, plants stalks, nitric acid, pulp.*

**Introduction.** Year by year, the increasing demand for paper and paper products in the world is becoming one of the important problems of many countries. To find a solution to this, many scientists are currently conducting various researches. It can be seen from the latest research that in recent years, the stems of annual plants are considered as a solution for the paper industry.

Cellulose is the basis for the production of paper and paperboards. Therefore, it is possible to obtain quality pulp for the production of quality paper. Production of cellulose from annual plants is well developed in China and India. It covers 50% of the defense needs of the People's Republic of China in one year. In Uzbekistan, thousands of tons of annual plant stalks (mainly artichoke stalks, cotton stalks, rice stalks, safflower stalks, wheat straw, etc.) are collected annually. The stems of the plants we need today have been used for a variety of purposes, including being used for livestock (other types of plants are now supported for livestock) and incinerated as waste. With this in mind, we have focused our research on extracting cellulose from annual plants and identifying and investigating the use of the resulting cellulose with the greatest potential. In this way, we will be able to solve the problems that the

paper in Uzbekistan is facing in the matter of the fetus. We selected 4 types of raw materials (artichoke, wheat straw, safflower stem, cotton stalk) to conduct the experiments. We used a natron tip, which is widely used in Uzbekistan, to remove the pulp.

Nitric acid is used to extract cellulose from one-year-old plant stems, plant stems are cut into 4-5 mm sizes, crushed in a porcelain mortar, the crushed stem is hydrolyzed in a 3% concentration of nitric acid, and then baking process is carried out using the sodium method.

In nitric acid solution, 1:20 module, 5 g of air-dry crushed plant stem was hydrolyzed. The hydrolysis process was carried out for 20 minutes at 85-95 °C. Then it was washed and boiled in 10-25% sodium alkali for 120 minutes. After cooling, it was washed again and boiled for 10 minutes in order to bleach it in a 3% H<sub>2</sub>O<sub>2</sub> solution. The oxidation reaction was allowed to proceed for 24 hours at room temperature.

The separated cellulose was washed until neutral and dried at room temperature. The analysis of the obtained results is presented in the following table.

**Table 1**

**The effect of alkali coconcentration on cellulose extraction from natural polymers and its quality indicators is presented**

Raw material type	NaOH, g/l	Cellulose product, %	Ash content, %	$\alpha$ - cellulose, %	PD
Cellulose from the cotton stalk	10	40.0	0.96	89.8	750
	15	41.5	0.91	90.9	800
	<b>20</b>	<b>42.0</b>	<b>0.84</b>	<b>90.4</b>	<b>850</b>
	25	39.3	0.99	89.6	700
Cellulose from the safflower	10	43.1	0.90	90.7	950
	<b>15</b>	<b>50.0</b>	<b>0.77</b>	<b>92.4</b>	<b>1050</b>
	20	45.3	0.89	90.5	1000

plant	25	40.1	0.95	89.0	900
Cellulose from straw stalks	10	46.2	0.85	91.0	900
	15	49.1	0.80	91.8	1000
	20	48.2	0.79	91.2	950
	25	42.3	0.83	90.4	850
Cellulose from Jerusalem artichoke	10	18.2	1.33	-	-
	15	30.2	1.20	-	-
	20	45.4	0.89	90.4	1200
	25	42.6	0.82	90.6	1050

**Conclusion.** The analysis of the results showed that we can get Jerusalem artichoke as the most acceptable raw material. Firstly, this plant is grown in large quantities in the conditions of Uzbekistan, and secondly, the degree of polymerization of cellulose is important for the paper industry.

On the other hand, in the process of extracting cellulose from the Jerusalem artichoke plant, the influence of alkali concentration on cellulose quality indicators was studied. So, it will be appropriate if we apply our obtained cellulose to the paper industry.

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