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Influence of Concentration of Alkaline Solutions in the Production of Semi-Finished Paper Materials from Local Raw Materials

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ABSTRACT: This article describes in detail the localization of local raw materials such as cotton stalks, stalks of cereals and reeds, to a certain extent by the formation of viscous masses and the hydrodynamics of this viscous mass. The article also considers the state of chemical impurities and the effect of concentration on cellulosic raw materials. The article clearly presents data on the ratio of raw materials and sorghum to viscous compounds.

KEYWORDS*:* hydromodule, concentration, rust, sodium hydroxide, cellulose, stems, reed, grain straw.

I. INTRODUCTION

Paper is an elastic-plastic, capillary-porous sheet material, consisting mainly of small plant fibers, suitably processed and joined into a thin sheet, in which the fibers are connected by surface adhesion forces. The combination of small fibers into a paper web is usually carried out by the method of deposition and filtering on a paper machine machine from a highly dispersed fiber suspension.

The global market for pulp and paper products is constantly growing, producing more than 403 million tons of paper and paperboard per year.

It is predicted that by 2025 this figure will increase by 2.1%, and production - by 500 million tons [1]. Today, the shortage of wood resources around the world is exacerbated, and the production of high-quality paper products using fibrous waste and their introduction into the printing industry is one of the most acute problems. Some success has been achieved in the USA, China, India, Brazil, South America, and Eastern Europe.

II. SIGNIFICANCE OF THE SYSTEM

During the years of independence, special attention is paid to the integrated processing of raw materials to finished products. Large-scale efforts have been made to create new paper and paperboard products using local raw materials. In this regard, a number of scientific studies have been carried out, including paper silk, short fiber waste, Jerusalem artichoke, poplar, licorice pulp, kenaf, wheat straw pulp and paper quality for paper production. The goals of developing fundamentally new types of products and technologies, as well as ensuring the competitiveness of domestic products in the domestic and foreign markets, are set out in the Action Strategy for the five priority areas of development of Uzbekistan. In this regard, one of the most promising methods is to increase the production efficiency of paper, cardboard, pulp and composite materials using local fibers and to ensure the competitiveness of products.

Improving research in the field of alternative and secondary raw materials is of particular importance in world practice. The aim of this work is to conduct research on the development of a new technology for the extraction of valuable cellulosic raw materials using fibrous waste at their enterprises with new physicomechanical properties, to develop the theoretical basis for the interaction of various fibers with polymers and dyes.

III. LITERATURE SURVEY

Demand for paper in Uzbekistan is 140-150 thousand tons per year. But at present, paper production is 60-70 thousand tons. These securities are classified as raw materials based on good quality raw materials, which are recorded

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in foreign currency. The production of this problem on the basis of local raw materials is an urgent scientific work, and it is difficult to draw a clear line between the concepts of paper and cardboard.

Pulp and paper material weighing up to 250 grams per 1 m2. Cardboard is a plant made of fibers that differ in thickness from paper and weighs 1 m2. Conductive cardboard is a material weighing 250 g or more, 0.5 mm thick and 1 m2 thick. Products (assortment) are divided into classification groups according to GOST 17586–80 and GOST 17926-80.

IV. METHODOLOGY

Paper is divided into different types, depending on its use: printing paper, newspaper, printing, offset printing, gravure printing, printing, cartography, document, cover, poster, ticket, label, floral paper (oboe), game card. Paper for drawing, drawings and letters: watercolor, natural paper, caps, whatman paper, faces, cardboard and postcards, copies, ink labels, clear drawings, notebooks, color notes, drawings. Document paper: airbrushed, velvet, wrinkled, glossy, glossy, shagreen, glued on the cover. Electrical paper: insulation, impregnated insulation, cable, telephone blanks, electrical equipment, electrical conductor, separator, packaging and wrapping paper: corrosion, graphite, packaging, tea, sugar, wet fruit packaging, bottles, paraffin, cigarette and cigarette packaging, lightproof, non-greasy, bituminous, two-layer film, film parchment, film for the production of film film. Photosensitive paper: light-positive, light hats, white copying, autograph, coated copy. Paper for the manufacture of cigarettes and cigarettes: smoking, beets, filtered beets, cigarettes, cigarettes. Blotter paper: non-ionized for chromatography and electrophoresis, chromatography and electrophoresis, for droplet analysis, filtration, fast filtration, moderate filtration, slow filtration, laboratory filtration, cellulose acetate solution, lubricants and coolants. Industrial paper for various purposes: for structural elements, for chemical sources of electric current, for calibration, aerating, spraying, corrugating, copying, bactericidal, insecticidal, fungicidal, portable, abrasive, fossil, sanitary.

V. EXPERIMENTAL RESULTS

The most common paper production method is based on the processing of wood pulp. The main types of wood pulp are cellulose obtained by sulfite, sulfate, sodium (alkaline) method, neutral. In some cases, paper is produced by mixing annual plant cellulose (prefabricated cellulose) with wood pulp. Production of cotton pulp paper in Uzbekistan began in 1994. It is produced in two ways: from cotton lint and pure cotton cellulose.

Getting paper from cotton lint. The cotton linter contains two types of waste. The first type is mechanical impurities (cotton and flowers, whole seeds and seeds, dry straw, dust, etc.). The first is to clean the group with mechanical impurities and satellite additives using a special technology [2]. Thus, the paper is made from cellulose. Another way to produce cotton pulp paper is to produce pure cotton pulp paper. In the paper industry, a wide range of paper is made from raw cotton pulp. Cotton pulp in Uzbekistan is produced according to GOST 595-79 and TS 6.19: 39-2003. In the production of paper, 70-150 varieties of cotton pulp are used [3].

Pulp making. In the crusher, the cellulosic raw materials are crushed in a mill with a crushing rate from 4800 to 0.1 mm. Data on the size of the raw materials during grinding are shown in table 1 below.

The production of high quality paper from local raw materials is one of the main problems at present. Currently, paper technology is economically disadvantageous. It is worth noting that the volume of paper and cardboard production in 2018 will be about 540 million tons. Of these, 41% are printing paper (14% of newspapers, 27% white paper), 53% packaging paper, cardboard, 6% hygiene and household paper. Demand for paper averages 3-4% annually. The results of the study show that the manufacturing process of paper raw materials includes:

- selection of cotton waste, cotton stalks, stems of various legumes and sunflowers, as well as reeds growing in salt water.
- technological regimes of grinding, washing of raw materials and the formation of viscous biomass in various solvents are established;
- the study of the concentration of sodium hydroxide, which affects the processes of cellulose swelling based on experimental studies;
- modes of generation of a homogeneous mass are being developed;
- development of the drying process of finished products and the establishment of drying modes.

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Changes in the size of raw materials in paper production, %

Table 1

№	Raw materials	The size of the crushed sieves, raw materials, mm		
		0,1	0,5	1,0
1.	Cotton stalks, %	67	76	87
2.	Cereal straw, %	82	93	96
3.	Cane, %	74	87	94

As can be seen from the table above, the crushing process is determined by the state of pulp. The more stable the content of raw materials, the more negatively it affects the crushing process. As shown in the sample, the strength of the cotton stalks is that 67% of a 0.1 mm diameter sieve can have a negligible effect. This may give better results. When we analyze the remaining samples, we see that the results are quite high. Grain grains have a high corrosion rate due to their high yield.

The powdered mass is fed to a high concentration storage tank through a small low pressure tank. An adhesive suspension of Kanifol, a suspension of kaolin with filler pigment, a solution of aluminum sulfate salt, which facilitates the drowning of cellulosic raw materials and the corresponding dye solutions, are added to this container. As soon as chemicals are added to the paper pulp, the pulp is ground again because the pigment particles contained in the chemicals can be larger than the size of the paper material. This situation degrades the quality of the paper, so grinding is done in a cone-shaped mill. Then the mass is transferred to the composite pool. The paper is diluted from 2-3% to 0.5-0.6% before mass transfer to the paper mill [4].

The selection of hydraulic models is one of the main tasks in crushing raw materials. The effect of selectivity of a 20% sodium hydroxide solution on raw materials and the formation of cereal on raw materials was studied. The hydromodule was obtained in the ratio 1: 3, 1: 4, 1: 5, 1: 6. It determines the effect of swelling of the hydromodule on paper semi-finished products. The ability of a viscous mass to form a viscous mass in the 1: 3 position is shown in table 2.

The following table shows the dependence of raw materials on paper production from a 20% sodium hydroxide solution 1: 3.

Table 2

№	Raw materials	Swelling of raw materials in units of time, hour.		
		12	**18**	**24**
1.	Cotton stalks	67	78	84
2.	Cereal straw	76	87	96
3.	Cane	72	83	92

The hydraulic module is one of the main parameters of paper production based on local raw materials. Table 2 shows the formation of homogeneous masses of the mixture when diluted with a 20% sodium hydroxide solution on paper semi-finished products obtained from local raw materials. This indicates that a 20% sodium hydroxide solution had a good effect during the first 24 hours compared to the first sample. Hence it can be said that the raw materials in the raw materials are much higher than those of cotton-cotton. This is due to the fact that the cellulosic compound is very dense in the stems. From this raw material, the yield of paper semi-finished products is high. To check the results of the study, it was supposed to increase the hydromodule several times and observe the changes between the pulp mass and the solution with a concentration of 20% sodium hydroxide. The experiments were carried out on a hydraulic module 1: 4. The results of the experiments are shown in Table 3.

The following table shows the dependence of raw materials on paper production from a 20% sodium hydroxide solution 1: 4.

Table 3

№	Raw materials	Swelling of raw materials in units of time, hour.		
		24	**48**	**72**
1.	Cotton stalks	76	87	93
2.	Cereal straw	85	96	99
3.	Cane	78	92	96

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As can be seen from table 3, the hydraulic module positively affects swallowing in time intervals. It was considered desirable to increase the concentration several times, and not just using a 20% sodium hydroxide solution. Theoretically, with an increase in the concentration of sodium hydroxide, the viscosity of the raw material and its ability to swallow increase many times. It also saves several laborious processes. Table 4 shows the effect of the concentration of sodium hydroxide on the viscosity of the feed and the swelling process.

Effect of sodium hydroxide concentration on viscosity and swelling local raw materials

Table 4

№	Raw materials	Sodium hydroxide solution concentrations, %				
		10	20	30	40	50
1.	Cotton stalks	Very little	Substantially	In the prefabricated porridge mode	In porridge mode	In case of cellulose degradation
2.	Cereal straw	Very little	In the prefabricated porridge mode	In porridge mode	In case of cellulose degradation	In case of cellulose degradation
3.	Cane	Very little	Substantially	In the prefabricated porridge mode	In porridge mode	In case of cellulose degradation

Table 4 shows that the higher the concentration of sodium hydroxide, the higher the viscosity and the process of swelling of cellulose-containing raw materials. Sodium alkali with a concentration of 30% has a great effect on cereal straw and cane plants grown in wild salt waters. In this case, an increase in alkali concentration in these raw materials ensures that the cellulose is in a state of decomposition. Conversely, cotton stalks can be formed into porridge with a concentration of up to 50% concentrated sodium hydroxide.

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