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Technology For Making Microcricstal Cellulose On The Basis Of An-35 Cotton Waste

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Abstract: This article provides information on the silkworm, the composition of the leaf that is its main food, the cocoon from which it is obtained, raw silk and the textile industry. However, in order to effectively use the fluff, which is a waste of cotton fiber formed during the primary processing of cotton, a method is used to obtain microcrystalline cellulose (MCC) by synthesizing it by processing and stimulating mulberry leaves to increase the nutritional value of plants. silkworm The results of the study of the influence of the weight and quality indicators of the cocoon on its use are presented. Was obtained and analyzed the IR spectrum of microcrystalline cellulose.

Key words: lint, textiles, microcrystalline cellulose, hydrochloric acid, hydrogen peroxide, sulfuric acid, concentration, solution, indicator, refrigerant, bleaching, neutralization, filtration, drying, silkworm, cocoon, cocoon varieties, raw silk, leaf composition, IR spectrum.

Аннотация: В этой статье представлена информация о тутовом шелкопряде, составе листа, который является его основной пищей, коконе, из которого он получен, шелке-сырце и текстильной промышленности. Однако, чтобы эффективно использовать пух, который представляет собой отходы хлопкового волокна, образующиеся во время первичной обработки хлопка, используется метод получения микрокристаллической целлюлозы (МКЦ) путем ее синтеза путем обработки и стимулирования листьев шелковицы для повышения питательной ценности растений. шелкопряда Представлены результаты исследования влияния веса и показателей качества кокона на его использование. Был получен и проанализирован ИК-спектр микрокристаллической целлюлозы.

Ключевые слова: линт, текстильные изделия, микрокристаллическая целлюлоза, соляная кислота, перекись водорода, серная кислота, концентрация, раствор, индикатор, хладагент, отбеливание, нейтрализация, фильтрация, сушка, шелкопряд, кокон, разновидности коконов, сырой шелк, состав листьев, ИК-спектр.

Аннотация: Ушбу мақолада ипак қурти, унинг асосий озуқаси бўлган баргнинг таркиби, ундан олинадиган пилла, ҳом ипак ва тўқимачилик саноати ҳақида маълумотлар келтирилган. Шу билан бирга пахтага дастлабки ишлов бериш жараёнида ҳосил бўладиган пахта толаси чиқиндиси бўлган линтдан самарали фойдаланиш учун уни қайта ишлаш орқали синтез қилиш йўли билан микрокристалл целлюлоза (МКЦ)ни олиниш усули ва бу олинган микрокристалл целлюлозадан ипак қуртини боқиш жараёнида тут баргларини тўйимлилик даражасини ошириш мақсадида стимулятор сифатида фойдаланишни пилла вазни ва сифат кўрсаткичларига таъсирини тадқиқ қилиш натижалари келтирилган. Микрокристалл целюлозанинг ИК спектори олиниб, тахлил қилинган.

Таянч сўзлар: линт, тўқимачилик маҳсулотлари, микрокристалл целлюлоза, хлорид кислота, водород пероксид, сулъфат кислота, концентрация, эритма, индикатор, совуткич, оқлаш, нейтраллаш, фильтрлаш, қуритиш, ипак қурти, пилла, пилла навлари, ҳом ипак, барг таркиби, ИК спектр.

The diversity of types of textile products in the world requires it to have a high level of quality. Especially, given that the share of raw silk in textile raw materials is only 0.2 %, but the characteristics of products made from pure silk or its mixtures are high, and ite show that serious attention to further improving the quality of cocoons and raw silk is one of the most important problems of the silk industry today [1].

Despite the fact that our country is among the top five countries in the world that grow and process cocoons, it produces 50-52 kg of cocoons from a box of silkworm seeds. 75-78 % of these cocoons are I-II grade cocoons. In countries with developed silk industries, the amount of cocoons grown from a box of silkworm seeds is 1.3-1.5 times more than in the country, and the share of varietal cocoons is 93-94 %. The price of such quality cocoons on the world market is 3-4 times higher than the cocoons grown in the country [2, 3].

Literature analysis and methodology.

In our country, high-tech, high-yielding white cocoon and hybrid cocoons have been introduced as raw materials for silkworm enterprises. However, the productivity and technological features of their heredity are not fully manifested. There are various subjective and objective reasons for this, which are inextricably linked to the microclimate conditions created in the process of feeding silkworms, as well as the nutritional value of mulberry leaves used in the process of feeding [4, 5]. This includes the use of artificial feeds in feeding small and large silkworms; natural nutrient enrichment supplements: trace elements such as sugar, phosphorus drugs, protein, carbohydrates, etc .; enzymes that speed up digestion; hormones of a metabolic nature, neutrons; requires research to find and apply stimulants that improve the nutritional properties of mulberry leaves and provide stimulants and efficacy [6].

It is known that the productivity of silkworms depends not only on the amount of nutrients in water, protein and other elements, but also on the supply of nutritious, high quality and sufficient nutrients for the growth and development of silkworms in young and old. The use of poor quality, withered mulberry leaves in the feeding of silkworms leads to a prolongation of the development period of silkworms, a decrease in cocoon yield and a decrease in quality indicators [7].

Based on the above, in order to increase the nutritional value of mulberry leaves during silkworm rearing, research has been conducted on the use of microcrystalline cellulose obtained as a stimulant by synthesizing waste lint from the primary processing of cotton as a raw material for textile enterprises.

Research has shown that microcrystalline cellulose can be obtained by processing the lint formed during the initial processing of cotton, and this has shown that the obtained microcrystalline cellulose has the potential to increase the nutritional value of mulberry leaves in the feeding of silkworms.

The technological process of obtaining microcrystalline cellulose from waste lint, which is formed during the initial processing of cotton, is carried out in the following stages.

In order to obtain microcrystalline cellulose, a sample was first taken from the waste (lint) formed during the initial processing of cotton. The obtained sample was completely cleaned of has straw, seed husks and other types of waste. The cleaned sample was finely chopped with scissors. Simultaneously, a solution of distilled water and sodium hydroxide (NaOH) in a ratio of 1:20 was prepared. The cleaned and finely chopped lint was placed in a 20 g flask and heated with 400 ml of

NaOH solution. The solution was evaporated, cooled through a refrigerator and boiled at a temperature of $90-100^0$ C for 70-80 minutes after the mixture was re-poured on top. The substance obtained in this way was purified of unnecessary substances. After the new substance was obtained, it was washed 10-15 times in well-distilled water, dried, and the result was a fresh unbleached cotton cellulose. Cotton cellulose was boiled with hydrogen peroxide (H_2O_2) for 70-80 minutes at a temperature of 80-900 C to bleach [8].

Cleaning and crushing lint

!

Preparation of an aqueous solution of NaOH crystals in a ratio of 1:20

!

Boiling (lint and aqueous solution)

!

Washing with distilled water

!

Drying

!

Bleaching

!

Neutralization

!

Washing

!

Drying

!

Crushing

!

Filtering

!

Drying

!

Ready microcrystalline cellulose

Figure 1 Sequence of technological processes for the production of microcrystalline cellulose

Bleached cotton cellulose was then neutralized with a 1,5–2 g / l solution of sulfuric acid (H_2SO_4).

To obtain microcrystalline cellulose from bleached cotton cellulose, it was boiled with hydrochloric acid (HCl) at 80–900 C for 100–110 min, and the resulting product was filtered and washed with distilled water, after drying, microcrystalline cellulose was formed [9].

In recent years, as a result of advances in science and technology, the production of various types of surfactants, water-soluble polymers and biostimulators required for various sectors of the economy through the efficient use and synthesis of various types of industrial waste [10].

Therefore, in our subsequent research, the IR spectrum of microcrystalline cellulose obtained from lint waste formed during the primary processing of cotton was used using SHIMADZU equipment to increase the nutritional value of mulberry leaves during silkworm feeding.

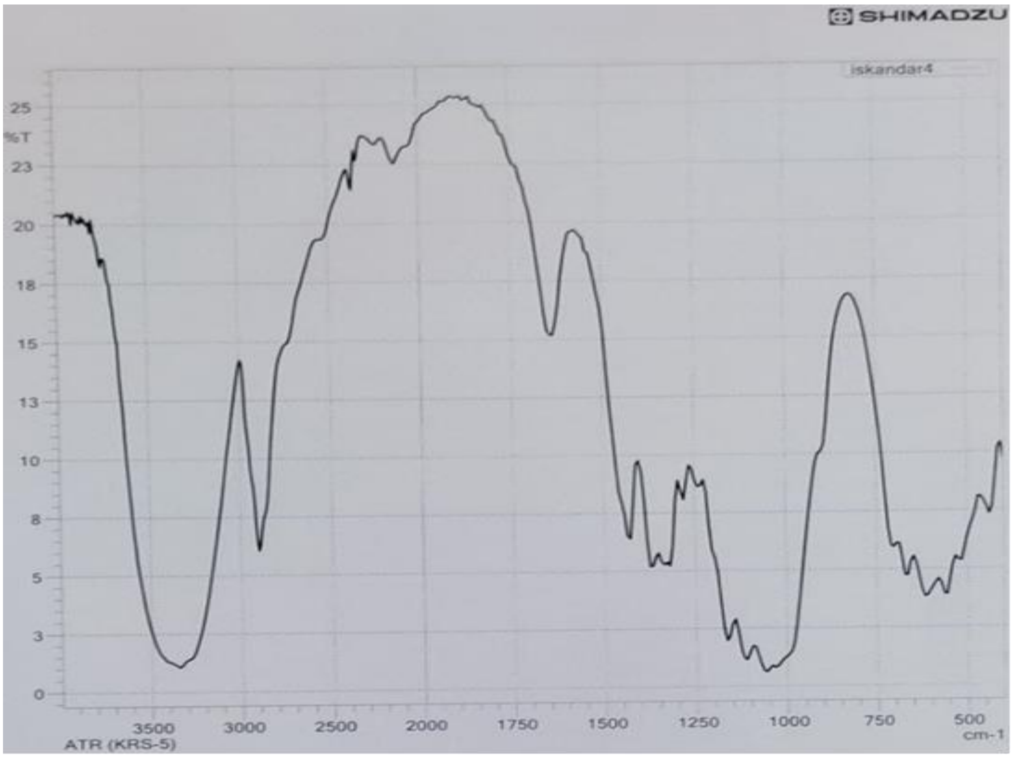

Figure 2. IR spectrum of microcrystalline cellulose.

A graph of the IR spectrum of microcrystalline cellulose is shown in Figure 2.

The structure of the synthesized microcrystalline cellulose on the IR spectrum proves that the valence oscillations of the OH group have absorption frequencies in the 3417, valence oscillations of the C-H bond in the ring 2927 (CH), which corresponds to the microcrystalline cellulose structure.

In conclusion, as a result of the application of the obtained microcrystalline cellulose in the silkworm feeding process, the weight of the cocoon increased compared to the control variant, the quality indicators improved and, accordingly, the silkiness increased.

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