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STUDY OF CELLULOSE EXTRACTION PROCESSES SUITABLE FOR OBTAINING LOW-QUANTITY PRODUCTS FROM THE STEM PART OF THE LOCAL SAFLOR PLANT

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Abstract:

This research explores cellulose extraction processes suitable for obtaining low-quantity products from the stem part of the local Saflor plant. Saflor stem cellulose is considered a promising source for sustainable and biodegradable materials. The study optimizes cellulose extraction methods, characterizes the obtained cellulose, and evaluates its suitability for low-quantity product development. This research contributes to the sustainable utilization of local resources and the production of environmentally friendly materials.

Keywords: Cellulose extraction, Saflor plant stem, Low-quantity products, Sustainable materials, Biodegradable materials, Stem cellulose, Process optimization, Feasibility study, Characterization, Product development

Аннотация:

В данном исследовании изучаются процессы экстракции целлюлозы, подходящие для получения небольших объемов продукции из стеблевой части местного растения сафлора. Целлюлоза стеблей сафлора считается многообещающим источником экологически чистых и биоразлагаемых материалов. Исследование оптимизирует методы экстракции целлюлозы, характеризует полученную целлюлозу и оценивает ее пригодность для разработки мелкосерийных продуктов. Эти исследования способствуют устойчивому использованию местных ресурсов и производству экологически чистых материалов.

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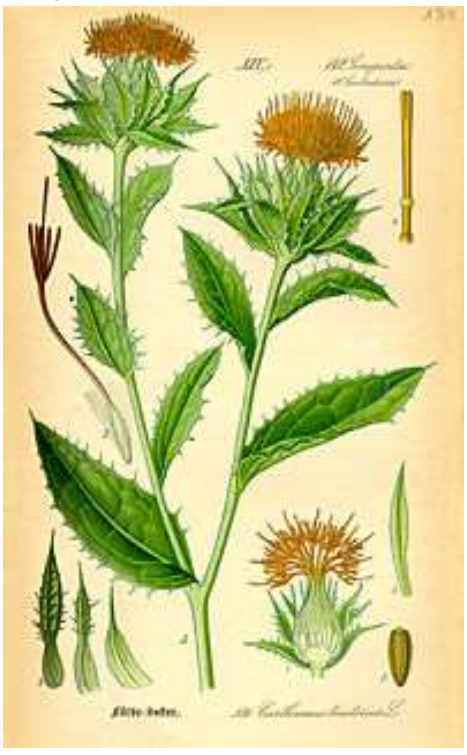
Ключевые слова: экстракция целлюлозы, стебель растения сафлора, продукты в небольших количествах, экологически чистые материалы, биоразлагаемые материалы, стеблевая целлюлоза, оптимизация процесса, технико-экономическое обоснование, характеристика, разработка продукта.

Introduction.

Safflower is an equally promising product in terms of investment space in the fruit and vegetable sector, and at the same time, it is a cheap alternative to saffron. It is an oilseed whose main product is the seeds used for processing into oil. It is dry in the regions is grown and about 3 tons per hectare harvest gives Wholesale sell price for 1 ton about $ 300 organize is enough Safflower production to issue investments quantity per hectare of plantation from about $ 500 consists of Investments profitability up to $ 900 per hectare is enough in Kyrgyzstan planting safflower now for commerce plantations is available and his area is 3500 hectares enough !



On the other hand, an alternative to growing safflower seed is to grow its leafy forms. Safflower leaves are also known as American saffron or wild saffron and a dye product. This product is used as a component for flower teas, a natural dye, in medicine

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- as a laxative, diuretic. From this besides, it is North Africa, Turkey , Iran and in the Caucasus countries cheap saffron place clicks Safflower leaves wholesale price from 7000 dollars per 1 ton begins , this to saffron 300-1500 times than cheap

Methodology

European Union to safflower leaves in countries demand high His leaves dial income up to 300% per hectare increase enable gives A gar safflower oil work release for raw material as safflower produce release profitability an impressive 200% if , then another one leaf for one of time in itself work release profitability is 300% does

Makhsar - Central in Asia wide spread out oily plant It is drought resistant Makhsar oil directly ozi q- to eat is used and in the preparation of margarine is used . 25-32% of the seed is semi- dry , hungry yellow oil is taken . Quality according to sunflower they don't run out of oil . Makhsar's pistachios again work as a result harvest has been of the crown the taste more bitter , however less amount it can be given to cattle . His 100 kg weight is 55 ounces unit , 7-8% fat is stored. From him Bull dog as too use can Makhsar seeds poultry for good food

Safflower plant In our republic average 40 thousand hectares of land per year is planted . His from grain plant fat is taken . Stem different methods with no will be done . Some safflower in the literature as " mockery " . too is called..

Results:

Cultivation and harvesting of safflower leaves, other medicinal herbs and spices is considered one of the most promising investment directions due to export to EU countries.

The study of the process of extracting cellulose from the stem part of the safflower plant with sodium chloride was mastered, and the effect of various parameters on the process was studied.

Table-1

NaOH concentration, and temperature on quality parameters of cellulose obtained from safflower stem

No	1 cooking time,	Quality indicators of cellulose						
		Yield, %		Hemi -	PD *		Residual	Ash

ISSN (E): 2181-4570 ResearchBib Impact Factor: 6,4 / 2023 SJIF(2023)-3,778 Volume-1, issue-10

	minute		a-celsius, %	cell, %		Degree of whiteness, %	amount of lignin in cellulose, %	amount of %
1	60	-	-	-	-	-	-	-
2	120	32	-	14.2	-	64	9.8	6.4
3	**180**	**52**	**89.2**	**8.2**	**900**	**82**	**3.8**	**1,2**
4	140	49	90.1	7.8	880	86	3.2	1.0
5	240	50	89.4	6.1	710	82	2.1	0.8
6	300	36	90.5	5.9	520	82	1.4	0.6
No	**2 NaOH concen-you, m/l**	**Unum, %**	**α-goal-for, %**	**Gemi-cell for %**	**PD***	**Intelligence level, %**	**Residual amount of lignin in cellulose, %**	**Cool amount of %**
1	20	-	-	-	-	-	-	-
2	30	41	-	13.2	-	68	10.2	7.1
3	**40**	**52**	**89.2**	**8.2**	**900**	**82**	**3.8**	**1,2**
4	50	53	90.2	6.9	705	85	3.0	1,2

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5	60	47	91.0	5.1	610	84	2.7	1.1
6	70	34	90.0	3.1	470	86	1,2	0.7
No	**3 Cooking temperature, ^{0}S**	**tenth, %**	**α-cell, %**	**Hemi-cell phone %**	**PD ***	**Intelligence level, %**	**Residual amount of lignin in cellulose, %**	**Cool amount of %**
1	120	-	-	-	-	-	-	-
2	130	45	-	11.7	-	-	11.9	-
3	140	46	79,1	9,8	910	77	9,7	6,8
4	**150**	**52**	**89,2**	**8,2**	**900**	**82**	**3,8**	**1,2**
5	160	49	90,8	5,2	620	86	1,9	1,1
6	170	32	91,1	2,0	410	85	1.0	1.2

PD * - degree of polymerization

In the process of extracting cellulose from the safflower plant, fibers are first separated into fibers 2-4 cm long in a special grinder - mill. Separated fibers are ground and crushed with water in a ratio of 1:10 for 5 hours in a special roll device. Then, sodium delignification processes are carried out at different concentrations of NaOH.

In part 1 of the table, the influence of sodium bicarbonate cooking time on the quality indicators of the extracted cellulose was studied, and the cooking process was carried out between 60 and 300 minutes. During 60-120 hours, no delignification process occurred, only a small amount of lignin was added to the composition of the

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alkaline solution in the amount of 6.4 . Increasing the cooking time from 120 to 140 minutes ensured the stability of the process, that is, the state of cellulose was tested. In this, that is, during 180 minutes, the cellulose yield was 52%, the degree of polymerization was 900, the degree of whiteness was 82%, and the amount of ash was 1.2%. This result is considered positive. During the process, it can be observed that increasing the cooking time from 240 to 360 has a negative effect on the yield of cellulose and the degree of polymerization. That is, the degree of polymerization and the amount of yield are sharply reduced. As a result of this delignification process, as a result of the destruction of the elementary rings of the macromolecule, the quality indicators - PD from 900 to 520, and the cellulose yield - dropped sharply by 36%.

Discussion.

Based on the analysis of the above results, it was determined that 180 minutes was chosen as the optimal cooking time for the delignification process. In this, cellulose content is 52%, α-cellulose is 89.2%, polymer grade is 900, whiteness is 82%, hemicellulose in separated cellulose is 8.2%, and the amount of ash is 1.2%. This characterizes that it is suitable for chemical processing.

In section 2 of the table, the delignification process was carried out in sodium baking at higher concentrations of NaOH. Cellulose was extracted from 20g/l solution of alkali to 70g/l solution. An alkali solution of 40 g/l was chosen as the optimal concentration. At high concentrations, some quality indicators of the released cellulose gave negative results.

In the 3rd section of the table, the influence of baking soda temperature on quality indicators of cellulose was studied. That is, increasing the cooking temperature from 120 ^{0}C to 150 $^{0\,C}$ had a positive effect on the yield of cellulose, the degree of polymerization and α-cellulose, in which the yield was 52%, α-cellulose was 89.2%, and the amount of ash was 1.2%. , on the contrary, increasing the cooking temperature from 160 ^{0}C to 170 ^{0}C led to a sharp decrease in the yield of released cellulose and the degree of polymerization. As a result of the analysis of the study of cooking time for the process, the temperature of 150 ^{0}C was determined as optimal.

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