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DEVELOPMENT OF TECHNOLOGY FOR WASTEWATER TREATMENT GENERATED DURING SILK PROCESSING AND THEIR REUSE IN THE PRODUCTION PROCESS

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ABSTRACT

This article presents methods for the chemical analysis of wastewater composition, the development of wastewater treatment technology generated at cocoon production plants, and their reuse in the process of extracting silk fiber from cocoons.

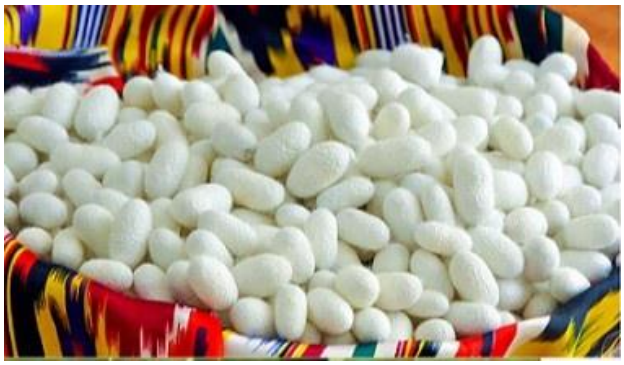
KEYWORDS

Coagulant, amount of dry residues, electrical conductivity, technology, surfactant, wastewater.

Introduction

Today, the constant increase in the number of points for the extraction of silk fiber from cocoons leads to an aggravation of the environmental situation, as untreated wastewater is discharged into sewers, often into the ground and even into fishing and drinking ponds. Obtaining silk fiber from a cocoon, the amount of such wastewater from the mine usually ranges from 1 to 3 m3 per hour[1-2].

Wastewater generated at stations for the extraction of silk fiber from cocoons is mainly contaminated with suspended solids and petroleum products, the amount of which reaches 2000 mg/l.



The permissible concentrations of these pollutants during waste discharge into wastewater are 15 mg/l and 0.3 mg/l, respectively, for industrial wastewater, when discharged to the earth's surface - 10 mg/l and 0.1 mg/l and when discharged into a fishing pond-3-5 mg/l and 0.05 mg/l. At the same time, in process water intended for car washing, the content of suspended solids is up to 70 mg/l, petroleum products - up to 20 mg/ l, and for extracting silk fiber from a cocoon - 40 mg / l and 15 mg / l, respectively. The design of a wastewater treatment and circulating water supply system is important.[3-7]

Wastewater treatment generated during the extraction of silk fiber from the cocoon technology development is one of the urgent problems of our time.

This technology includes various methods of physico-chemical wastewater treatment (precipitation, flotation and filtration using various porous filter materials, this significantly reduces costs.

Taking into account the growing need to create small-sized, inexpensive and high-performance wastewater treatment plants for sericulture enterprises, experimental studies on the creation of a wastewater treatment plant were conducted in the water supply department of the Bukhara Region and the research laboratory of the Bukhara State University. The proposed device includes:

- filter for separating coarse solids from water;
- separation of colloidal particles and petroleum products;
- non-pressure flotation device for water purification from surfactants;
- column with adsorbent.

According to this scheme, the treated wastewater contains 12-15 mg/l of suspended solids and 4.5-5 mg/l petroleum products, which allows them to be reused in the process of extracting silk fiber from the cocoon. Floating petroleum products are collected in an intermediate tank and periodically transported to asphalt plants.

Wastewater generated at sericulture enterprises consists of a mixture of various substances and forms a complex system: dissolved inorganic and organic compounds, suspended coarse-grained dispersed and colloidal impurities. Extraction of silk fiber from the cocoon the chemicals used in it are washed off with water, a certain part is dissolved in water to form a colloidal solution. Wastewater collected at mines contains surfactants (SPS), petroleum products. These substances should not be thrown directly into nature. The water is purified and disinfected to a technical level if coagulants are used, which we offer to extract the above substances from the water that pose a danger to flora and fauna, and to neutralize them. Drinking and process water is saved by treating wastewater coming from enterprises for the production of silk fiber from cocoons to the level of process water and re-directing it into the process of obtaining silk fiber from cocoons.Thanks to the proposed wastewater treatment technology, up to 90% of the generated wastewater is sent for reuse as process water.

Table 1. Indicators of wastewater samples from enterprises for the extraction of silk fiber from the cocoon under study for purification

Sample analysis	Transparency	Dry residue mg/l	pH	comparative electrical conductivity χ mKCm/cm	TDS mg/l	SAL	Overall stiffness
Technical water	Transparent	1000	7	41.0	15.75	0.02	7-9
Ground water	Transparent	1050	8	4700	2100	2.5	16.5
Output from enterprises for obtaining silk fiber from the cocoon	Pale	2325	7.5	4897	2347	2.38	18.8

Table 2. Indicators of wastewater samples from enterprises for the extraction of silk fiber from the cocoon under study after purification

Sample analysis	Transparency	Dry residue mg/l	pH	comparative electrical conductivity χ mKCm/cm	TDS mg/l	SAL	Overall stiffness
Technical water	Transparent	1000	7	41.0	15.75	0.02	7-9
Ground water	Transparent	7	1050	4700	2100	2.5	16.5
Output from enterprises for obtaining silk fiber from the cocoon	Transparent	7.5	773	1317	1514	1.04	8

Based on laboratory experimental tests, the composition of the waters was fully analyzed before and after washing to obtain silk fiber from the cocoon.The results of the analysis show that when synthesized coagulants are added to the wastewater of sericulture enterprises, properties such as pH, hardness, amount of dry residue, color, odor, electrical conductivity are equated to the indicators of process water. This suggests that in this method, purified water can be re-applied directly in the process of extracting silk fiber from the cocoon. However, purified waters can also be used for greening the environment.

One of the important problems is the disinfection of wastewater generated during the extraction of silk fiber from the cocoon, reducing its impact on the natural environment, as well as the use of the proposed method for the processes of extracting silk fiber from the cocoon, conducted through wastewater treatment plants and bringing the content to the level of industrial water.

The full compliance of the treated wastewater with the requirements for technical waters in terms of composition and indicators, as well as their unsuitability to affect the details and color of the car when used in car washing, has been scientifically substantiated based on pilot tests.

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