



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

IJRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 11, Issue 1, January 2022

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.569

9940 572 462

6381 907 438

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Quality of Cotton Waste and Their Efficient Use

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ABSTRACT: The article explores the possibilities of collecting, pre-processing and adding to the working mixtures of wastes generated during the processing of mixtures of different compositions. The research was carried out in the production conditions of three spinning mills, using three variants of technological systems installed in these mills, two of which produced pneumo-mechanical yarns and analyzed the quality indicators of yarn.

KEYWORDS: breeding area, fine and large contamination, selection, cleaning efficiency

I. INTRODUCTION

The article explores the possibilities of collecting, pre-processing and adding to the working mixtures of wastes generated during the processing of mixtures of different compositions. The research was carried out in the production conditions of three spinning mills, using three variants of technological systems installed in these mills, two of which produced pneumo-mechanical yarns and analyzed the quality indicators of yarn.

The state standard UzSS 3310-2018 is applied to secondary material resources in the processing of all types of cotton fiber [1].

It is known that the fiber class describes the total amount of defects and foreign impurities in them. The differences between the classes also depend on the industrial navigation of the fiber. Quantitative differences of defects and foreign compounds between adjacent varieties and classes range from 0.5% to 3.5%. Typically, these differences are taken into account in the formation of the primary mixture. However, this difference in the waste generated is very large and is not reflected in the classification. Although it has a significant share in the amount of spinning, it requires special cleaning for processing.

II. METHODOLOGY

Given the above circumstances and data, this study explored the possibilities of waste collection, initial processing, and addition to working mixtures generated during the processing of mixtures of different compositions. The research was conducted under the production conditions of three spinning mills. These enterprises use three variants of installed technological systems, two of which produce pneumo-mechanical yarns. In these factories, grinding and cleaning, mixing and scraping processes are carried out on machines of the firm Truetzschler (Germany). In the third enterprise, the yarn is produced in a ring method [2].

Here, the grinding and cleaning, mixing and scraping processes are carried out on JINTAN machines. 10 samples were selected in the study. 2 of them are cotton fibers.



Table 1 shows the names, preparation sites and characteristics of the samples.

Table 1

Location and properties of fiber and fibrous waste samples

Cleaning unit and combing machines	Sample number	Description of the sample
Equipment from JINTAN	1	4 type I sort cotton fiber
	2	collected St.7,11 waste
	3	harvested nut and fluffy St.3
Truetzschler equipment (pneumatic mechanics)	4	4 type II sort cotton fiber
	5	pressed St 7.11 waste
	6	collected St.7,11 waste
Truetzschler equipment (ring method))	7	collected St.7,11 waste
	8	harvested nut and fluffy St.3
Waste treatment unit UOA-2	9	cleaned St. 7.11 waste
	10	peeled walnuts and fluffy St.3

Typically, the following methods are used to identify and analyze defects in fibers and fiber wastes, fiber and particle size: manual sampling, device separation of defects and debris in samples, and treatment of samples with reagents. Although manual sorting requires a great deal of labor, this method allows the careful identification of various types of defects and peculiarities. Such results are necessary to study the causes of defects and develop recommendations for measures to eliminate them [3].

Manual quantitative sampling of samples was performed according to the standard method [4].

III. EXPERIMENTAL RESULTS

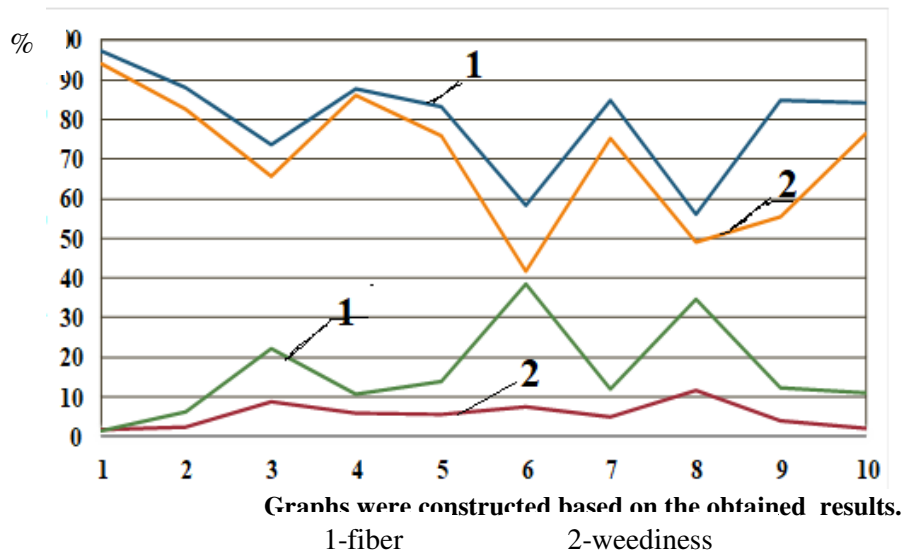
In the experiments, fibrous seed pods, rods and twigs were manually separated and weighed. The percentages of each of them were determined. Preliminary analysis showed that the samples taken at the second plant had many defects and shortcomings. The reason for this is that the recycling of the main mixture at the plant by mixing Type 4 Type II fibers with fibrous waste significantly worsens the waste composition. In UOA-2, the amount of fibrous seed husk is significantly reduced during waste recycling (Example 9).

It can also be said that the number of entanglements is relatively high in №3 wastes, especially in low-grade fiber mixtures. Such a comparative analysis can be continued, which confirms the assumptions that the composition of the waste depends on the primary sorting composition and the technology used. Shirley Analyzer MK2 Cotton Model, SDL Atlas (USA) with a fibrous material drum was passed through the laboratory equipment to separate the defects and impurities in the sample in the equipment [5].

Graphs showing the composition of fibrous wastes show that samples 6 and 8 have the highest specific gravity. However, the test methods gave different results, while maintaining the above regularity. Based on the research and analysis, it was found that in determining the composition of the mixture for the production of yarn for a specific purpose, it is necessary to take into account the fiber class, to conduct quantitative analysis of its composition to more accurately assess the quality of fiber waste [6].

In studying the effect of emulsification of fibrous waste on technological parameters, taking into account the specificity of raw material properties, the effect of four different composition emulsifying mixtures for fiber mixtures consisting of a mixture of low-grade fiber and fibrous waste on technological processes and fiber mass quality change.

Graphs were constructed based on the results obtained.



When samples are tested under the influence of a drum shock in the Shirley Analyzer MK2, some brittle compounds break down and the amount of invisible waste increases.

IV. CONCLUSION

Thus, in determining the composition of the mixture for the production of yarn for a specific purpose, it is necessary to carefully select the fiber class, conduct quantitative analysis of the quality of fiber waste, organize the cleaning process in order to separate them from major defects and abrasions.

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