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Influence of Contaminated Cotton on Yarn Manufacturing

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Abstract: Contamination is the major issue of concern to the ginning, and textile industry. In our study cottons with and without foreign matter were processed into yarn. The cotton was carded but the contamination was not fully firmed by the card as foreign matter often flattened in carding. The contamination tends to fibrillate and behave as coarse fibers. The contaminated cottons fiber always appears to interfere with the drafting process and the ring travelers during yarn formation resulting in increased end breaks, thus lowering the strength of contaminated yarns.

Keywords: Influence of Contaminated Cotton were processed into yarn

1. INTRODUCTION

The presence of foreign matter in ginned lint can cause cotton to be reduced its inherent characteristics and value while its grading and classification, also cause a determination in spinning quality American Society for Testing and Materials (ASTM). (2001).. Contamination directly effects strength and fineness as well as on the processing quality of cotton Ellen (1992).. This study is to determine the influence of contaminated cotton on yarn manufacturing.

Experimental.

The two bales of NIAB-78 upland variety of cottons were selected; one contaminated bale of medium staple 1-1/32 inch (2.62cm) another bale of same staple variety. The selections were based on similar fiber properties and it's testing of Shirley Analyzer for non-lint content, Fibrograph length, Pressley strength, and Miconaire fineness measurements were made on two samples of ginned lint from each bale at fiber testing laboratory of the department. Shirley Analyzer non-lint content was determined on one sample of ginned lint from each bale.

Processing and testing.

Both cottons were processed into yarn in the textile product lab at Mehan University of Engineering & Technology. These cottons processed by Rieter B3/4 Bale opener, B11 UNIclean, B3/3 Mixing opener, B60 UNIflex, C15 Card, D35 Draw frame, and EGM 168 Ring frame (China). The preparatory processing specifications were 0.0330 g/cm sliver carded at 0.050 g/s, 0.0366 g/cm drawing sliver formed at 130 cm/s, 0.0330 f/cm roving produced at 23.5 cm/s. The cotton was carded rolls loading used was 126,000 g. The cotton was spun into 0.000123 g/cm yarn with 6.27 turn/cm at 16.3 cm/s. **(Table 1,2)**

Table 1. Statistical analysis for lint classification, fiber properties, and processing waste for contaminated cotton:

Source	NIAB78 cotton	NIAB78 cotton
Grade	Grade 3	Grade 4 (contaminated)
Staple — inch	1-1/32 (2.62 cm)	1-1/32 (2.62 cm)
Micronair -unit	4.3	4.7
2.5% span length, cm	2.62	2.62
1/8 in, gauge Pressley x10^{-7} dyne/cm^2 strength	3.61	3.62
Shirley Analyzer non-lint Content, %	1.76	2.63

Table.2 Individual spinning performance and yarn qualities for contaminated cotton:

Source	NIAB78	NIAB78
Grade	Grade 3	Grade 4 (contaminated)
End down spindle, h	41.0	47.3
Strength x10^{-7} dyne/cm^2	2.00	1.98
Irregularity C.V., %	24.0	23.3

There is no difference in miconaire reading within the source of cotton. The number of end breaks per 96 spindles during spinning was used to characterize processing performance. One yarn size and 5 strength measurements were made on each of 5 yarn packages made from for each test. And all yarn packages made from both cottons were tested by Uster4 for yarn evenness at 37.1 cm/s. Testing including fiber quality evaluation, ring according to following established procedures has been made for:-

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2. MATERIAL AND METHODS

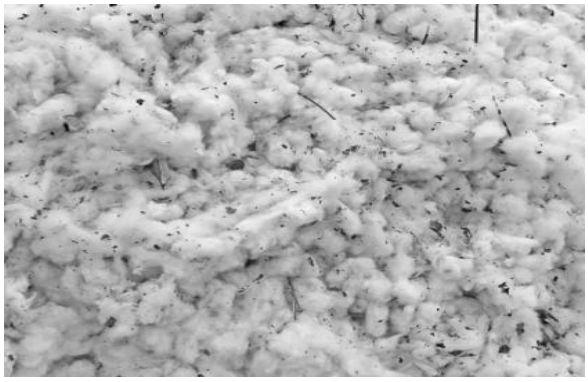
The both cottons were initially classed as normal preparations, one-grade up and one-grade reduction, but review classification the cotton containing trash were considered to be one-grade reduction. The one-grade reduction indicated that the cotton averaged 0.61% trash **(Table 3)**.

Table.3 Comparison of contamination effects on spinning quality:

Grade	Grade 3	Grade 4 (contaminated)
Ends Down spindle, h	34.5	45.7
Strength $-x10^{-7}$, dyne / cm^2	2.06	1.97
Irregularity C.V., %	23.6	23.5

The cotton that was reduced in grade because of trash exhibited a slight depression in the micronaire readings. This reduction in micronaire reading is thought to be because of the increased non-lint content of the cottons containing trash. The clean cotton was longer and stronger than the one-grade reduction. The cottons always reduced in grade because of contamination produced higher non-lint contents and processing waste than the clean cotton.

Spinning performance and yarn properties.



Grade 3 Cotton



Grade 4 Cotton

3. RESULT

Spinning performance and yarn quality determinations are shown in Table 2. The number of ends down was higher for the cottons reduced in grade because of contamination. The strength of the yarn averaged lowest for the cottons reduced in grade. Comparisons of the grade effects are presented in (Table 3). The cottons containing trash produced increased end breaks during spinning and were of lower strength than the clean cotton. The trash particles most likely interfere with twist insertion at the front roll during spinning. The trash particles are thought to upset the traveler during spinning therefore causing ends-down.

4. CONCLUSION

While comparison it revealed that the clean cotton was longer and stronger than the cotton reduced in grade because of contamination. The cotton contaminated with trash produced increased textile mill processing waste, and decreased yarn strength. The overall trend for the comparisons between cottons of normal preparation and those reduced in grade because of contamination was toward reduced spinning quality.

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