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INFLUENCE OF NOILS UPON COTTON YARN QUALITY

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Different proportions of short fibres extracted from comber noils were blended with cotton variety MNH-93. The effect on yarn number, yarn strength and yarn evenness for 22'S was found to be significant.

Key words: cotton yarn, noils

INTRODUCTION

In addition to raw cotton, Pakistan exports a bulk of its waste, which fetches low price as compared to the export of cotton yarn. The wastes such as blow room droppings, taker-in, card flat strips and comber noils extracted at preparatory stages of cotton spinning are sold as such. There are a few waste plants in operation in this country which utilize a small quantity of cotton waste mechanically, leaving a considerable quantity of cotton waste to be utilized by hand spinners and up-holstery makers who spin coarse yarn. Obviously, the yarn spun from such material is poor in quality. Rapid increase in the cost of raw material affects the cost of manufactured yarn. It is, therefore, suggested that some appropriate measures should be taken to reduce the cost of yarn production by using considerable quantity of waste, while keeping in view the acceptability ofthe quality of yarn.

Booth (1983) stated that strength of fibres is generally regarded as an important criterion of quality. Wulfhorst and Friebel (1986) reported that the quality of yarn is characterized by various textile physical parameters such as strength, count and evenness, of which the most fluctuating characteristic is yarn number. Basit (1990) reported that differences in yarn number for different cotton/noil blends were found to be highly significant. Sheikh (1991) observed the yarn lea-strength of Pakistani cotton for the count 20'S as 107 lb.

MATERIAL AND METHODS

This study was conducted in the Crescent Textile Mills Ltd., Faisalabad. MNH-93 cotton variety having 4.2 microgram per inch fineness, 27.50 mm staple length, 50.90% uniformity ratio, 88.50 thousand pounds per square inch strength and 88% maturity was used for this study. Waste extracted at comber noils consisting of short fibres was blended with cotton in different ratios such as To = cotton. 'PI = 93.75% cotton + 6.25% noils, T2 = 87.50% cotton + 12.50% noils, T3 = +81.25% cotton 18.75% noils, T4 = 75% cotton '+25~ noils and 'I's = 68.75% cotton +31.25 noils at draw frame. Yarn of 22'S was prepared on ring frame.

Yarn count was determined according to the method approved by ASTM (1968a) with the help of Uster Auto Sorter, which monitors direct reading with coefficient of variation. Yarn strength expressed in terms of lea-strength was determined on pendulum Type Tester by skein method as suggested by ASTM (1968b). Yarn unevenness was evaluated on Uster Evenness Tester Model UT-Ill according to its operational manual by Uster Zellweger Ltd. Completely randomized design was applied in the analysis of variance for testing the various quality characters. Tests of significance were made both at 1 and 5% levels of significance for interpretation of results. Duncan's new multiple range test was also applied for individual comparison of means as suggested by Steel and Torrie (1984).

RESULTS AND DISCUSSION

Yam Number: The analysis of variance ofthe data of yarn count (Ne) for different cotton/short fibre blends and individual comparison of means is shown in Table 1. This table shows that differences among the mean values for blends due to both sources of variation I.e. count and treatments were highly significant. The comparison of individual mean values shows the highest count value for Ts followed by T4, T3, T2, To and TI with their mean values as 23.63, 23.53, 23.19. 22.85, 22.57 and 22.49, respectively. The lowest variation in count value was recorded for TI, being the optimum value.

The relationship between short fibres percent addition to cotton variety MNH-93 and yarn number is represented by regression equation Y = 22.43 + 0.036 X (where Y = yarn number, X = short fibre percentage added). The regression equation shows that with each unit increase in the short fibre percentage in the material, yarn count would increase by 0.036. The present results agree with

Table 1. Analysis of variance for different yarn characteristics

S.O.V.	d.f.	Yarn number (22's) M.S.	Yarn number (22's) F.ratio	Yarn strength M.s.	Yarn strength F.ratio	Yam unevenness M.S.	Yam unevenness F.ratio
Treatment	5	1.88	15.79"*	1221.99	166.63**	50.41	218.50**
Error	54	0.12		7.33		0.23	

** Highly significant (P<O.Ol).

Table 2. Comparison of means for different yarn characteristics

Treatment	Yarn number (22's)	Yarn strength Ob)	Yarn unevenness (%)
To	22.57 cd	100.90 a	12.05 f
r:	22.49 d	97.90 a	13.17 e
T2	22.85 c	89.50 c	14.25 d
Ta	23.19 b	81.80 d	15.02 c
T4	23.53 a	80.50 d	16.74 b
Ts	23.63 a	71.70 e	18.11
CV (%)	1.50	3.11	3.23

'Means for any characteristic with different alphabets differ significantly (P<0.05).

various textile physical parameters, among which the important criterion is the fluctuation in yarn count.

Yarn Strength: The analysis of variance of data relating to lea-strength and resulting from different blending ratios of noils with cotton and tneir individual comparison of means is shown in Table 2. It is indicated that differences in mean values due to addition of different percentages of short fibres were highly significant. The highest yarn strength was recorded for control sample (To) followed by 'I'i, T2, Ta, T4 and Ts with mean values as 100.SO, 97.90, 89.50, 81.80, 80.50 and 71.70 lb respectively.

The results indicate that lea-strength decreases with each progressive addition of short fibres to cotton. The regression equation Y = 101.53 - 0.49 X was computed (where X = short fibre a~dition, Y = yarn strength) which shows that with unit change in short fibre content, the yarn strength changes in opposite direction. Optimum results were obtained for control sample (To). These findings partially agree with the findings of Rusca (1970) who stated that short fibres could contribute little ;'0 th' ',C-:: strength. Further, in present study, under no circumstances the blend of short fibres could give comparable results with that of pure cotton, having no short fibres in it.

Yarn Unevenness: The analysis of the data related to yarn unevenness is shown in Table 2. Highly significant differences exist among samples having different percentages of short fibre blends. Comparison of individual mean values shows the lowest value for control sample (To) followed by 'I'r, T2, Ta, T4 and Ts. Different level blends of short fibres varingly affected yarn evenness. The higher the proportion of short fibre blend, the lesser was the yarn evenness. Pertinent values were 12.05, 13.17, 14.25, 16.u2, .i.o.74 and 18.11% against Tl, T2, ~a, T4 and Ts short fibres blended at draw frame respectively. The regression equation Y = 11.91 +. 0.19 X (where Y = yarn unevenness percentage and X = short fibre blend percentage) showed that each unit change in short fibre blend causes 0.19% unevenness in yarn. The present results conform to those of Sethi (1960) who described that although both longer and shorter fibres contributed to the staple irregularity of cotton but short fibres cause evident losses and produced unevenness in yarn. The results of the present study indicated that quality of yarn spun is degraded consistently with progressive increase of short fibres in it. However, to bring the cost of yarn down and to produce a yarn of acceptable quality not more than 12% short fibre noils should be blended:

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Cotton yarn mat preparation: A wrapping machine was used to wind cotton yarn at a private textile factory in Surat. Fiber mats of the required size of 300 Ã— 300 mm2 were produced using a cutter, as shown in Fig. 13.1. Each mat weighed approximately 15 gm. Figure 13.1. Cut mat of cotton yarn. CFPC preparation: There are number of methods available to prepare composites: compression molding, vacuum molding, pultrusion, resin transfer molding, hand layup, etc.Â Different desizing techniques are employed depending upon the kind of sizing agent to be removed. Sizing agents are commonly based on natural polysaccharides (starch, protein and cellulosic derivatives) and synthetic polymers (polyvinyl alcohol (PVA), polyacrylates, polyesters and polyvinyl acetates). During the production of yarn, cotton and other fibers experienced a range of mechanical processes. In its phases of operation at blow room, card, draw frame, flyer frame and ring frame, these places can be subjected to change from one department to other in order to receive optimum production efficiency and lowest waste. A study reveals that for a range or relative humidity from 25 percent to 65 percent and a frequent temperature of 25 degree Celsius, the roller-lapping drift changes.Â After conditioning, while a majority of the quality factors get well, there is a clear increase in imperfection values provided by capacitance type evenness testers. The increment in yarn imperfections normally occurs because of mechanical processing - mainly rubbing of yarn on any peripheral surface. Key words: cotton yarn, noils. INTRODUCTION In addition to raw cotton, Pakistan exports a bulk of its waste, which fetches low price as compared to the export of cotton yarn. The wastes such as blow room droppings, taker-in, card flat strips and comber noils extracted at preparatory stages of cotton spinning are sold as such. There are a few waste plants in operation in this country which utilize a small quantity of cotton waste mechanically, leaving a considerable quantity of cotton waste to be utilized by hand spinners and up-holstery makers who spin coarse yarn. Obviously, the yarn spun fro