A study of jute (tossa and white)-wool blends, in different proportions, has been made, as regards their strength, elongation, lea breaking strength, resilience, etc., with a view to finding new uses for jute fibres. The results indicate that blends of both types of jute with ‘C’ grade wool in 30 : 70 proportion can be utilized for making carpets, blankets and furnishing fabrics.

In the present study, the possibility of finding new uses for jute fibres after blending with ‘C’ grade wool has been investigated.

Materials and Methods

Woollenized tossa and white jute were cut into 75 mm staple (approximate) length, willowed twice separately for preliminary opening and mixed with ‘C’ grade (40 μ diameter, 75 mm fibre length) wool in three different proportions, viz. 15:85, 30:70 and 50:50 jute/wool respectively. After subjecting each lot of jute-wool mixture to another willowing treatment, they were processed on woollen machineries, keeping the machine setting and all other factors constant for all the lots. No trouble was encountered during processing at carding and spinning stages, except with the 50:50 blends.

Small samples of jute-wool mixed fibres after last willowing were taken from each lot for bulk resilience test. Drawn samples were then mixed thoroughly on the Laboremixer for homogeneous mixing. The bulk resilience was tested on the Instron tensile tester. Five samples, each 1 g, were prepared and tested from each lot for bulk resilience. The sample of loose wool was put on a platform attached to the compression cell of the Instron tensile tester and was compressed with steel anvil at the rate of 0.5 cm/min up to 5 kg load. Subsequently, the samples were unloaded at the same rate. The loading and unloading curves were drawn and bulk resilience calculated from them.

The importance of fibre length in determining the character of spun yarn is well recognized. To see the effects of processing on fibre length, the samples were drawn after willowing and from breaker and finisher cards. Three sub-samples, each of 300 fibres, were measured for fibre length.

Sliver from the finisher card was drawn and tested for count and count variation. Ten bobbins of yarn were selected randomly from each lot for yarn testing. Lea breaking strength and single yarn strength testing were carried out for the assessment of yarn properties. For lea testing, 5 leas, each of 50 m, were prepared from each bobbin and tested on Goodbrands strength tester. Twenty tests from each bobbin of yarn were done for single yarn strength in Uster single yarn strength testing machine (CRL type). During single yarn testing, tension and load were so selected that each break occurred within 18±2 sec. All tests were done under standard atmospheric conditions (65±2% RH at 27°C).

Results and Discussion

Bulk resilience data for blends of jute-wool fibres in different proportions, including the component fibres, are presented in Fig. 1. The superiority of pure wool which gives 59.7% bulk resilience is evident. Both types of jute show very poor bulk resilience as compared to all-wool fibres; slightly better bulk resilience of white jute over tossa jute is clear from Fig. 1. All blends of white jute-wool also gave better resilience compared to the same
blends of tossa jute. Although the resilience of jute-wool blends is lower than that of 'C' grade all-wool fibres, the bulk resilience of 15 : 85 and 30 : 70 blends of either grade of jute with wool is enough for the production of carpet as well as coarse fabrics or furnishing fabrics.

Fibre lengths at different stages of processing are given in Table 1. It is seen that the fibre length decreases from willowing to finisher card. The trend of fall in fibre length with the advancement of processing was reported by earlier workers also. This may be due to the breakage of some fibre during processing or to splitting of jute fibres.

Sliver and yarn count data are given in Table 2. It is seen that both sliver and yarn C. V. % change with change in the proportion of jute in the blends. The variation in yarn count is higher in the case of all-wool lot as compared to any of the jute-wool blends.

Lea breaking and single yarn strength data are presented in Table 3. It is seen that the strength decreases continuously with increase in the proportion of jute in the blends. This is in conformity with the earlier results on 'B' grade wool blends with jute. All-wool yarn of 'C' grade wool has given higher lea breaking strength and lower strength CV% i.e. 52.13 kg and 14.38% respectively. All blends of white jute-wool have shown higher lea breaking strength and lower strength CV% for the production of carpet as well as coarse fabrics or furnishing fabrics.
compared to the blends of tossa jute-wool in the same proportions. The 50 : 50 blends of either of the jute varieties with ‘C’ grade wool show very poor lea breaking strength, indicating its unsuitability for making blends. Like lea breaking strength, the tenacity of all-wool yarn is also higher. The tenacity falls with increase in the proportion of jute. There is negligible variation in percentage elongation with change in the proportion of jute in the blends.

Conclusion
The results of the present study show that, as expected, the strength of jute-wool blends is lower than that of all-wool yarn and it goes on falling with increase in the proportion of jute. This happens despite the higher strength of jute fibre compared to wool because of the very poor percentage elongation of jute fibre which causes unequal sharing of loads during testing. Rupture of the less extensible fibres of blends occurs before much of the load can be shared by the more extensible fibres.

White jute-wool blends are superior to tossa jute-wool blends in respect of resilience, strength, etc. Among the three blends of jute and wool tried (15 : 85, 30 : 70 and 50 : 50) with ‘C’ grade wool, 30 : 70 blends show reasonable strength, elongation, lea breaking strength and resilience. The strength of 30 : 70 blends of jute and wool is enough for further weaving. These yarns can be utilized for the preparation of carpets, blankets and furnishing fabrics. The use of either variety of jute at 30% level will help to produce a cheaper product, as the price of jute is much lower than that of wool.

Acknowledgement
The authors are thankful to Dr R. M. Acharya, Director, Central Sheep and Wool Research Institute, Avikanagar for his guidance. They are also grateful to the Jute Technological Research Laboratories, Calcutta for the supply of woollenized jute. Their thanks are also due to Shri R. K. Arora, Scientist-S and other colleagues in the Wool Science Division of the Central Sheep and Wool Research Institute, Avikanagar for their co-operation.

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