



INTERNATIONAL TEXTILE CENTER • TEXAS TECH UNIVERSITY
LUBBOCK, TEXAS USA

*Sharing current
research
information and
trends in the
cotton and
textile
industries.*

NEW DEVELOPMENTS IN FIBER INSTRUMENTS

The ITC has a new Zellweger Uster Advanced Fiber Information System (AFIS) instrument for the Materials Evaluation Lab. This latest model adds a fineness and maturity module, as well as an automatic sample loader. The purchase was made through the generous donations of Plains Cotton Cooperative Association, Plains Cotton Oil Mill, and Farmers Coop Compress. Other segments of the Texas cotton industry have also pledged support for the enhanced testing capability.

An automatic, high-precision microtome has been added to the microscopy lab to be used for

cutting cross sections of fibers, yarns, and fabrics. The visual analysis system will now be state-of-the-art with the addition of the microtome, which slices specimens down to one micron in thickness.

The Lintronics Fiber Contaminants Tester (FCT) is running well, with a good correlation to the subjective card test for fiber stickiness. A new high pressure liquid chromatograph (HPLC) is now in use for identifying sugars in aqueous samples. The ITC now has an impressive range of quantitative testing equipment for stickiness to support its expanded research in this area.

TEXAS INTERNATIONAL COTTON SCHOOL

Please remember that the next Texas International Cotton School is scheduled to be conducted at the ITC during October 6-17, 1997. For additional information, contact:

Mandy Howell, Lubbock Cotton Exchange
(806) 763-4646 telephone, (806) 763-8647 fax

PRODUCER INFORMATION WORKSHOP

The ITC is assembling and jointly sponsoring a producer information workshop with Plains Cotton Growers and Texas Agricultural Extension Service. The producer education event will be held during the Texas Cotton Ginners Trade Show in Lubbock on April 11. On the program are

sessions on sticky cotton, managing for plant sugar and late season aphid infestations; the boll weevil economic impact study; an introduction of the new Extension cotton specialist—Randy Boman; record keeping for pesticide use; and nematode soil sampling and control.

COTTON FIBER PROPERTIES SEMINAR

The ITC will conduct a cotton fiber properties seminar on June 4th and 5th, 1997. The seminar will include sessions on HVI and AFIS testing and how to read those test results. This is helpful information for cotton breeders and buyers. See the back of this issue for additional information.

STUDY OF SHORT STAPLE PROCESSING OF WOOL/COTTON BLENDS ON ROTOR SPINNING SYSTEM

*William D. Cole, Manager, Short Staple Spinning Lab
Reiyao Zhu, Ph. D., Head of Fibers Research*

This study examined the processing of wool/cotton blends on the open-end rotor spinning system. The intent is to take advantage of higher production speeds possible with this system. Optimization of the spinning parameters may enable the commercial production of wool/cotton blend yarns with sufficient quality for coarse knitting and weaving applications.

Three different wool/cotton blends were tested. These were 75% wool / 25% cotton, 50% wool / 50% cotton, and 25% wool / 75% cotton. The fiber properties are listed in Table 1. Yarns were spun at 6Ne on the Rieter M1/1 system, using a 45mm rotor. Three twist multipliers (4.5, 4.8 and 5.42) and three rotor speeds (55,000, 50,000 and 45,000 rpm) were used, in order to cover the optimum parameters for spinning.

Resulting yarn properties examined included count-strength-product (measured on Scott Pendulum Tester), single yarn tensile properties (on Uster Tensorapid), and yarn evenness (on Uster Tester 3).

Results

Table 2 summarizes the yarn properties that resulted from different twists and alternative wool/cotton blends. The rotor speed used to produce this data was 55,000 rpm. It can be seen that yarn properties showed no significant differences due to twist. Since 4.8 twist multiplier is the manufacturer recommended twist, this was used for further study.

The higher the wool fiber percentage, the lower the yarn quality (Table 2). Thus, as the fiber content changed from 25w/75c to 75w/25c, both yarn CSP and tenacity dropped significantly (about 50 percent). The other properties, such as yarn evenness and elongation, also deteriorated.

The effect of the rotor speed on yarn quality is shown in Figures 1-4. When the rotor speed decreased, yarn strength properties (CSP and tenacity) did not show any improvement; however, yarn evenness and elongation displayed a noticeable improvement. Over all, yarn properties with high

wool content were consistently poor.

In order to explain the lower yarn quality with higher wool content, we inspected the yarn cross sections under the microscope. The pictures of three yarn cross sections are shown in Figure 5. By comparing Figure 5a with 5c, it is clear that the number of fibers in the cross section is much less in the high wool content yarn than in the high cotton content yarn. This is due to a heavier linear density of wool fibers. The yarn with more wool is also less compact due to the larger diameter of wool fibers. It is known that, in general, rotor spun yarns are weaker than ring spun yarns. A major reason is that the rotor spun yarns lack compactness. High wool fiber content aggravates this deficiency, as revealed in Figure 5.

Conclusion

While cotton/wool blend yarns can be spun on the rotor system, yarn quality is poor when the content of wool fibers in the blend is high. These results indicate that the 25% wool/75% cotton blend makes yarn that is adequate for most coarse knitting and weaving applications. However, the 50%/50% blend would be generally inadequate. Therefore, elevating the wool content above 25% should be done only with great care.

Table 1. Fiber properties

Cotton fiber properties	
Strength (g/tex)	28.4
Elongation (%)	6.2
Length (inch)	1.17
Uniformity Ratio (%)	84.2
Micronaire	4.7
Leaf	3
Reflectance	76.7
Yellowness	8.9
Wool fiber properties	
Mean length	1.842
Coefficient of variation	41.36

Test No.	4.5				4.8				5.42			
	CV%	CSP	Tenacity	Elongation	CV%	CSP	Tenacity	Elongation	CV%	CSP	Tenacity	Elongation
75w/25c	15.39	847.5	5.29	5.96	15.68	839	5.45	5.62	15.64	813	5.45	5.44
50w/50c	15.6	1198	7.48	6.03	15.43	1204	7.59	5.94	15.12	1189	7.73	6.21
25w/75c	14.74	1706	10.36	6.61	14.74	1738	10.3	6.68	14.47	1729	10.49	6.85

Table 2. Yarn properties for different twist multipliers

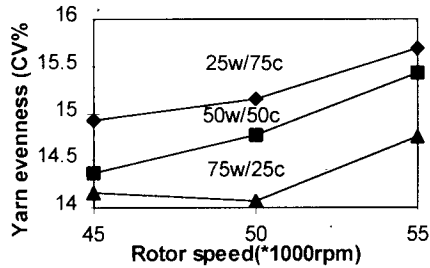


Figure 1. Yarn evenness for three wool/cotton blends at different rotor speeds

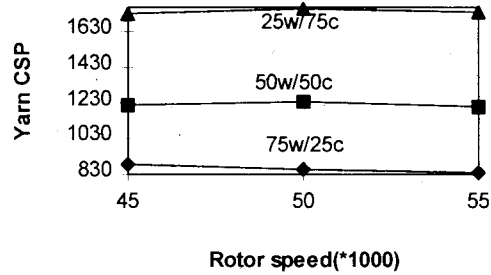


Figure 2. Yarn CSP for three wool/cotton blends at different rotor speeds

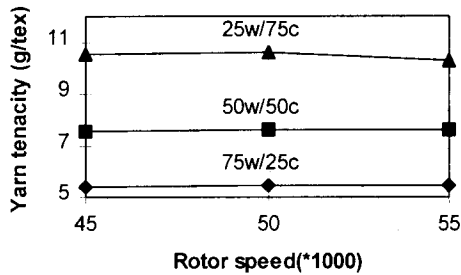


Figure 3. Yarn tenacity for three wool/cotton blends at different rotor speeds

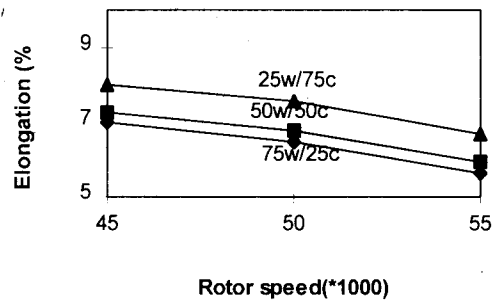


Figure 4. Yarn elongation for three wool/cotton blends at different rotor speeds

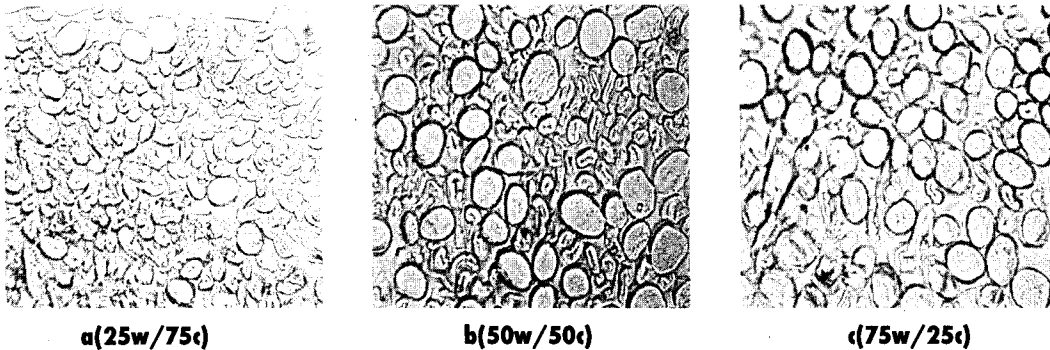


Figure 5. The cross sections of three wool/cotton blending yarns

TRANSITIONS

As of March 1, 1997, James L. Simonton filled the position of Textile Engineer at the ITC. He graduated from Texas Tech University in 1979 and has spent the intervening years in commercial textile manufacturing. He came to the ITC from Lindale Manufacturing, a division of Greenwood Mills. James will be replacing Edwin Foster after he retires on April 30.

In January, two longtime ITC employees retired. Dr. R.D. Mehta, Head of Finishes/Chemical Research, retired after 27 years of service to the ITC. Also retiring was Tom McMillan, Technician IV. Tom worked over 24 years at the ITC. Tom had a variety of duties, but keeping equipment running was his top priority. We will miss our colleagues and wish them well.

COTTON FIBER PROPERTIES SEMINAR, JUNE 4-5, 1997

Cotton is the only commodity sold on the individual characteristics of each unit. Fiber properties of cotton are measured for marketing and utilization in textile processing. Cotton breeders, merchants and buyers need an understanding of the various fiber property measurements and how they may be used.

The International Textile Center has conducted two seminars on Cotton Fiber Properties and announces a third to be held June 4 and 5. Subjects covered will include: Fiber Property Basics, Cotton Fiber Measurement, Spinning Tests, Fiber Contamination, Utilizing Fiber Measurements in Screening for Breeding, Value of Cotton Fiber Properties in Textile Processing, and a Textile Processing Demonstration. Instructors will be: Reiyao Zhu, Ph.D., Head of Fibers Research, ITC; James Simonton, Textile Engineer, ITC; Jane Dever, Ph.D., Research Scientist, BioTex; and Bobby Wyatt, Analytical Chemist, ITC.

Cost of the seminar at \$250 will also include two lunches, dinner on June 4, transportation in Lubbock from the hotel to the ITC each day, and a large notebook of reference material. The seminar will be limited to 25 participants.

The seminar hotel is Barcelona Court (5215 S. Loop 289, Lubbock) which has suites, a cooked free breakfast, afternoon drinks, and airport shuttle for \$55 per night. Make reservations with the hotel directly at 1-800-222-1122.

COTTON FIBER PROPERTIES SEMINAR - JUNE 4-5, 1997

Name _____ Title _____

Firm _____

Address _____

City, State, Zip _____

Telephone _____ Fax _____ e-mail _____

Registration Fee: \$250 (includes 2 lunches, 1 dinner, transportation in Lubbock, notebook)

Make checks payable to International Textile Center.

Confirmation will be faxed back on receipt of a photocopy of this form and registration fee.

For more information contact Pam Alspaugh at:

(806) 747-3790 or (806) 747-3796 fax

Registration deadline is May 28, 1997.
