A NEW METHODOLOGY USABLE BY RESEARCHERS AND SPINNERS FOR SHORT STAPLE FIBER MICROSPINNING

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Abstract

From this specific methodology developed by Cirad, the scientist is able to widen his investigation to variable quantities of cotton ranging from 50 to 500 g. The choice of the amount of cotton will be induced by the cost of the study, the kind of information and the accuracy of the results to be obtained.

Experimental Procedure

For industrial carded varieties of cotton, the procedure is as follows: first opening and blending of cotton, then carding, condensation of the web in a sliver, drawing steps and spinning. As far as the microspinning is concerned, the previous procedure is used by adapting it as a function of the quantity of cotton to be spun.

The microspinning stages for an amount of cotton ranging from 50 to 500g are showed in box 1 and Figure 1.

The Cirad uses a Platt microspinning equipment which consists of a minicard, a drawing frame, and an eight spindles spinning frame with double drawing, as well as a six Suessen open-end rotors.

Practical Results

According to the sample weight (Figure 2), the sliver length is comprising between 15,6 and 175 m and the sliver counts range between 2 300 and 3 500 tex. From these slivers, it is possible to spin in ring spinning or /and rotor to obtain a yarn length between 1 000 to 20 000 m, depending of the count.

Conclusion

It is a specific and original microspinning methodology which consists in processing both very small quantities of cotton fibers:

- 50g necessary to evaluate the varietal improvement
- quantities ranging from 250 g to 500 g necessary for researchers and spinners to evaluate the behavior of cotton fibers in the spinning processes
- the yarn length produced may be used to weave fabrics and to carry out different kinds of tests such as that of dyeing affinity.

References

Frydrych, R., Gourlot, J.P., 1993. Yarn Strength Evaluation Based on Technological Fiber Characteristics Obtained on HVI, *Cot. Fib. Trop.* 48, 201-206 .

Frydrych, R., 1997. Méthodologies pour la microfilature de fibres courtes et l'analyse du fil. Manuel de formation, Cirad, Montpellier, France, 67 p.

Box 1. Microspinning Steps.

The full set of spinning tests must be carried out in standard room conditions.

*First Step: Opening and Carding.*The fiber preparation consists in blending, cleaning, disentangling fibers. It can be split into the two following stages:

- cotton opening and blending for samples of 50 g and over; for samples of 250 g to 500 g, the sample is split into 5 parts of 50 or 100g. The subsamples form into 5 fleeces that will then be carded;
- carding operation provides the cleaning, disentangling and paralleling of fibers while eliminating a part of the neps and short fibers. Depending on the starting weight of the sample, i.e. 50 or 100 g, the outgoing web of a weight of 5g/m² is taken either by the cylinder, respectively l = 0.77 m or 1.57 m.

Second Step: Drawing. The drawing consists in passing the fibrous flow (fleece or sliver) between four pairs of pressing cylinders, driven at different tangential speeds. In all cases, it is necessary to perform three drawing operations. The first passage changes the card outgoing fleece into a sliver. The two other operations correspond to those performed in an industrial plant. Two ways:

- sliver from the sample of 50 g is collected on a taken drum;
- sliver from the sample of 250 g and over is collected in cans.

Third Step: Ring Spinning and Rotor Spinning. Spinning consists in winding the yarn on a support. The two main types are being used : ring and rotor spinning.

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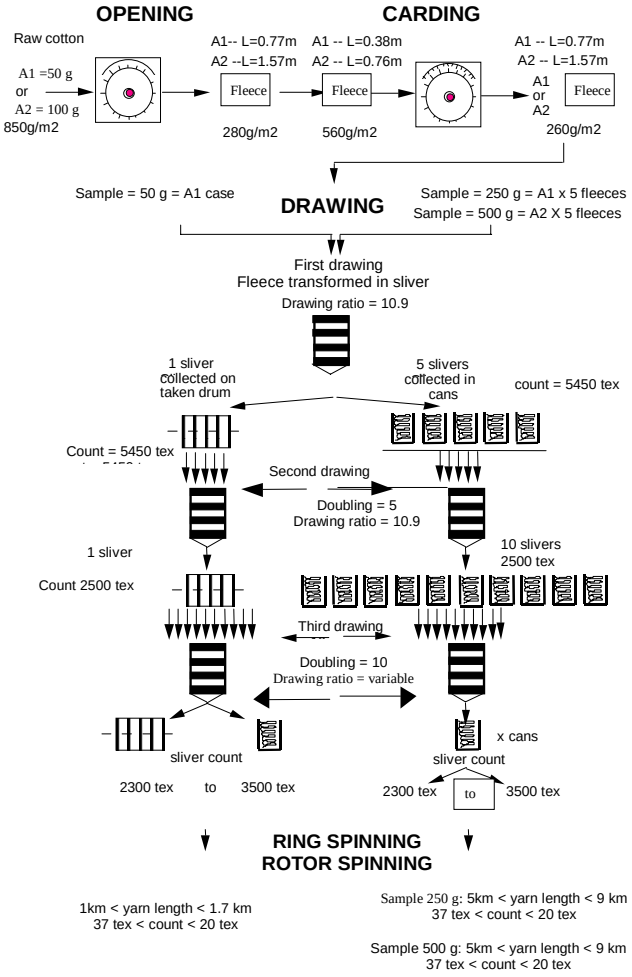

Figure 1. Microspinning process

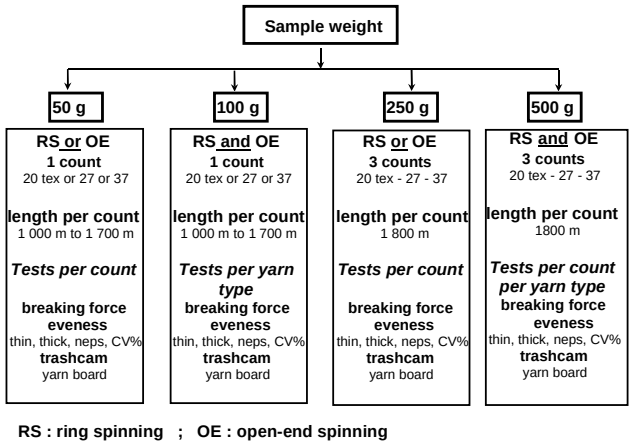

Figure 2. Microspinning trial for different cotton sample weights (50 to 500 grams).