EFFECT OF SPINNING SYSTEMS AND SPINNING PROCESSING ON THE FIBER AND YARN PROPERTIES OF EGYPTIAN COTTON

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Abstract

Yarn characteristics extensively influence by spinning process. The aim of this study is to observe that each processing stage in spun yarn production changes both the single fiber properties and the bundle tensile tested by HVI and AFIS and other quality characteristics and the effect of conventional ring and compact spinning processes, on carded and combed properties of yarn. 100% Giza 86 Egyptian cotton variety was used to produce conventional ring card yarn and card compact yarn. The were settled to fabricate 40 Ne count of yarn respectively both for conventional ring and compact spinning. The positive effect of spinning process on the yarn properties were evaluated by co-efficient of variation (CVm %), imperfection index (IPI), hairiness, tenacity, and elongation (%). The results exposed that yarn qualities of compact spinning were exhibited higher than conventional ring spinning.

Introduction

Fiber to yarn conversion process has been affected by several factors which include properties of raw material, level of technology, machinery and skill of machine operators. In cotton fiber spinning, the cost of raw material plays an important role, since it accounts for over 65% of the total cost of the ring spun yarn. Yarn imperfections on the other hand are an important yarn parameter which affects yarn and fabric processing, and quality parameter.

As a first step, this study examines the changes in single fiber properties by AFIS and the corresponding HVI bundle test results in raw cotton bales and cotton samples taken at the end of each process stage of spinning. By establishing the relations between and among the data sets, the idea is to frame a concept of quality/process control in spinning by use of HVI data. Furthermore, the study is to recommend an expanded HVI output for accomplishing the objectives in coming years.

MATERIALS AND METHODS

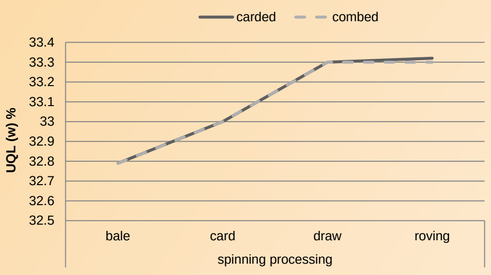
To investigate the effects of yarn processes on the tensile properties of cotton fibers from the lint cotton after ginning to consuming of yarn end-products, it was necessary to collect, process, and test considerable amount of fibers. Although HVI data or AFIS data have provided us varieties of properties of cotton, they have limited amount of usages.

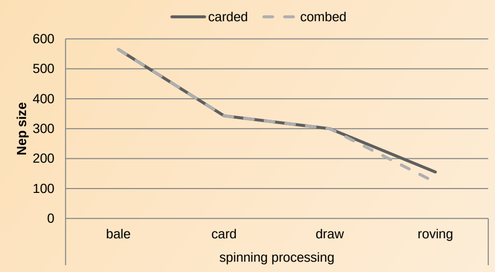
Furthermore, these data could be obtained beyond carding process. Therefore, it is not possible to study the changes by HVI or AFIS in a roving, yarn or fabric form. In addition, the HVI tests represent bundle properties in lieu of single fiber tensile properties.

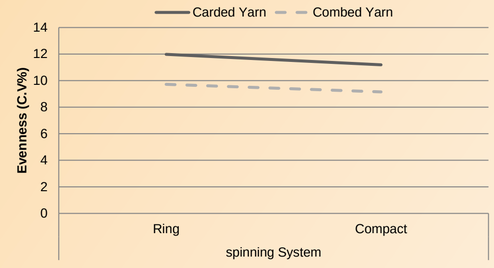
RESULTS & DISCUSSION

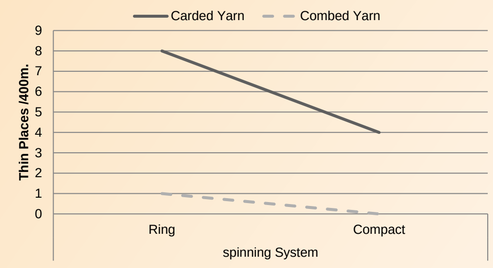
Table 1. Fiber properties for "Delta Egypt" Long Staple Varieties measured on AFIS PRO

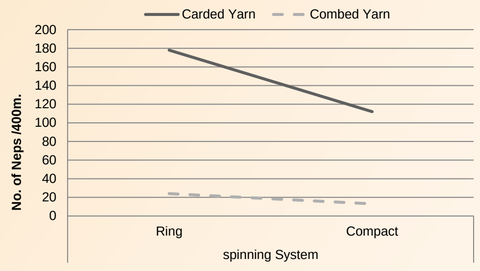
Instruments	Fiber Property	Delta Egypt LS Cotton
		Giza 86
HVI	Upper Half Mean (UHM. Mm)	32.8
	Length uniformity index (U.I. %)	86.7
	Strength (g/tex)	41.7
	Elongation (%)	6.4
	Micronaire	4.4
Uster AFIS-L (w)	Medium fiber length (mm)	27.9
	Coefficient of variation (%)	31.5
	Short fiber content<12.5mm (%)	5.0
(N)	UQL (mm)	33.1
	Medium fiber length (mm)	23.4
	Coefficient of variation (%)	44.3
	Short fiber content<12.5mm (%)	7.5
	Fiber fineness (mtex)	158
	Maturity ratio	0.96
	Immature Fiber Content IFC (%)	4.3
Uster AFIS-T	Total (1/g)	84
	Mean size (µm)	685
	Visible Fiber matter V.F.M. (%)	2.36

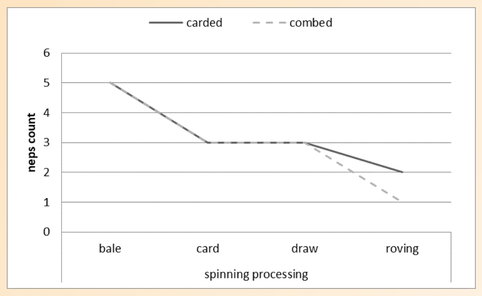


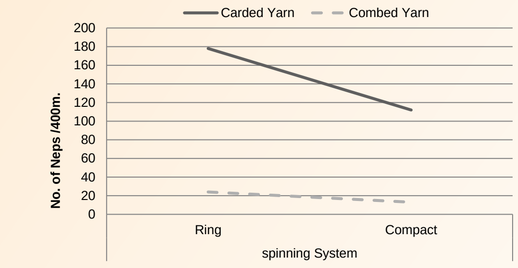


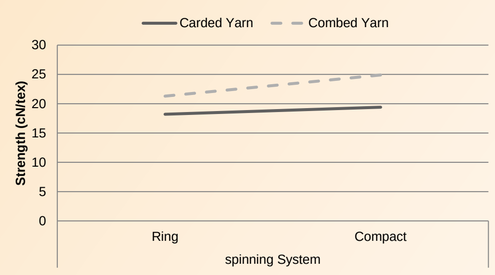


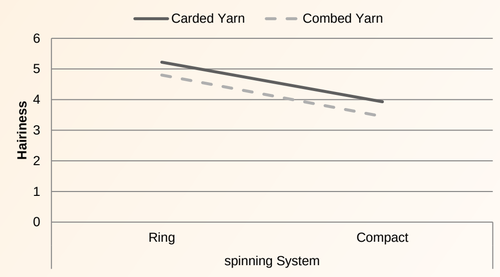












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