Short Communication

Development of jute, cotton and sheep wool blended yarn using cotton spinning system

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Abstract

A large number of farmers are rearing sheep in Bangladesh. Enormous quantity of local sheep wool are wasted due to lack of processing and proper applications. As the consciousness is growing for the use of natural fibre products, this wool can play a significant role. If proper processing technology can be employed in this sector, the natural fibre will be a good resource for us and will meet today's necessity in all respects of life. Wool is normally collected from sheep by shearing in our country. A total of about 2.5 thousand metric tons of raw wool can be collected from local sheep every year. Therefore, the present experiment was undertaken to know the physico-mechanical properties of blended yarn. Wool and jute were treated with chemicals, washed, dried and opened to form spin able fibre. After that, jute, cotton and wool fibres were turned to blended yarn through cotton processing system. In results, it was observed that 30% wool, 30% jute and 40% cotton fibre 12s blended yarn used for blended yarn production. Therefore, Wool, jute and cotton blended yarn may be a new horizon for developing diversified products.

(**Key words:** Wool, jute, cotton, carbonization, blended yarn)

Introduction

Bangladesh is an agro-based country. A large number of farmers are rearing sheep all over the country. The total estimated population of sheep in Bangladesh is 3.313 million and the present annual rate of growth is ever increasing (BER, 2016). Sheep farming is important for socio-economic development in Bangladesh, especially for poverty alleviation, employment generation, improving nutrition (Mahabuzzaman, 2006; Buxton and Fraser, 1977; Kendall and Telfer, 2000 and Suliman *et al.*, 1988). Since the advent of human civilization, quite a large number of fibrous material origins have been identified to meet the essential needs of the human being. Cotton, jute, wool and silk are some of the major fibres, which are widely used throughout the world for producing yarns and fabrics. These huge number of fibres are grown in much similar quantities in different parts of world. However, they have local economic importance and are mostly consumed locally. Local sheep wool mostly goes as waste. It has huge potential for using as textile fibres as well as different finished products. With the conciseness, which is growing for the use of natural fibre products. This fibre can play a significant role if proper processing technology and products of today's necessity can be developed out of this fibre. One such fibre is the sheep wool. Average 700 to 800 grams of raw wool can be collected from each sheep per year. Then 2.5 lacs tons of raw wools will be obtained. At the same times farmers will be economically benefitted (Buxton and Fraser, 1977; Kendall and Telfer, 2000; Suliman *et al.*, 1988). These blended yarn wools are expected to show some properties like CSP (Count Strength Product) Count, elongation, TPI (Twist per

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Inch). It is almost similar to the jute cotton blended count yarn (Mahabuzzaman, 2006; 2011 and Shah and Prasad, 1995). Due to natural source wool, jute and cotton blended yarn has tremendous potentiality for making good quality warm cloth, floor mate, blazer cloth etc. So, the development of local sheep wool blended yarn decorative fabrics and value added products may enable to unlock the enormous potential of this fibre and provide very good scope for sheep farmer to make money. As reported the farming of local sheep wool for making blended yarn, clothing and other household uses (Shah and Prasad 1995; Ahmed *et al.*, 1996; Jabbar and Rahman, 1990; Ali, 1997; Khan *et al*., 2011; Sheikh, 1982). Therefore, the aim of the research work is to know blended yarn properties and to compare the blended properties with respect to 100% cotton, jute and woolen properties.

Table 1. Physical properties of sheep wool, jute and cotton fibre

Property	Jute fibre	Cotton fibre	Sheep wool
Fibre fineness (µg/inch)	5.05	3.35	8.03
Moisture (%)	13-14	7-8	9-10
Tenacity (g/tex)	35	25	32

Materials and Methods

This experiment was conducted during the year of 2014-15 at Bangladesh Livestock Research Institute, Savar, Dhaka and Jute and Textile Product Development Center, Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka. The harvested wool was first washed in water with some chemical to prepare to fibre for making the blended yarn. Development of sheep wool, jute and cotton blended yarn different program were conducted on different aspects of wool viz. quality, process ability in cotton spinning system, blended yarn from sheep wool, jute and cotton fiber.

Sheep wool was collected from Bangladesh Livestock Research Institute, Savar, Dhaka. Jute was collected from local market. Cotton was collected from cotton board. The required chemical was collected from local market. The process sequence of sheep wool, jute and cotton fibre processing in cotton spinning machineries to manufacture sheep wool, jute and cotton fibre blended yarn is given below.

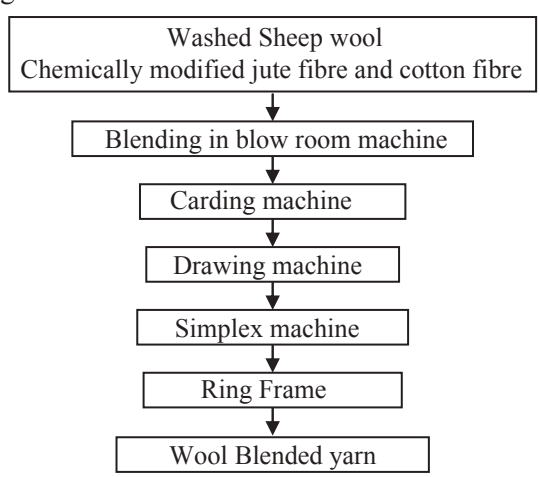

Figure 1: Rearing of local sheep

Figure 2: Shearing of local sheep

Figure 3: Jute fibre

Figure 4: Cotton fibre

Raw sheep wool was washed with detergent and carbonized with 8% H_2S0_4 at normal temperature. Raw jute fibre was treated with sodium hydroxide, sodium carbonate and hydrogen per oxide at boiling temperature.

Results and Discussion

In the present study, it was observed that 30% wool, 30% jute and 40% cotton fibre 12s blended yarn had been successfully developed. During operation, it was seen that there was some limitation in spinning section such as wool dropping was more than jute and cotton fibre. But, count strength product (CSP) was nearer to jute cotton blended yarn (Booth, 1996).

It was observed from the data both wool, jute and cotton blended yarn was appeared to be as near at 100% 12s cotton count yarn (Booth, 1996). Jute and wool were available in the locality. Cotton fibre was costly. For these reason, the cost of wool, jute and cotton blended yarn was less than 100% cotton yarn.

Table 2: Wool, jute and cotton 12s blended yarn compared with 50% jute and 50% cotton blended yarn

Properties	Wool, jute and cotton blended yarn	50% jute and 50% cotton blended yarn
Count	12s	12s
TPI (Twist per Inch)	16	18
CSP (Count strength Product)	1400	1600

Table 3. A comparative result of wool, jute and cotton blended yarn and 50% jute, 50% cotton blended yarn and 100% cotton

Properties	30% wool, 30% jute & 40% cotton blended yarn	50% jute & 50% cotton blended yarn	100% cotton yarn
Count	12 s	12 s	12 s
CSP (Count Strength Product)	1400	1600	2000
TPI (Twist per Inch)	16	18	20
Breaking Elongation	4.00	4.80	5.60
Neps/meter	9	5	2

Note: Count: The "count" of a yarn is a numerical expression which defines its fineness.(Booth, 1996).

Figure 4: Cotton fibre

These wool fibres had various degress of softness. This further resulted in yarn and textiles and different qualities that can be used specific purpose.

Conclusion

Spinning technique and types of spinning can play a vital role for the perfection of blended yarn properties and specific blended ratio is very important to get diversified products. Fine wool is more effective for making yarn than coarse wool. Wool, jute and cotton blended yarn may be a new horizon for developing diversified products. Handycraft sector and cottage industries can use this blended yarn for making their products. Sheep cultivators will be encoureged by selling their waste wool and therefore, the country will be economically benefited.

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