

## **Determination of the optimum technological criteria under different spinning systems affecting the yarn hairiness**

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### **Abstract:**

Yarn hairiness is reflected the amount of free fibers protruding from the spun yarn body towards the outer yarn surface. From a spinning point of view, studying this phenomenon is considered essential step because it influences the post spinning operation and the characteristics of the end textile structure. Many spinning factors are affecting the yarn hairiness. The main objective of this search is to examine the effect of yarn count and twist multiplier on yarn hairiness under six different spinning systems. Accordingly, three yarn counts (40's, 50's and 60's Ne) and three twist multipliers (4, 4.4 and 4.8) were applied. The used spun systems were carded, combed, carded compact, combed compact, jetring carded and jetring combed systems. Three-dimensional response surface graphs were used to easy and faster understand the results. Results indicated that the lowest hairy yarn was spun by jetring combed spinning system with significant differences compared to the other spinning systems. Jetring carded and combed compact ring spinning systems occupied the second order regarding the production of the least hairy yarns with significant differences than the others. Overall the used spun systems, it is indicated that the hairy yarns may be dramatically decreased with increasing yarn count to a certain extent and then slightly decreased while the hairiness was gradually decreased with increasing twist multiplier. However, the percentage of decrease % of hairy yarn with increasing yarn count was greater than that observed by increasing twist multiplier under all spun systems. Multiple regression analysis exhibited that yarn count and twist multiplier explained the most variation of hairiness expressed as high values of coefficient of determination ( $R^2$  %). Also, it is presented that the relative importance % of yarn count toward yarn hairiness was greater than that observed by twist multiplier overall applied spun systems.

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