

The effect of mercerization process on both physical, chemical and mechanical properties of compact cotton gassed yarns.

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Abstract:

There is a deficiency in both aesthetic and functional properties of cotton yarns (carded, combed) and thus the fabrics produced from them (weaving, knitting, domestic fabrics) manufactured from the most spinning methods achieving the aesthetic and functional properties of yarns "compact spinning". In order to contain the yarns on a fair number of dead, immature and short fibers, which are inflexible because these fibers are hollow with a few convolutions in it, which causes their conglomeration and cohesion with each other during the spinning process so-called "Neps" and hairiness. Which is detrimental to the appearance and regularity of both cotton yarns and fabrics especially after the final processing. In terms of functionality, these imperfections (IPI) reduce the tensile strength, elongation, uniformity of yarns, their resistance to wrinkle, friction due to the weakness of flexibility and softness, which leads to shortening the life span of fabrics produced from them. Increases such imperfections (IPI) clearly in both yarns and fabrics, especially with the low quality of current Egyptian cotton grades. Therefore, many developed countries and Echo specifications prohibit the increase of the formaldehyde ratio to 75 ppm and less so, in children's clothing especially those that have direct skin contact (low health properties and pollution of the environment) from one side, the final processing of cotton fabrics leads to deterioration of both physical, chemical and mechanical properties. These are : low tensile strength, elongation, abrasion resistance and friction due to deterioration of cellulose strength after processing due to high mechanical strength, loss of tensile strength From 30% to 60% as compared to untreated fabrics. **Objectives;** Studying the response of the structural structure of compact cotton gassed yarns (carded, combed) with a solution of sodium hydroxide in yarn hank form using yarn tension, and achieve the physiological comfort of the body through both functional and kinetic, thermal, tactile and psychological characteristics commensurate with the functional and aesthetic performance of external clothing and domestic fabrics using environmentally safe materials and free of formaldehyde. **Methodology:** the analytical and experimental methods. Results : The correlation coefficient was extracted and the regression line equation for the different relationships between the different gassed yarns count of the different types (carded, combed) after mercerizing process and : The yarn tensile strength, Breaking Elongation, Yarn Hairiness, Yarn Imperfection (IPI), Yarn T.P.I, yarn Humidity, Gassed yarn count before mercerizing. The yarn count of both carded compact cotton gassed yarns and combed compact cotton gassed yarns reduced by cotton count system after mercerizing process-using tension for many reasons. Yarn tensile strength increased for both carded compact cotton gassed yarns and combed compact cotton gassed yarns after mercerizing process-using tension for many reasons. Breaking elongation ratio of both carded compact cotton gassed yarns and combed compact cotton gassed yarns reduced after mercerizing process-using tension for many reasons. Yarn hairiness disappeared completely in carded compact cotton gassed yarns, especially in combed compact cotton gassed yarns after mercerizing process-using tension for many reasons.

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