FIBRES (incl. Textile and other utility fibres)

NPARR 4(3), 2013-0261 Effect of various metallic salts on antibacterial activity and physical properties of cotton fabrics

In this research work, the antibacterial activity of inoculated cotton fabric in various metallic salts was investigated. Copper chloride, nickel nitrate, silver nitrate, cobalt oxide, antimony oxide, titanium oxide and tin chloride were used as metallic salts. Very good antibacterial activity for silver-, copper-, nickel- and cobalt-treated fabrics were achieved, however, the effect of titanium and tin on antibacterial efficiency of cotton fabrics was moderate. The scanning electron microscope was used for morphological study. Also, the crystallinity and size of crystals for inoculated and untreated samples were studied by using X-ray diffraction method [M Ghoranneviss* and S Shahidi (Faculty of physics, Islamic Azad University, Karaj Branch, Karaj, Iran), *Journal of Industrial Textiles,* 2013, 42(3) 193-203].

NPARR 4(3), 2013-0262 Influence of spinning parameters on milkweed/cotton DREF-3 yarn properties

In this study, *Pergularia* milkweed fibre (70%), cotton fibre (30 %) core and 100% cotton fibre sheath DREF-3 core yarns of 74 tex were produced using different spinning parameters in order to understand their effect on yarn properties. Box–Behnken design was used for the optimization of core ratio, drum speed and suction pressure, and to evaluate the effects and interactions of the process variables on the yarn properties at a constant opening roller speed of 12,000 rpm and production speed of 100 m/min. The effects of the core/sheath ratio on all the yarn properties are significant. With an increase in the core/sheath ratio, yarn tenacity and elongation decrease due to insufficient wrapper fibres in the yarn and yarn unevenness; imperfection increases due to higher feed rate and draft at higher core ratio. The yarn hairiness increases at higher core ratio due to higher number of short fibres in milkweed and lesser sheath fibres to cover the core fibres effectively. An increase in the spinning drum speed damages fibre in the sheath and increases the number of hooks at the end of fibres, as a result of which the core yarn tenacity decreases at higher drum speed. At a higher air suction pressure, yarn tenacity and the elongation at break increases. The drum speed and suction pressure have no significant effect on yarn unevenness and imperfections. The yarn hairiness decreases slightly with increase in drum speed and suction pressure but is insignificant [T. Karthik* and R. Murugan (Department of Textile Technology, PSG College of Technology, Coimbatore, India), *The Journal of The Textile Institute,* 2013, 104(9), 938-949].

 NPARR 4(3), 2013-0263 Extraction of high quality cellulose from the stem of *Calotropis procera*

The stem of *Calotropis procera* (vern. *Aak*) is a source of natural cellulosic bast fibres wherein the commercially valuable properties like cellulose content, fiber strength and fiber elongation are found to be intermediate between that of cotton and linen. Other than high tensile and abrasive strength, fibers from *C. procera* possess more weight per square meter than the cotton fibers. We have been trying to standardize protocol for isolation of high quality cellulose from *Calotropis*. We have compared the effects of alkali treatment and acid treatment on the yield and quality of cellulose fibers obtained. When the retted stems of *C. procera* were treated with 0.5N NaOH, the natural yield of cellulose fibers was approximately 6%. The efficiency of cellulose extraction was increased to 26% when the fibers were treated with 80% acetic acid and concentrated nitric acid (10:1). The percentage composition of cellulose was determined through infrared spectroscopy and acid detergent fiber
method by refluxing. Acid treated fibers show higher percentage of cellulose content (85%) compared to the alkali treated method. The cellulose content in fibers obtained through acid treatment is comparable with that of cotton and better than linen. The acid treated method requires significantly less time compared to the alkali treated method. Since Calotropis is a wildly growing shrub in major parts of India, its use as a source of excellent cellulose fibers might have enormous economical implications [Somnath Maji, Rajesh Mehrotra and Sandhya Mehrotra* (Department of Biological Sciences, Birla Institute of Technology and Science, Pilani, Rajasthan, India), South Asian Journal of Experimental Biology, 2013, 3(3), 113-118].