Preparation and physical properties of regenerated cellulose fibres from cotton waste garments

Abstract

The aim of this research was to investigate the recycling of cotton waste garments by fibre regeneration. Easy care finished cotton fabrics and indigo dyed waste denim garments were successfully purified, dissolved in a suitable solvent and spun into fibres. The physical properties of the resultant fibres were compared with standard lyocell fibres spun from wood pulp and the fibres regenerated from the cotton waste garments exhibited improved mechanical and molecular properties relative to the typical fibres regenerated from wood pulp. Furthermore the results have indicated that a suitable blend of wood pulp and pulp reclaimed form cotton based waste garments can produce fibres with properties that are intermediate to cotton and lyocell fibres. The results suggest an alternative approach to fibre resource management by converting cotton based waste garment through regeneration processing into second lifetime cellulosic fibre. The approach will contribute to the reduction of both economic and environmental impact of waste garments and better management of resources required for production of cotton and synthetic fibres.