Cellulosic Fibers: Effect of Processing on Fiber Bundle Strength - DTU Orbit (24/12/2018)

Cellulosic Fibers: Effect of Processing on Fiber Bundle Strength

A range of differently processed cellulosic fibers from flax and hemp plants were investigated to study the relation between processing of cellulosic fibers and fiber bundle strength. The studied processing methods are applied for yarn production and include retting, scutching, carding, and cottonization. There was a monotonically decreasing relationship between the strength and the number of processing steps, which was well fitted by an exponential regression line. The reduction factor was determined to be 0.27, indicating that the fiber bundle strength was on average reduced by 27% per processing step at the applied conditions. No large changes in cellulose content and crystallinity were observed, so the reduction in strength must be explained by other changes in the fiber ultrastructure. Altogether, the study presents a quantitative basis for reduction in strength of cellulosic fibers due to processing.

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