

**HIGH STRENGTH CELLULOSE-BASED FIBERS FOR DEVELOPMENT OF  
SUSTAINABLE BIO-COMPOSITES**

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Synthetic fibers such as glass and carbon fibers are extensively utilized in manufacturing plastic composites. However, since these fibers are from petrochemicals that are neither renewable nor biodegradable, the development of natural fibers as alternatives to traditional synthetic fiber has gained increasing interest over the past few decades. Under ideal circumstances, certain natural fibers like flax and hemp can display excellent tensile mechanical properties. However, the potential of the fibers is generally not realized in natural fiber reinforced composites. Partly, this poor performance can be explained by the presence of defects in the fibers, known variously as microcompressions, dislocations, or kinks, and arise from fiber growth and extraction processes. Herein, we present a series of efficient approaches associated with fiber delignification and regeneration to improve adverse effects of fiber defects and produce the fiber with superior mechanical properties and less variation. The treated fibers are favorably comparable to some synthetic fibers and provide great potential for fabricating sustainable high-performance polymer composites.