

Preparation of hydrophobic nonwoven using recycled jute fibre and a titanium dioxide/fatty acid coatingMohamed Ameer Arfaoui^{1,2}, Patricia I Dolez¹, Martine Dubé² and Eric David²¹CTT Group, Canada²École de Technologie Supérieure, Canada

A large quantity of jute fibres is used each year, for example as packaging bags for cotton and coffee or as a building material. These fibres can be recycled after use and given a second life in order to divert them from landfill. However, their performance may be reduced compared to virgin jute. In particular, they may become more sensitive to moisture. Therefore, the aim of this study is to develop a hydrophobic treatment for recycled jute fibres. A non-woven composed of 85% of recycled jute fibres and 15% of sheath/core bicomponent fibres was manufactured by carding/needling and thermally bonded using a calendar. The jute nonwoven was then coated with a dip-pad-dry method using different solutions of titanium dioxide (TiO₂) nanoparticles developed by a sol-gel process. It was followed by a treatment by different concentrations of stearic acid, a typical fatty acid. The untreated samples had a water drop retention time of 31s. They became superhydrophilic after being treated with the TiO₂ solutions. Upon treatment with more than 4 mM of stearic acid, the sample retention time exceeded 120 min, indicating an hydrophobic behavior. This study also showed that the TiO₂ nanoparticles size, which increased with the ethanol concentration in the TiO₂ solutions, did not seem to have an effect on the nonwoven hydrophobicity. In addition, no significant effect of the hydrophobic treatment on the thermal stability of the jute nonwovens was observed. This “green” hydrophobic treatment opens large opportunities for technical applications of recycled jute fibres.

Biography

Mohamed Ameer Arfaoui is a PhD student in Mechanical Engineering at École de Technologie Supérieure of Montreal (Canada). He is carrying out his research project at CTT Group (Canada). He received a Master's degree's in Industrial Engineering from the École Nationale Supérieure des Arts et Industries Textiles and the Université de Lille (France). He also holds a Bachelor's in Textile Materials Engineering from the École Nationale d'Ingénieurs de Monastir (Tunisia). He specializes in the surface treatment of textile fibres and biocomposites.

marfaoui@gcttg.com**Notes:**