

Packaging from recycled textile fibers. Opportunities and challenges.

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The environment is facing some urgency related to fashion industry, according to a report around 92 million tonnes per year of textile waste ends up in landfills [1]. As consequence of fast fashion cycle and consuming habits, textile waste is expected to increase up to 148 million tons in 2030. Studies point to fiber recycling and textile waste valorization as two ways to reduce pollution caused by this industry.

As a contribution to this aim, we propose the use of post-consumed clothing as raw material to produce protective packaging. Cellulosic packaging traditionally uses virgins and recycled fibres from wood and non-wood sources. However, packaging industry is moving into "alternative" fibers available to meet market needs. This represents an opportunity to textile industry to add value to their wastes by promoting a circular economy.

Two batches of 150 kg of post-consumed clothing and cotton wipes were received. Metallic and plastic impurities such zippers and buttons were removed from the clothing batch. Then pulp and paper pilot equipment were run to transform clothing into cellulosic pulp. First clothing was shredded by using a Tornado pulper. To improve defibrillation a refining proceeds to give appropriate properties to the textile pulp. Finally, molded fiber products were obtained as well as protective cellulosic foams.

[1] C. A. Echeverria, W. Handoko, F. Pahlevani, and V. Sahajwalla, "Cascading use of textile waste for the advancement of fibre reinforced composites for building applications," *Journal of Cleaner Production*, vol. 208, pp. 1524–1536, Jan. 2019, doi: 10.1016/j.jclepro.2018.10.227.