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Biocomposites from side streams of paper and board industry – Fibre Clay composites

Kirsi Immonen[1], Lisa Wikström[1], Katariina Torvinen[2], Lars-Erik Furu[3], Terhi Saari[4]

[1] VTT Technical Research Centre of Finland Ltd, P.O.Box 1300, FI- 33101 Tampere, Finland
[2] VTT Technical Research Centre of Finland Ltd, P.O Box 1603, FI-40101 Jyväskylä, Finland
[3] Oy FL-Pipe AB, Putkitie 3, FI-69600 Kaustinen, Finland
[4] Metsä Board Corporation, P.O.Box 600, FI-44100 Äänekoski, Finland

In Europe 11 million tons of side streams regarded as waste are generated in paper and board production[1]. These side streams include rejects, different sludges and ashes and lignin. Some of those fractions are attractive components to be used in composite materials blended with different thermoplastic polymers. For example lignin has been successfully productized for thermoplastic raw material for different purposes. For most of these side streams the final place is at landfill site, which should be minimised due to new directives coming into effect at 2020[2].

Fibre clay is a side stream fraction from paper and board manufacturing containing mainly short cellulose fibres fractions, calcium carbonate and kaolin clay. The main end-use use for that is burning, which still causes ash. Those inorganic fractions in fibre clay are containing typical additives or fillers used in plastics for extrusion products to give stiffness and improved processing properties for the end product.

We studied the applicability of fibre clay to polypropylene and polylactide (PLA) based composites for extruded and injection moulded products. We tackled the challenges related to processing of fibre clay suitable for compounding process with plastics and successfully made products with extrusion and injection moulding. In extruded pipes the fibre clay brings ring strength comparable to normally used fillers improving the ecological value of the product. In injection moulded biopolymer, PLA, based products the strength properties are in the same level as with neat cellulose fibre-PLA compounds making the compound attractive for many injection moulded products.

[1] Monte et. al. 2009, Waste management from pulp and paper production in the European union. Waste Manag. (2009), 29(1) p.293-308.
[2] EU Directive 2008/98/EY 11 article 2