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Hemp and Wood Fibre Reinforced Polypropylene Composites: Effect of Separation and Processing Systems on Morphology and Mechanical Properties

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The separation processes of natural fibres and the technique of composite processing influence the fibre degradation, length and herewith the composites properties in a wide range.

Different separation processes (mechanical, refiner and enzymatic separation) were investigated with hemp and partially with wood, flax and wheat straw. Selected Fibres were mixed with PP in a cascade mixer (heat-cooling mixer system), compounded in a twin screw extruder or agglomerated and formed into test specimens by injection moulding with 40 wt.% fibre content.

Wood fibre reinforced polypropylene composites containing hard wood fibre were prepared by extrusion-injection moulding, mixer-injection moulding, compression moulding and direct extrusion (profile) process with 30 wt.% and 50 wt.% fibre contents.

The influence of these different separation and processing systems were investigated in composites mechanical properties (tensile, flexural and impact tests). Scanning electron microscopy of the composites is also observed to better understand the interaction between wood fibre and polypropylene in all processing systems.