

Dissertation release**4.6.2014**

Title of the dissertation	Micro and nanofibrillated cellulose (MNFC) as additive in complex suspensions: influence on rheology and dewatering
Contents of the dissertation	<p>One of the important recent developments in the area of bio-based materials is the production of nanocellulose (MNFC). In the paper/board market, applications for MNFC include the reinforcement of paper/ board materials for fibre reduction and the production of coatings to reduce fossil-based laminations in the food packaging sector.</p> <p>The target of this thesis is to analyse in detail, and therefore evaluate and validate, in which way utilisation of MNFC will affect rheological measurement complexity, processability and dewatering behaviour when implemented as bonding enhancing additive in high consistency fibre-filler furnishes allowing increase in amount of filler in papermaking furnishes, and as partial or total substitution of traditional co-binders in coating colour formulations.</p> <p>MNFC suspensions display very different properties compared with traditional pulp fibres, including higher particulate charge and water trapping properties in a polymer-like matrix rather than individual fibre structure swelling. Additionally, when combined with other components in composite structures, such as paper, board or coatings, the application of MNFC material demands the control of the complex interactions on a colloidal level.</p> <p>There is a difference in rheology between MFC and NFC due to differences in their flocculation state, aspect ratio, and swelling degree of fibres, all of which affect mobility within the suspension through the size and elasticity of aggregates and the strength of the water binding gel structure. The novel findings surrounding the nanocellulose fraction of MNFC in this thesis, specifically referring to the gel effect and the differentiating properties in interaction with polar and non-polar liquids, opens a wide field for potential further research.</p>
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