

MWP – Young Researcher Abstract 2023

Project title: Overcoming manufacturing challenges of biobased nanopapers	
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Abstract (approx. 200 words): During the last decade, one of the interesting research directions in paper manufacturing has been toward the use of nanomaterials as furnish components. These materials can have novel functional properties and replace plastic in a range of applications such as energy storage, packaging etc. Micro-nano fibrillated cellulose (MNFC) is one of the most important constituents in many nanopapers. MNFC is deconstructed cell wall fragments – usually fibrils and fibril aggregates, which are much smaller and more water-binding than the parent pulp fibres. Adding MNFC to the paper improves strength, barrier, optical, and surface properties. However, one of the main challenges for the wide-scale application of MNFC in papermaking operations is poor water removal properties. We study novel strategies to overcome the dewatering challenges of nanopapers. We apply cationic nanobubbles to make flotation and modify MNFC/fibre flocs and their aggregation in the suspension. We also change the sheet structure and modify the z-distribution of the MNFC fibrils in the sheet through multilayer forming. We suggest a new method to enhance fibers micro fibrillation without producing excess flake-like fines and nanofibrils. This research delivers new insights into manufacturing challenges of novel paper/board grades and proposes innovative approaches to overcome these challenges.	
Key words: Nanocellulose, Nanopapers, Plastic replacement, Dewatering, Multilayer forming, Nanobubbles,	