## SPEAKER


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**BIOGRAPHY**
Maria has a Ph.D. in chemical engineering design from Luleå University of Technology and has worked as assistant professor at Chalmers University of Technology, Gothenburg. At Luleå and Chalmers her major research areas was solid-liquid separation. Since 2013 she is employed as senior research associate at RISE. At RISE Maria is working with biorefinery topics, mainly in the pulp and paper mill. Examples of project areas at RISE are separation of kraft lignin and hemicellulose, carbon fibres from lignin and cellulose, dewatering, pressing and drying of fibres suspensions and tissue paper production. She is technical scientifically leader in the areas 'Lignin refining for high value applications' and 'Tissue products and processes' in RISE Bioeconomy Research Programme.

## LECTURE

### Dewatering of Cellulose nanofibril suspensions – Comparison of cake filtration, electronkinetic dewatering and centrifugation


Maria Sedin, Ehsan Moslehi



Cellulose nanofibrils (CNF) is a material which can be used as a strengthening component, a barrier and in composites in many products. One difficulty with CNF production is high energy consumption and a great deal of research has been done to make the fibre delamination process more energy efficient. On the other hand, research about efficiency of dewatering of CNF-suspension is more limited. Depending on the application the CNF suspension might need to dewatered to different degrees depending on the application and/or to reduce transportation cost. In this work three different separation processes for enzymatically treated homogenised CNF are compared: cake filtration, electrokinetic dewatering (EKD) and centrifugation.
In cake filtration an increase in dry content from about 2 to between 5-10 w/w% was achieved during the cake build-up phase with a weak pressure dependency (up to 10 bar) but the dry content after expression, more than 30 w/w%, was highly pressure dependent. EKD with pressure up to 2 bar yielded a dry content greater than 25 w/w% after cake build-up. Centrifugation of CNF suspensions at 2300g increased the CNF concentration up to 8 w/w%. In all these cases, ionic strength and pH influence the final dry content and separation time. The separation time for cake filtration was more than 3 h but by using EKD this time was decreased to less than 45 min at similar final dry content. Centrifugation of the CNF suspensions did result in a lower dry content but the required separation time was much shorter, less than 100 s, thus making it feasible to use a decanter centrifuge.



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