

Licentiate Seminar

Modifying kraft pulping to produce a softwood pulp requiring less energy in tissue paper production

Hafizur Rahman

Faculty of Science, Technology and Media

Thesis for Licentiate Degree in Chemical Engineering

Mid Sweden University

Abstract

Modification of softwood kraft pulp by the addition of either polysulfide (PS) or sodium borohydride (NaBH_4) has been shown to increase the pulp yield due to a higher retention of glucomannan. The pulps with higher yield gave a paper with higher tensile index than reference pulp, especially at lower degrees of refining. The higher yield pulps also showed a greater porosity of the fibre wall, indicating an increase in the swelling potential of the fibres. This can lead to increased fibre flexibility and increased joint strength between the fibres and to the higher handsheet tensile index. However, the swelling increase associated with the higher hemicellulose content could also make dewatering more challenging because of the higher water retention of the pulp. The results of this study show however that the positive influence of the increase in yield (fewer fibres and a more open sheet structure) dominates over the negative influence of the higher hemicellulose content on the dewatering properties, especially at lower refining energy levels. Studies simulating full-scale tissue machine dewatering conditions showed that pulps with a higher yield and a higher hemicellulose content had a higher tensile index at the same dryness. Moreover, the same dryness level was achieved in a shorter dwell-time. A given tensile index was also achieved with less refining energy.

Increasing the yield and hemicellulose content by the addition of either an oxidizing or a reducing agent in the softwood kraft pulping process thus has a potential for giving high quality fibres for tissue paper production with less refining energy and lower drying energy costs.



Supervisors Prof. Per Engstrand, Mid Sweden University
Dr. Louise Logenius, Mid Sweden University
Prof. Mikael E. Lindström, KTH
Sr. R&D Specialist Peter Sandström, SCA R&D Centre

Faculty Examiner Prof. Ulf Germgård, Department of engineering and
Chemical Sciences/ Chemical Engineering
Karlstad University

When March 22th 2018, 10:00

Where Mid Sweden University Campus Sundsvall M102

Welcome!