

## **Supplementary files**

### **Controlled retention and drainage of microfibrillated cellulose in continuous paper production**

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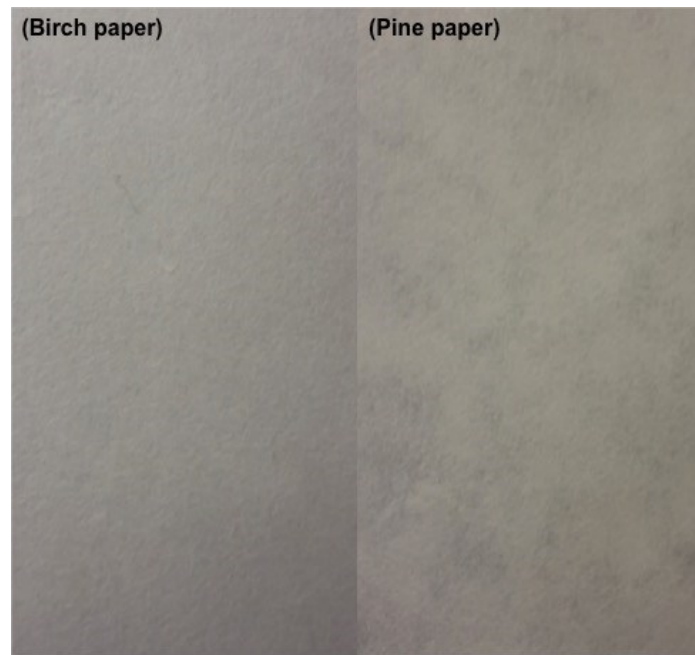
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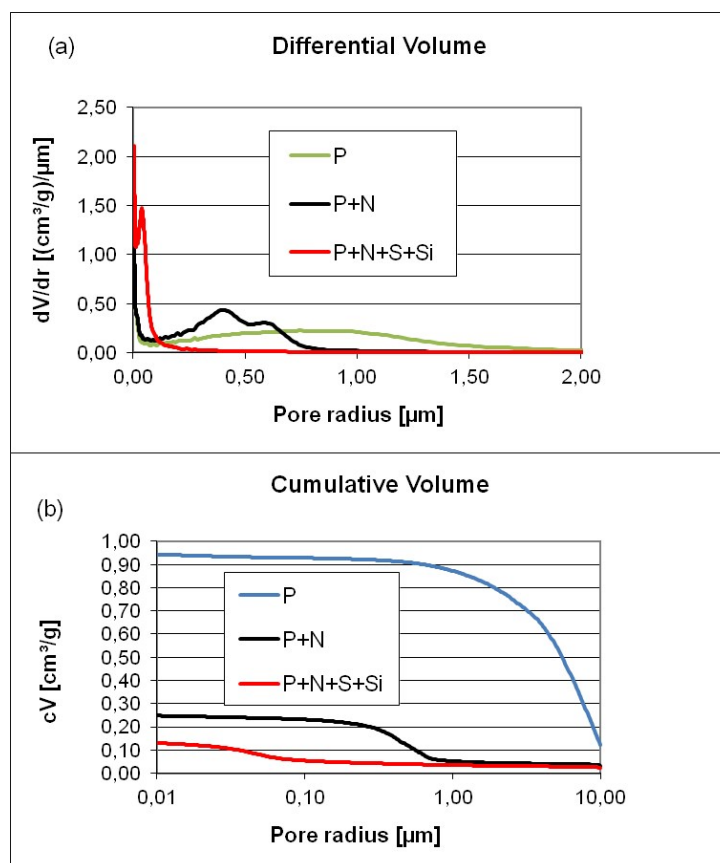
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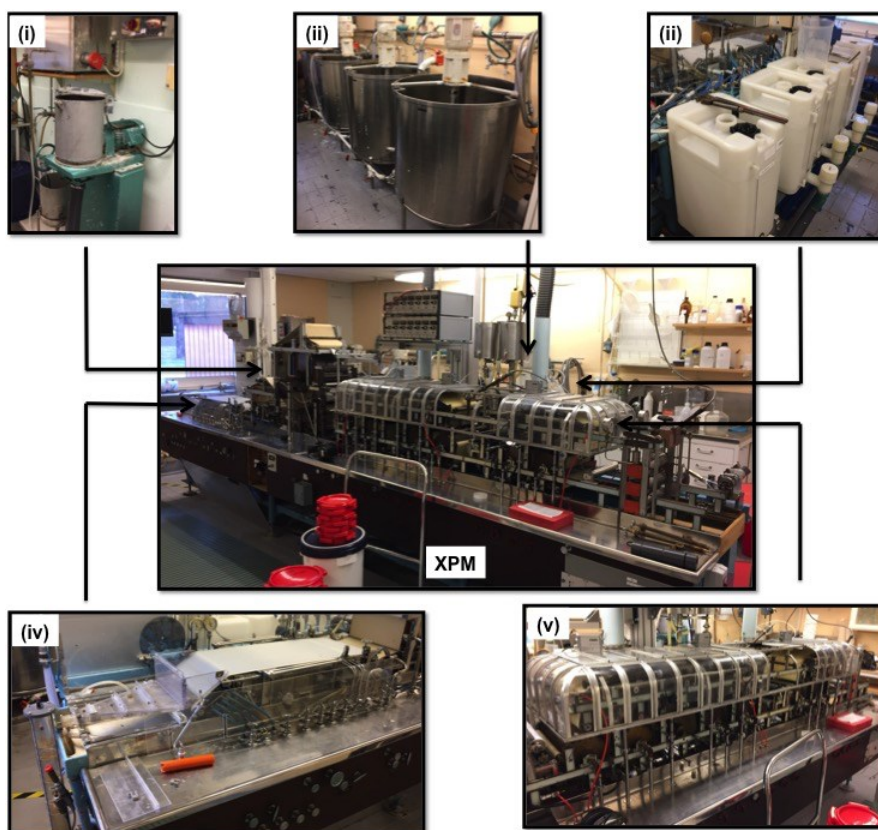
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**Figure S1:** Images of produced birch and pine papers. It is easy to see the smooth and homogeneous distribution of birch fibers within the produced paper's network. In parallel, very uneven distribution of pine fibers and rough surface of paper was detected during production of online pine paper. The tensile strength of pine paper was 21 MPa, higher than birch paper (13 MPa), assist to use pine fibers for further study.



**Figure S2:** Pore size distribution of produced paper. Decrease in pore volume and average pore size is reported after measurement as discussed in manuscript. Both volumes, differential (a) and cumulative (b) were measured using porosimetry. P, N, S and Si denote pine fibers, nanocellulose (MFC), cationic starch, and silica microparticles, respectively.



**Figure S3:** Various parts of Experimental Paper Machine (XPM) as discussed in manuscript. Refiner was used to produce pulp with various °SR values (i), machine chest tanks are used for the mixing and preparation of hybrid (MFC with pulp fibers) suspensions (ii), chemical tanks were used for the introduction of additive (cationic starch and anionic silica micro- particles) during production of paper (iii), headbox and wire mesh were used for the production of semi-solid paper, furthermore, retention of MFC and dewatering studies could be easily expressed in this section (iv) and in last heating section was used for the complete drying of paper using controlled heated cylinders (v).