Dispersions of attractive semi-flexible fiber-like colloidal particles from bacterial cellulose microfibrils

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Supporting Information

Calculation of van der Waals forces

We calculated the Van der Waals energy for two parallel fibers, assuming they are cylinders, using the Hamaker constant (A_H) of cellulose ($8*10^{-21}$ J [Bergström et al., Cellulose **1999**, 6:1-13]):

$$E = \frac{-A_H\sqrt{a}}{24D^{3/2}}$$

With a the radius of the cylinders and D the distance between them. This leads to a strong attraction of tens of kT/μm at short distances (see figure below).

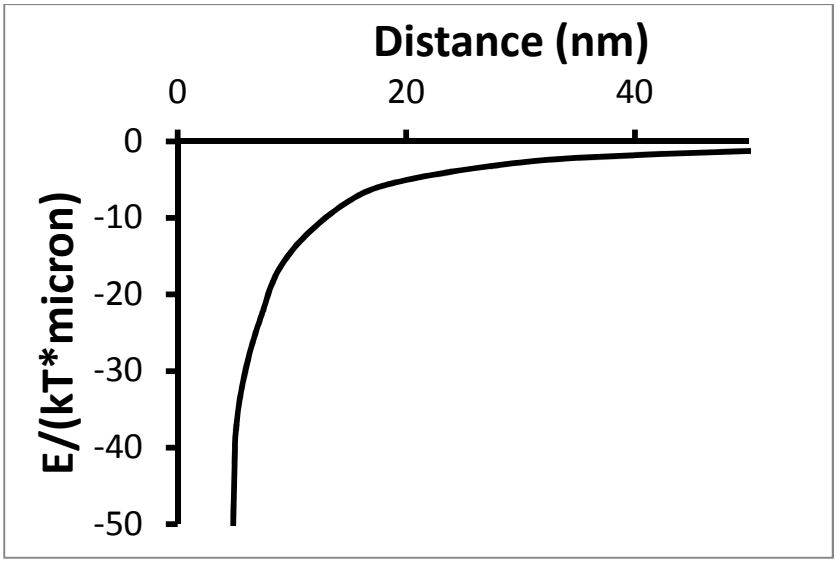

Figure S1: Van der Waals energy between two cellulose cylinders with a radius of 30 nm.

Sedimentation

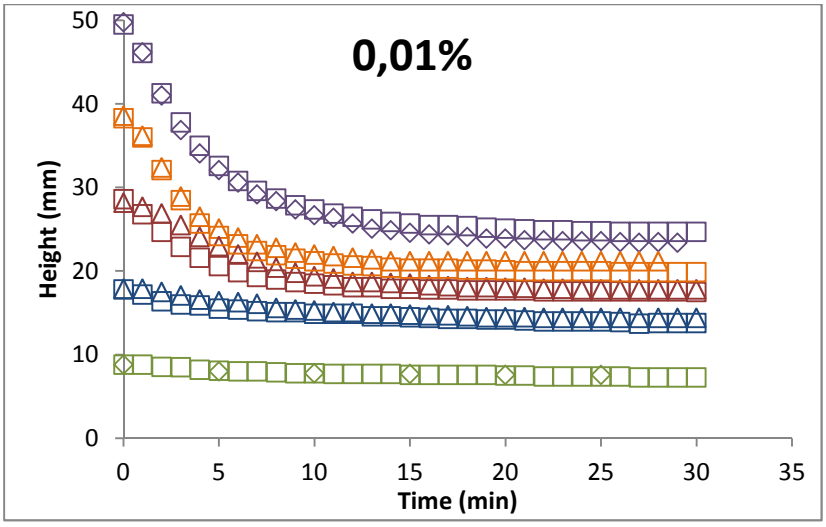

Figure S2: Sedimentation in a 0.01% CMF sample for different sample heights. Sedimentation increases with increasing sample height due to increased gravitational stress.

Confocal microscopy images and analysis

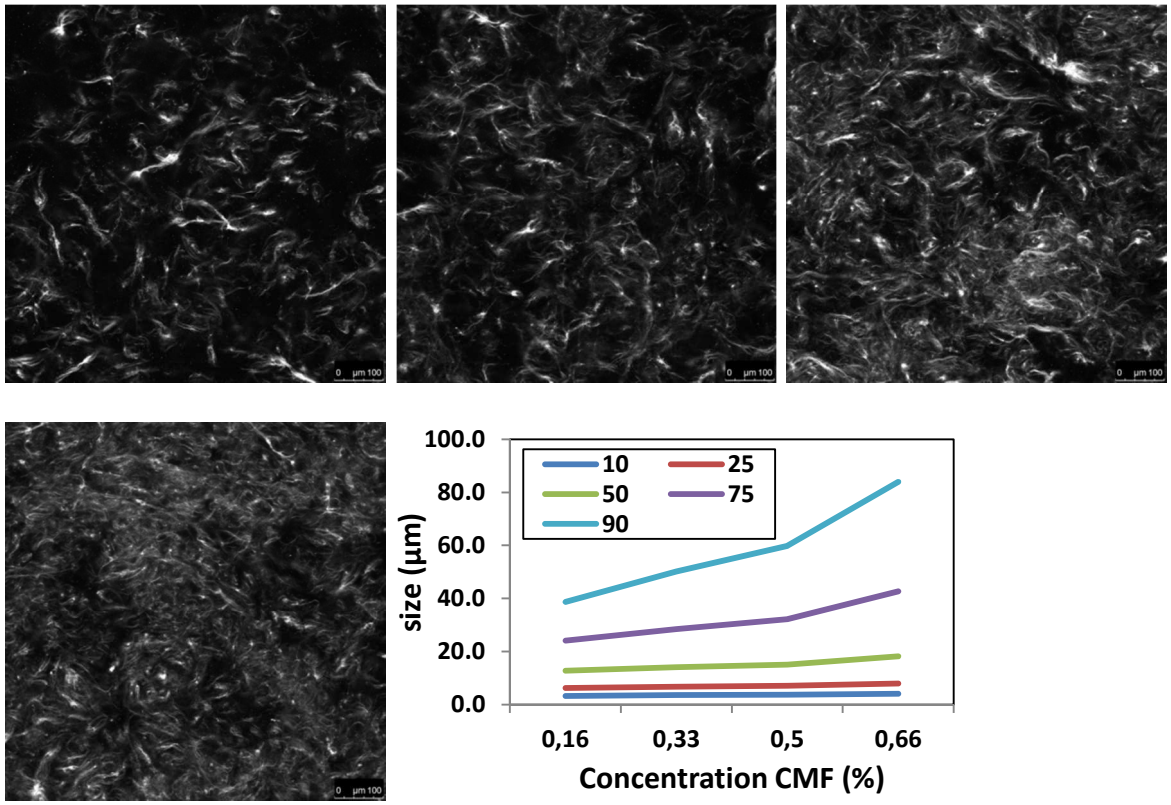

Figure S3: Examples of images used for analysis of floc sizes. The graph shows the maximum size in different percentiles of the distribution. This shows that at higher CMF concentrations indeed larger flocs were found: the 75 en 90 percentile lines increased while the lower percentile lines stayed constant.