Supporting Information

Assembly of Debranched Xylan from Solution and on Nanocellulosic Surfaces

Toon J. Bosmans, Agnes M. Stepan, Guillermo Toriz, Scott Renneckar, Erdem Karabulut, Lars Wågberg, and Paul Gatenholm

Calculation of the surface coverage of the original and debranched xylan

1. Original xylan; M_w= 45000, Solid adsorbed mass is 0.48 mg/m^2, diameter of the molecule is 42 nm

$$Surface\ coverage = \frac{\pi(42 \cdot 10^{-9})^2}{4} \cdot \frac{0.48 \cdot 10^{-3}}{45000} \cdot 6.023 \cdot 10^{23} = 8.9\ m^2/m^2$$

2. Debranched, aggregated xylan; A different route has to be adopted where the size of the aggregates and the adsorbed amount is taken as base for the estimates. Diameter of the particles; 310 nm, density of the particles 1000 kg/m3, assume a spherical close-packing which will give a solids volume of 50 %. Original adsorbed amount from QCM= 5.5 mg/m^2 which yields a solid adsorbed amount of 2.75 mg/m^2.
   First calculate the number, *n* , of adsorbed xylan particles

$$Adsorbed\ amount = \frac{n \cdot 4\pi(155 \cdot 10^{-9})^3}{3} 1000 = 2.75 \cdot 10^{-6}; n = 1.8 \cdot 10^{11}/m^2$$

$$Surface\ coverage = 1.8 \cdot 10^{11} \cdot \frac{\pi \cdot (310 \cdot 10^{-9})^2}{4} = 1.8 \cdot 10^{-2}\ m^2/m^2$$