Supporting Information

Comparison of the influence of a Lewis acid $AlCl_3$ and a Brønsted acid HCl on the Organosolv pulping of beech wood

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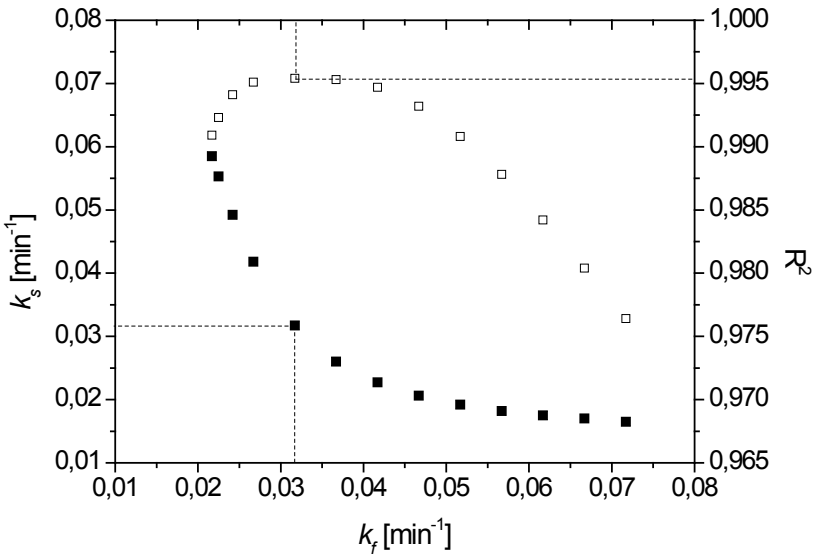
Following it is shown that, the use of the biphasic xylan hydrolysis model is not necessary. Therefore the optimization of the kinetic parameters is done manually with the program "Origin". The kinetic rate function (eq. 1) is used. Herein $[Xylan_f](0)$ and $[Xylan_s](0)$ are the initial amounts of fast and slow reacting xylan and k_f and k_s are the correspondingly kinetic rate constants. The experimental data are fitted with (eq. 1) while set k_f and $[Xylan_f](0)$ as constant. For most of the materials the amount is about

(eq. 1)

65 % and it differs just slightly.[1] Thus the range of the initial fast reacting xylan amount is chosen from 60 % till 68 %. In the following graphs (*Fig. S1 – Fig. S4*) the fits are shown. As can be seen in *Fig. S1 – Fig. S4* the highest regression coefficient is achieved when the kinetic rate constants are equal with 0.0317 min^{-1}. That means that the Saeman model can be used to describe the kinetic behavior of the degradation of xylan during $AlCl_3$ catalyzed ethanosolv pulping of beech wood.



$$[Xylan](t) = [Xylan_f](0) \cdot \exp(-k_f \cdot t) + [Xylan_s](0) \cdot \exp(-k_s \cdot t)$$

Fig. S1: Regression coefficient R^2 (open symbols) and kinetic rate constant k_s (closed symbols) in dependency of k_f as the result of fitting the experimental data with (eq. 1). The initial amount of fast reacting xylan is set as 60 %.

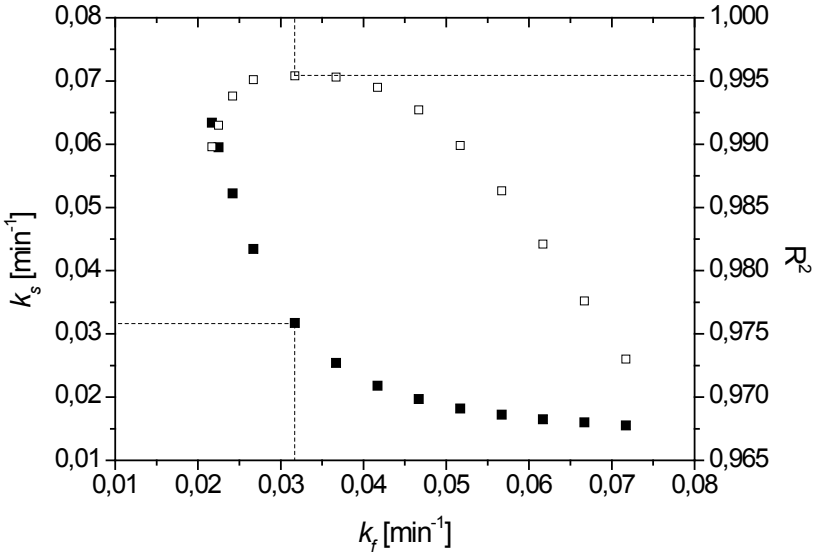


Fig. S2: Regression coefficient R^2 (open symbols) and kinetic rate constant k_s (closed symbols) in dependency of k_f as the result of fitting the experimental data with (eq. 1). The initial amount of fast reacting xylan is set as 63 %.

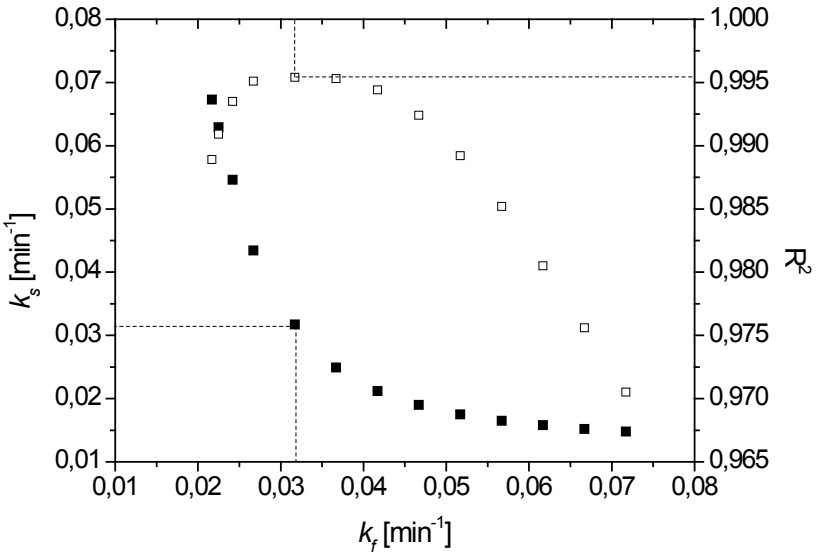


Fig. S3: Regression coefficient R^2 (open symbols) and kinetic rate constant k_s (closed symbols) in dependency of k_f as the result of fitting the experimental data with (eq. 1). The initial amount of fast reacting xylan is set as 65 %.

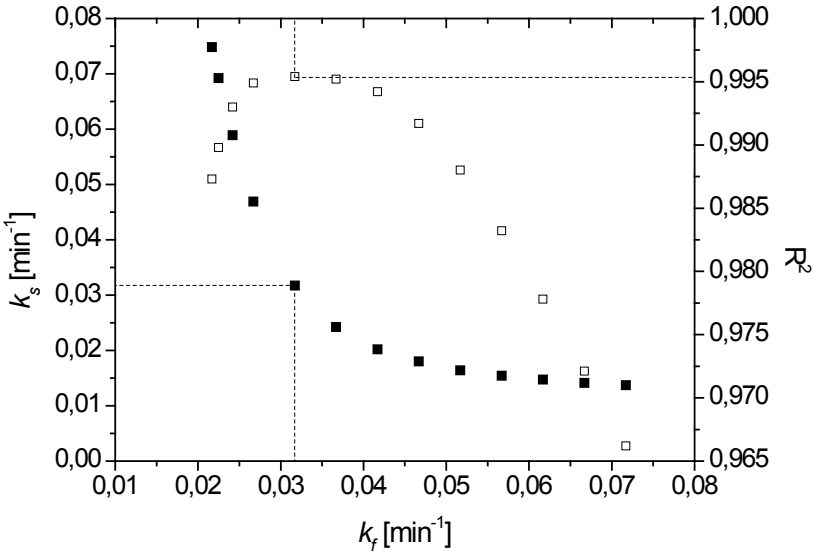


Fig. S4: Regression coefficient R^2 (open symbols) and kinetic rate constant k_s (closed symbols) in dependency of k_f as the result of fitting the experimental data with (eq. 1). The initial amount of fast reacting xylan is set as 68 %.

References

1 S. E. Jacobson and C. E. Wyman, *Applied Biochemistry and Biotechnology*, 2000, **84 – 86**, 81.