

State Institute of Wood Chemistry, Riga, Latvia

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- Established in 1962
- Joined into ERA (5th FP Project “Woodpro”) in 2003-2006
- Total staff 100 people, incl. 60 scientists
- 10 B.Sc., M.Sc. and Ph.D. Students from Riga Technical Uni and Uni of Agriculture

Research areas:

- Characterization of wood and wood components
- Wood biological, pyrolytic and chemical destruction, wood protection
- Wood and plant mass processing technologies, traditional and innovative products, their structure and properties (polysaccharides and derivatives, lignin products, pulp, furfural, charcoal, etc.)
- Testing and certification.

Departments and laboratories

- Wood biodegradation and protection
- Polysaccharide chemistry
- Lignin chemistry
- Biomass eco-efficient conversion
- Cellulose and fibres properties
- Biocomposites
- Polymer chemistry
- Xylogenesiis
- Thermolysis
- Bioengineering
- Technical Research Dep + Service Dep-s.

THE SWELLING BEHAVIOUR OF SPRUCE WOOD CELL WALLS DURING KRAFT PULPING

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Abstract. The swelling of spruce wood cell walls during kraft and extended kraft pulping was evaluated by fibre saturation point (FSP) measurements and direct light microscopy. The pulping processes were characterised by gradual growth of FSP values from 0.62 ml per 1g of fibres to maximum 1.25-1.37 ml/g at pulp yield 65-48%. Then a slight decrease of FSP values was observed which was much more distinct if the FSP data were calculated as ml of water per 1g of initial wood. Direct measurements of cell wall thickness and fibre diameter demonstrated a characteristic bimodal distribution consisting of both thin-walled springwood and thick-walled summerwood fibres. A considerable reduction in scattering was made if only springwood or summerwood were considered. As to the cell wall thickness alteration of springwood fibres during pulping process, their maximum (close to 5 μm) was achieved at yield of approx. 90% and then decreased to 4.4-4.5 μm . It was noticed that the pattern of spruce springwood fibre wall swelling to some extent resembled behaviour of birch wood fibre walls as detected by solute exclusion. Still the extent of the contraction of spruce fibre walls at the end of cooking as detected by SET was not confirmed by microscopy.

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- ***Treimanis A., Maloney T., Klevinska V., Eisimonte M., Paulapuro H.*** The swelling behaviour of spruce wood cell walls during kraft pulping. *Lenzinger Berichte*, 2000, p.137-142.
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- ***Eremeeva T., Bikova T., Eisimonte M., Viesturs U., Treimanis A.*** Fractionation and molecular characteristics of cellulose during enzymatic hydrolysis. *Cellulose*, 2001, p.69-79.
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Thanks for the attention!

*The comments highly appreciated:
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