VUPC a.s. Bratislava, Slovak Republic

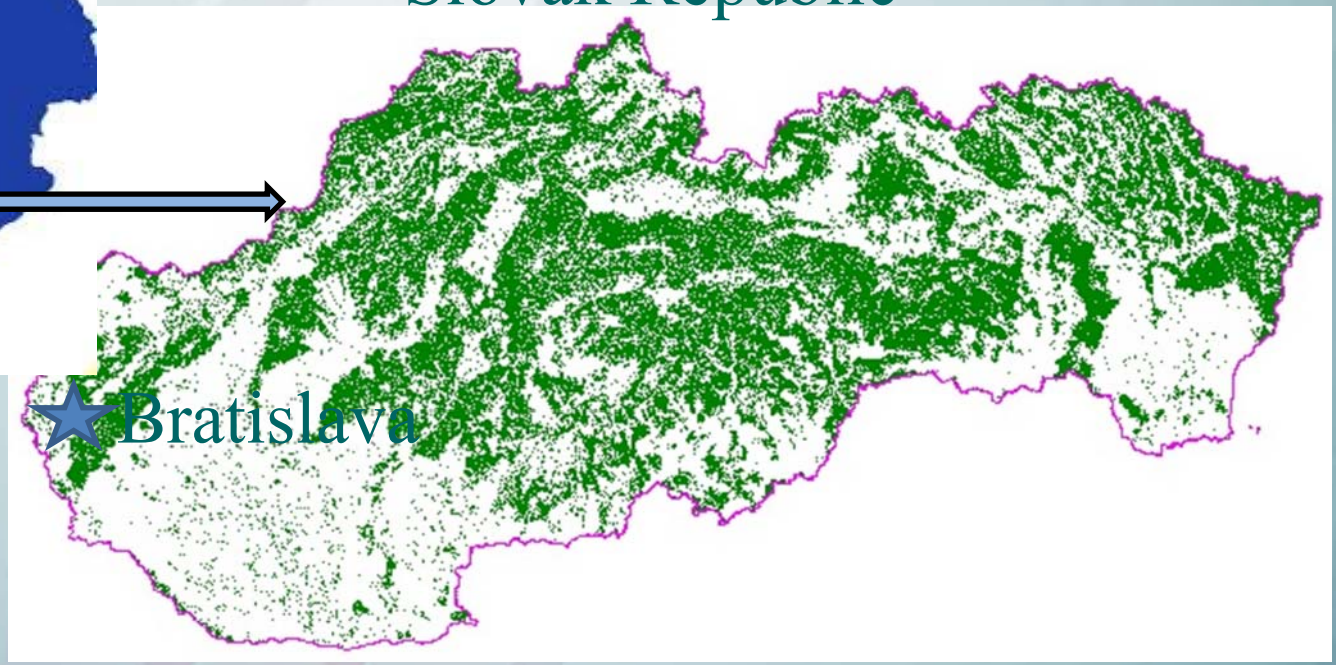
Pulp and Paper Research Institute

Stefan Bohacek

Destruction of the crystalline structure of cellulose by Deep Freezing and Thawing (by Cryolysis)

Europe

Slovak Republic



VUPC (PPRI) Bratislava - established in 1947

Main activities :

1. Research and development
2. Process simulation in laboratory scale
3. Technology testing in pilot plant scale
4. Specialty paper and board production
5. Coating and laminating
6. Pulp, paper and board quality testing
7. Technical and economical information services
8. Instrument service, development and production
9. Research activities for Bio-based Industry
10. Smart biodegradable packaging
11. Publication of research results in WOOD RESEARCH

1. Research and development

activities are oriented to

- cooking technologies
- bleaching technologies
- recycling technologies
- papermaking
- surface treatment
- process optimisation

More details about these activities you can find on the website **www.vupc.sk**

2. Process simulation in laboratory scale

Sheeter

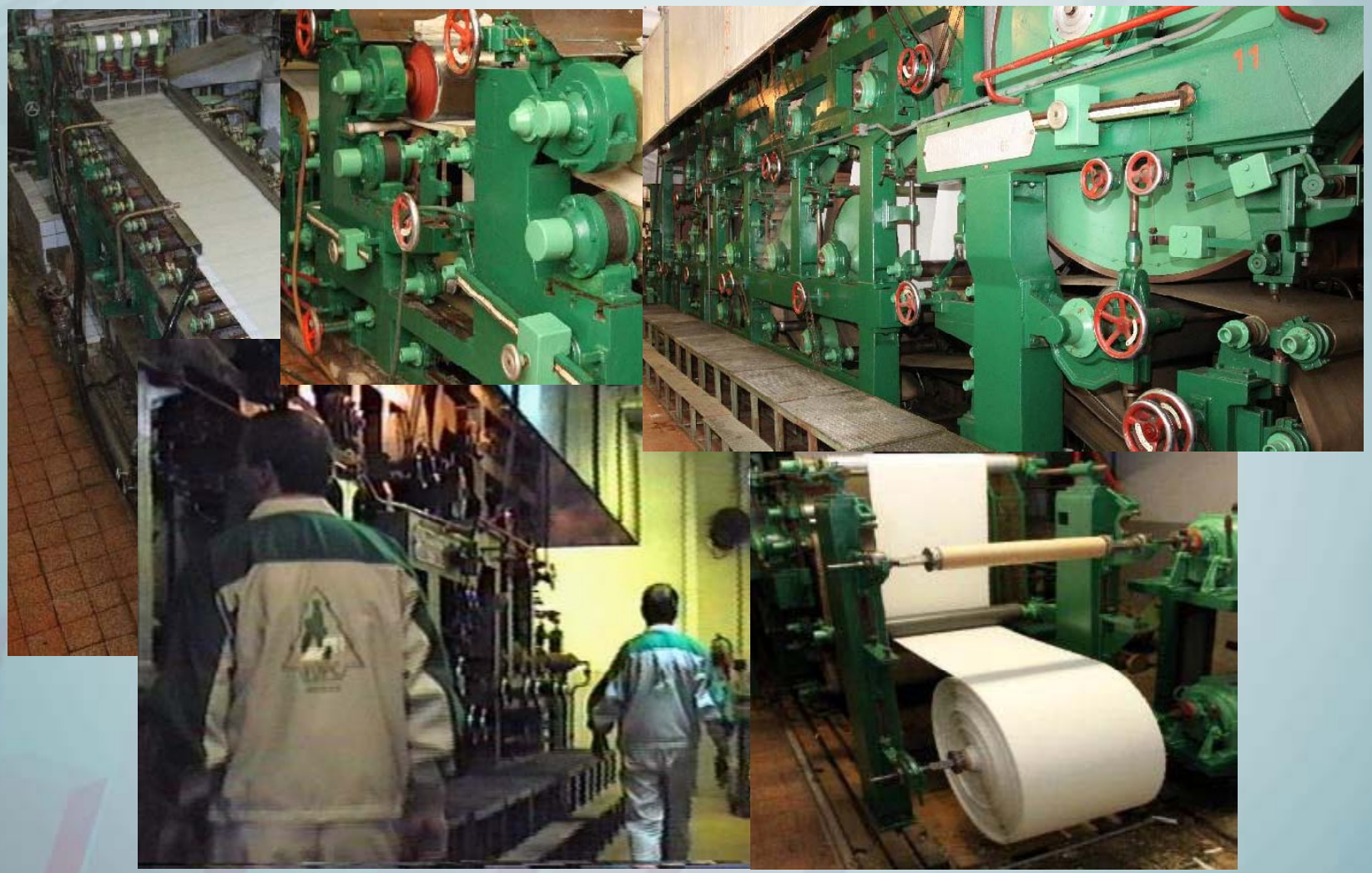
SCREENING

Pressing

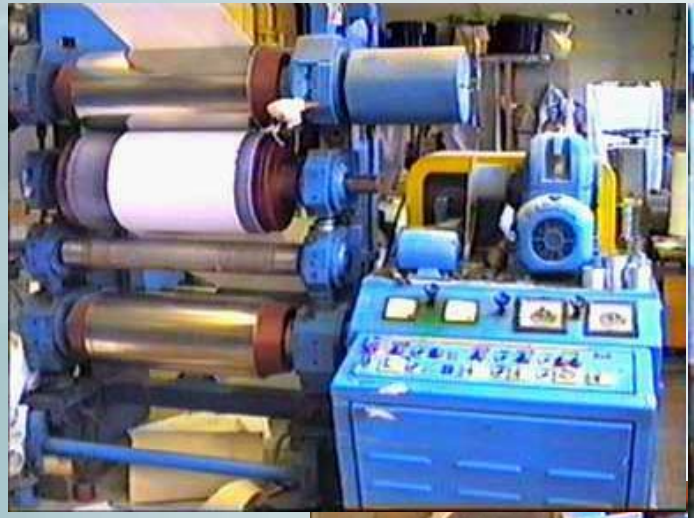
Drying

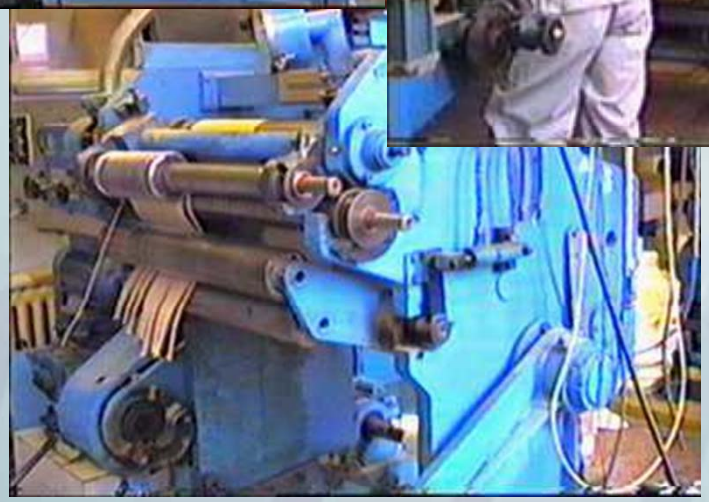
Coating

3. Well Equipped Pilot Plant Facilities
Universal Pilot Plant Paper Machine with 3 headboxes and on-line sizing press



3. Pilot Plant Supercalender and Pilot Plant Coating, Laminating and Roll-Slitting Machine





4. Specialty paper and board production

- Watermark Paper – Safety Paper

5. Coating and laminating

6. Well Equipped Laboratories

6. Pulp, paper and board quality testing

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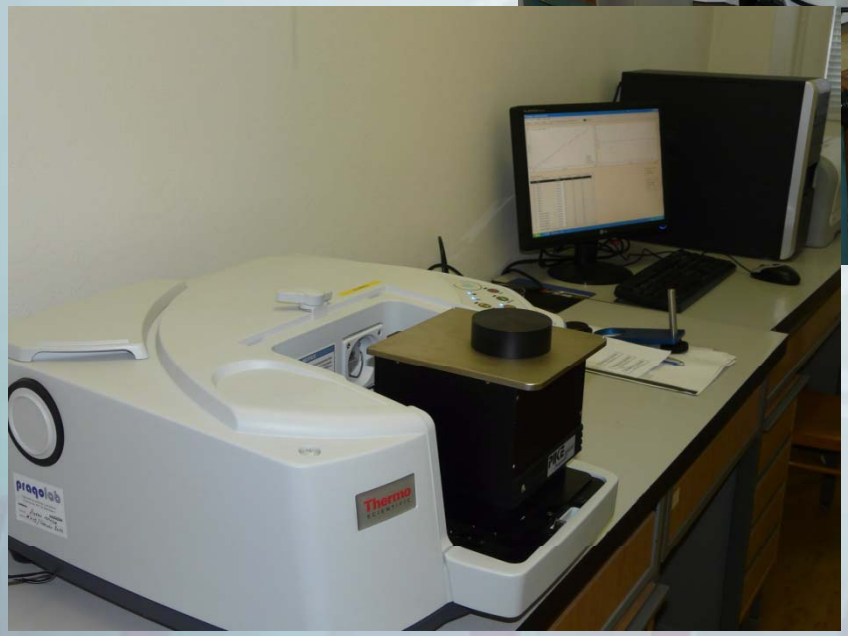

6. Pulp, paper and board quality testing

7. Technical and economical information services

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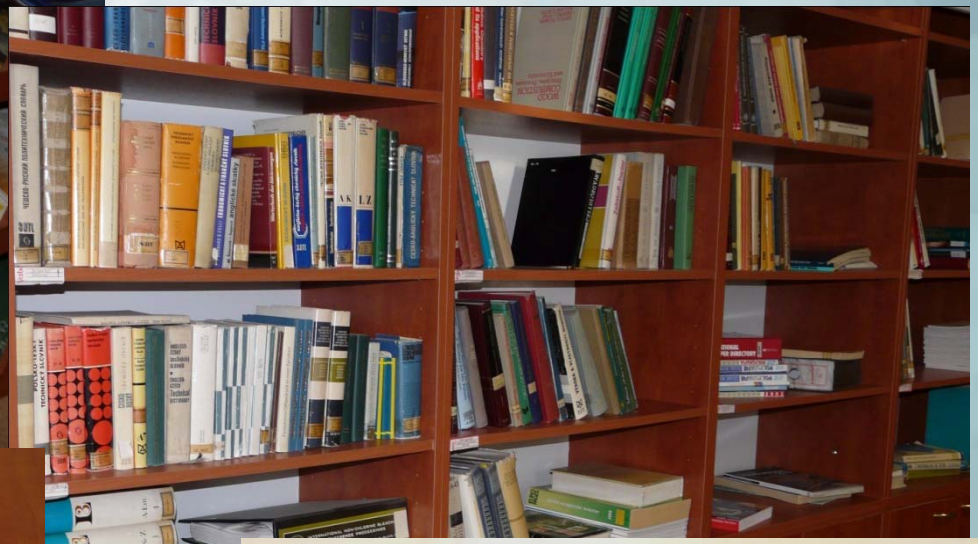
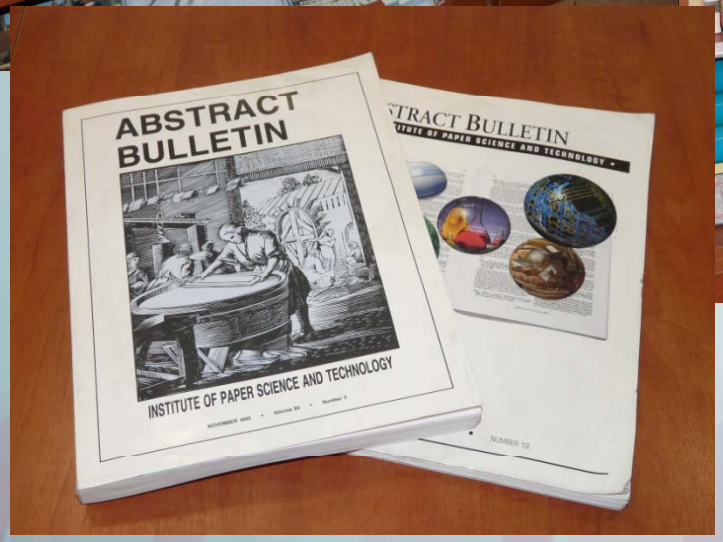




8. Instrument service, development and production

- Fibre Length Analyser ADV 3.1

Awarded by the International prise for technical progress

9. Research activities for Bio-based Industry

Destruction of the crystalline structure of cellulose by Deep Freezing and Thawing (by Cryolysis)

Patent application PP50076-2014 „Increasing Accessibility of LC Materials for Hydrolytic Enzymes by Cryolysis During Biofuel Production“

9. Research activities for Bio-based Industry

Chemical composition of poplar wood

parameter	unit	Young poplar	Poplar core	poplar sapwood	method test
Ash	%	1.1	0.54	0.87	ISO 1762
Extracts - acetone	%	2.36	16.4	2.27	T 264 cm-07
* Klason lignin	%	19.65	18	19.31	T 222 om-98
Acid soluble lignin	%	2	1.42	2.24	Tappi UM 250
Total lignin	%	21.65	19.42	21.55	
Holocellulose	%	74.9	63.6	75.3	Wise method
Cellulose	%	44.7	42.8	49.9	ISO 692

*** Klason lignin is corrected for ash content in Klason lignin**

9. Research activities for Bio-based Industry

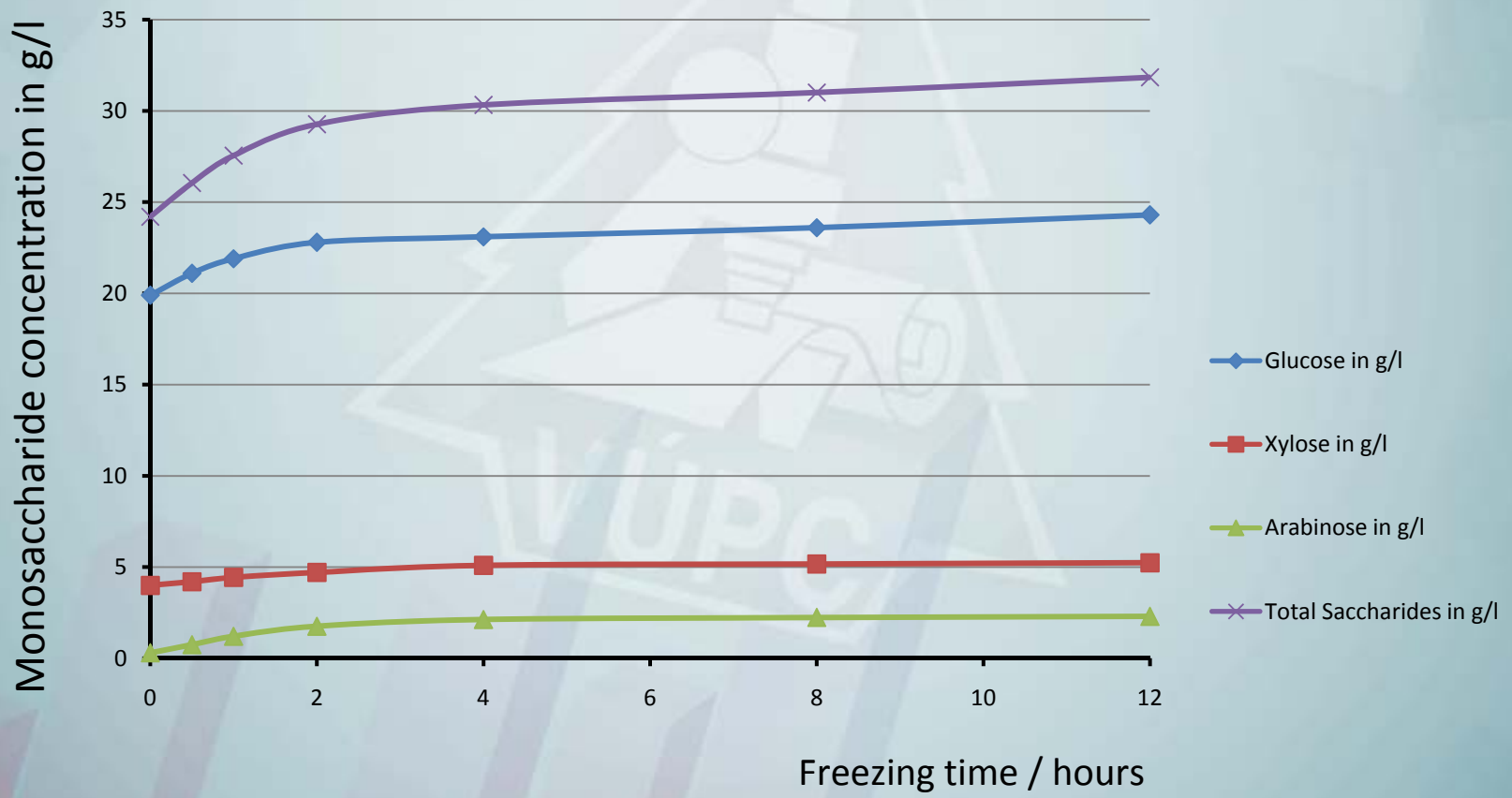
Ash content and its composition in poplar wood

parameter	unit	Young poplar	Poplar core	Poplar bee
Ash	%	1.1	0.54	0.87
Potassium	%	0.378	0.101	0.193
Calcium	%	0.157	0.12	0.2
Magnesium	%	0.032	0.021	0.017
Iron	%	0.0085	0.011	0.026
Silicon	%	< 0.01	< 0.01	0.012
Sodium	%	0.0092	0.001	0.0021
Zinc	%	0.0034	0.0017	0.0016
Copper	%	0.0034	< 0.001	0.0011

Method of determination: PP-LCHS-19, Tappi T 266

9. Research activities for Bio-based Industry

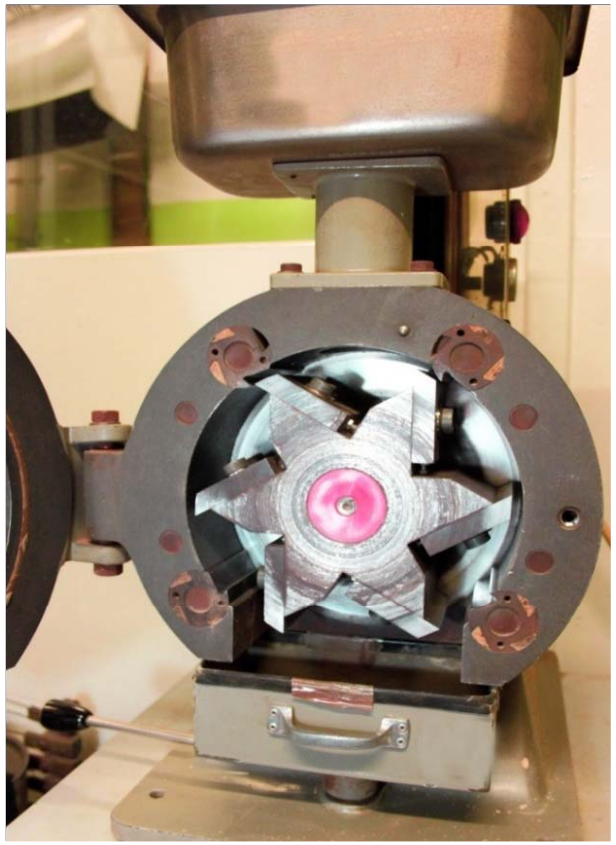
Monosaccharide concentration versus freezing rate



9. Research activities for Bio-based Industry

Dry pretreatment of LCM in a laboratory rotary mill

- Brabender

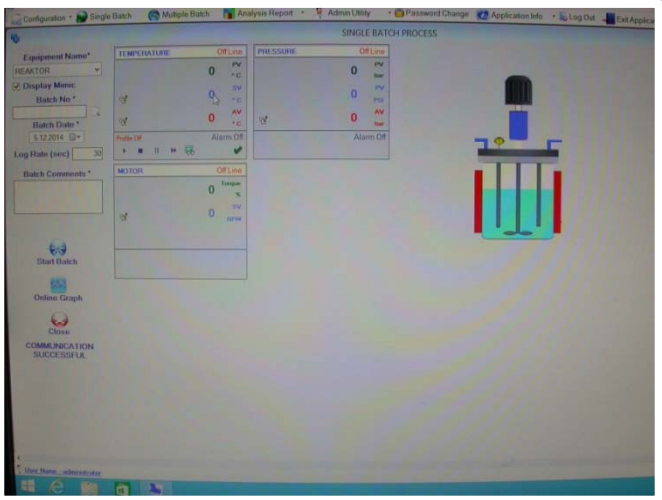


9. Research activities for Bio-based Industry

Wet pretreatment of LCM with defibrator Sprout-Valdron

9. Research activities for Bio-based Industry

Reactor for Discontinuous Steam Explosion of Impregnated LCRM

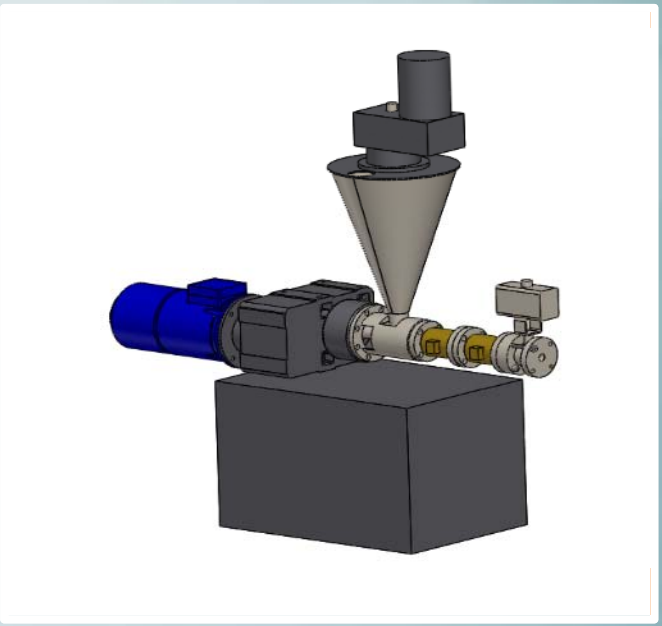


9. Research activities for Bio-based Industry

Extruder for Continuous Steam Explosion
of Impregnated LCM

9. Research activities for Bio-based Industry

Pilot plant equipment for pretreatment of LCRM
with steam explosion



9. Research activities for Bio-based Industry

Pilot mixing batch reactor for hydrolysis

The End of the Fossil Age /
Transition to the Sustainable & Circular Bioeconomy

The Green New Deal for Europe
Ursula von der Leyen
The president of the European Commission

The GPW is the investment programme to deliver Europe's transformation. It links economic aims with a vision of environmental justice: decarbonising Europe's economy, reversing biodiversity loss and guaranteeing decent jobs across the continent. GPW funding will be allocated to private firms that advance Europe's economic, social and environmental goals. Firms that reorient manufacturing towards recycling and repair, extend product life-cycles and shorten the working week will be given funding to support the transition.

11. Publication of research results in WOOD RESEARCH

Division of VUPC Bratislava

– The Slovak Forest Products Research Institute

is the editor and publisher of our scientific journal

WOOD RESEARCH

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Scientific Journal

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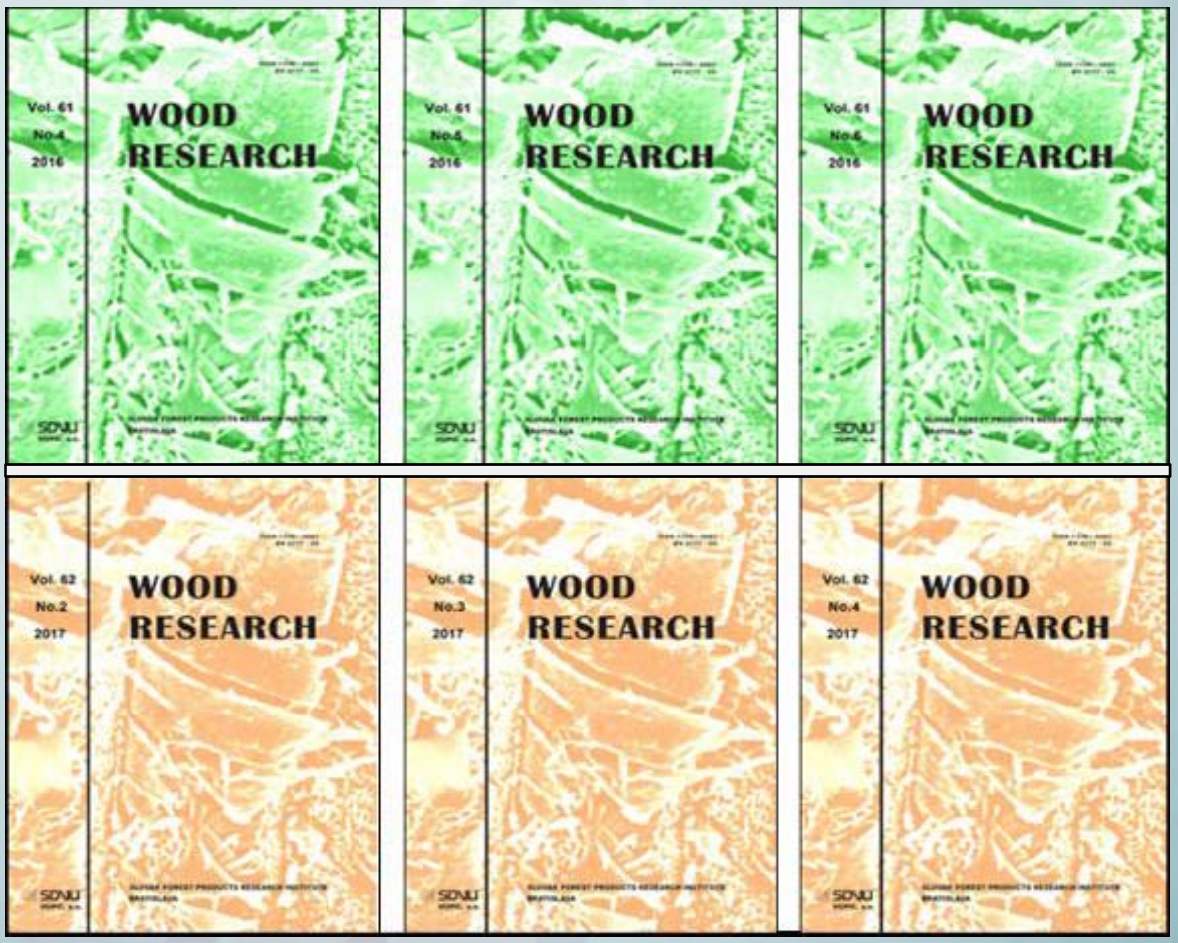
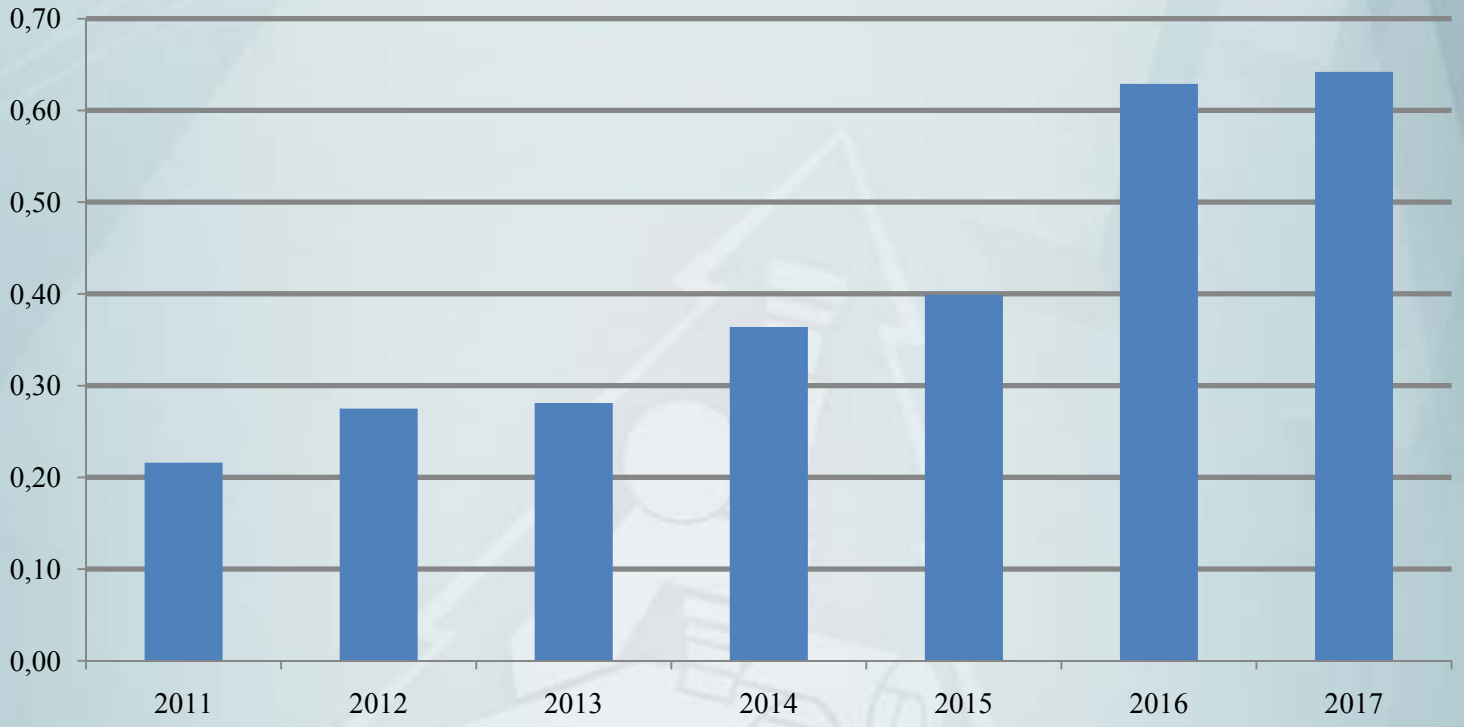


Wood Research Impact Factor



Year	IF	Total Articles	Total Cites
2017/2018	0.642	91	464
2016	0.629	96	338
2015	0.399	97	214
2014	0.364	65	165
2013	0.281	65	117
2012	0.275	64	97
2011	0.216	41	74

Division of VUPC Bratislava

- The Slovak Forest Products Research Institute
is the editor and publisher of our scientific journal

WOOD RESEARCH

(ISSN 1336-4561)

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in the field of wood research

published since 1956

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www.woodresearch.sk

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