



**LIGNO
SILVA**

CENTRE
OF EXCELLENCE
OF FOREST-BASED
INDUSTRY

Implementing break-through technologies for increasing added value in wood and paper processing Part II.



Ing. Štefan Boháček, PhD.

BIOECONOMY AND CIRCULAR ECONOMY

16th March 2021

Výskumný ústav papiera a celulózy a.s.

Bratislava, Slovak Republic

Pulp and Paper Research Institute

Stefan Bohacek

Slovak Republic

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VUPC (PPRI) 布拉迪斯拉发 -WestEnd Gate总部



Štefan Boháček
纸浆研究所
布拉迪斯拉发
斯洛伐克



VÚPC, a. s. Bratislava
info@vupc.sk
www.vupc.sk



地址: WestEnd Gate
Dubravska cesta 14
841 04 Bratislava
Slovak Republic

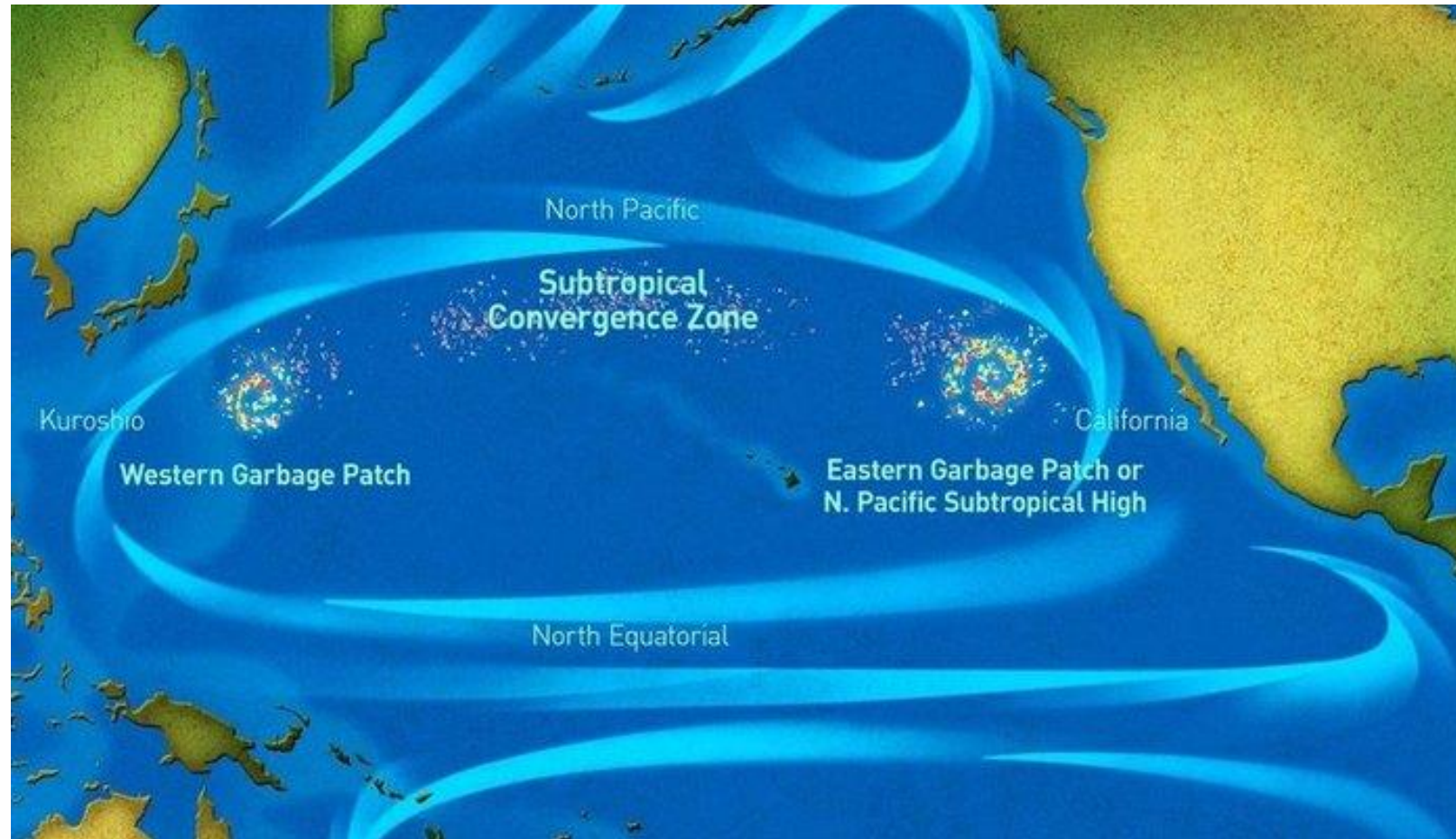
Challenges of the present time

- 1. Replacement of fossil-based packaging by paper-based biodegradable and compostable active and intelligent smart packaging*
- 2. Special products based on nanofibrillated cellulose and nanocellulose*
- 3. Second generation biofuels based on lignocellulosic materials*



The problem of our time

*The Seventh Continent of plastic floating in the Pacific Ocean.
According to the current survey, it may have an area such as
Germany, France and Spain together.*



Current challenge:

Worldwide annual plastic production increased from 1.5 million tonnes in 1950 to over production of 400 Mt in near future .

Challenge:

Replacement of plastic packaging for biodegradable compostable packaging



Scary Examples of Negative Impacts of Non-biodegradable Plastics Accumulation in Nature



Biodegradable and compostable packaging based on paper and cardboard (thrown away in nature is like fallen branches or fallen leaves - soil fertilizer)



Our activities are primarily focused to research of possibilities the replacement of non-biodegradable packaging with biodegradable and compostable packaging based on paper and paperboard

- wherein the main component - cellulose which is hydrolyzed in nature to the simple sugars, feed for some soil bacteria, soil fertilizers.



Our activities in response to challenges

Complementing the unique research infrastructure

Building and permanent refining of research staff

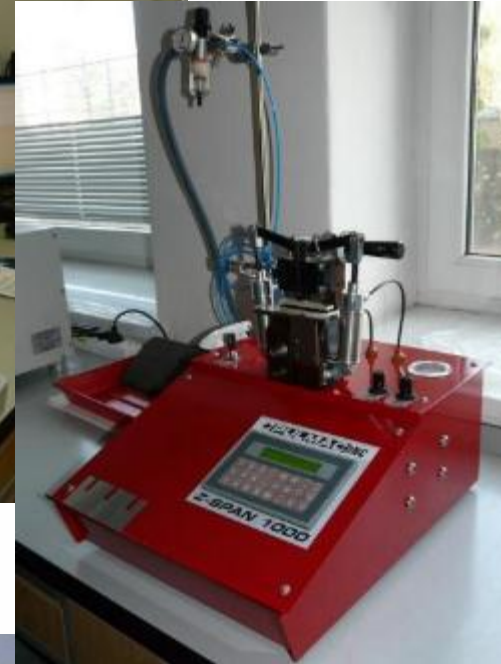
Optimal use of our research infrastructure to meet the requirements of the challenges

Efficient communication with industry in order to implement research results and increase the competitiveness and environmental friendliness of industrial production



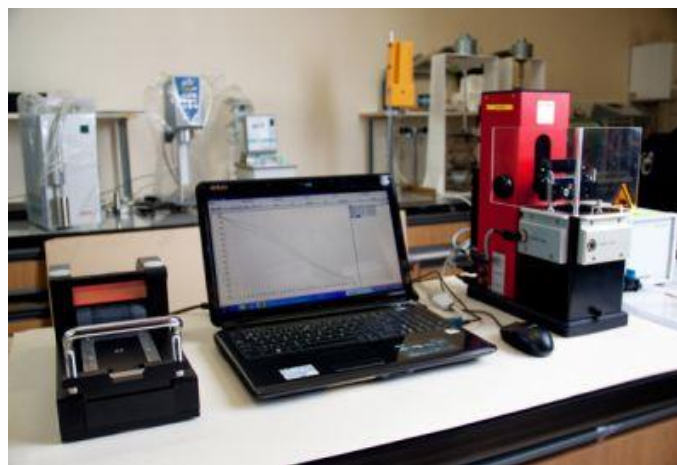
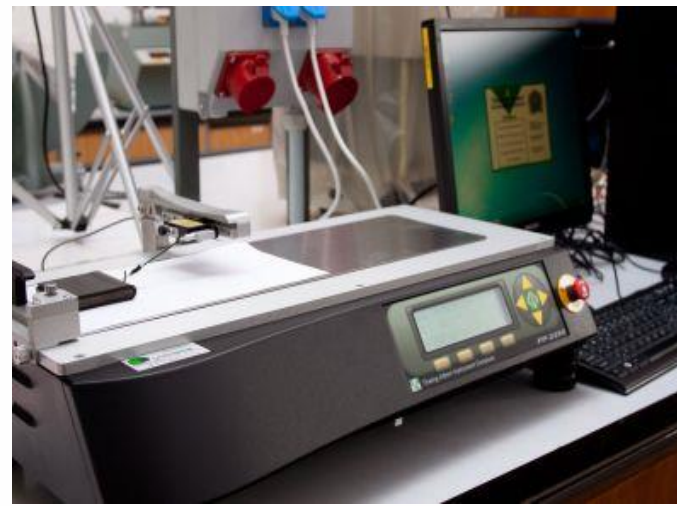
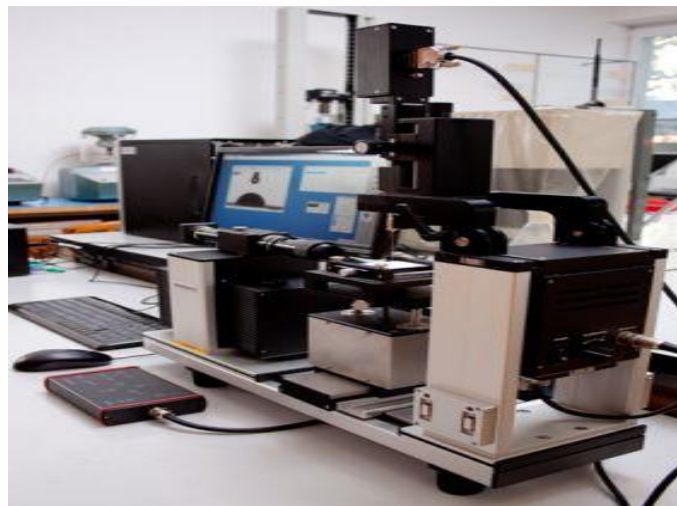


Our laboratories are well equipped



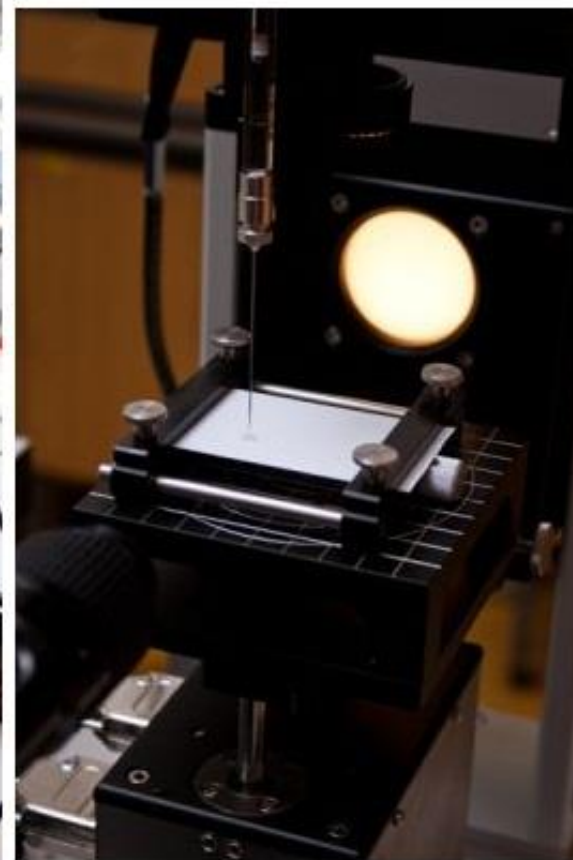


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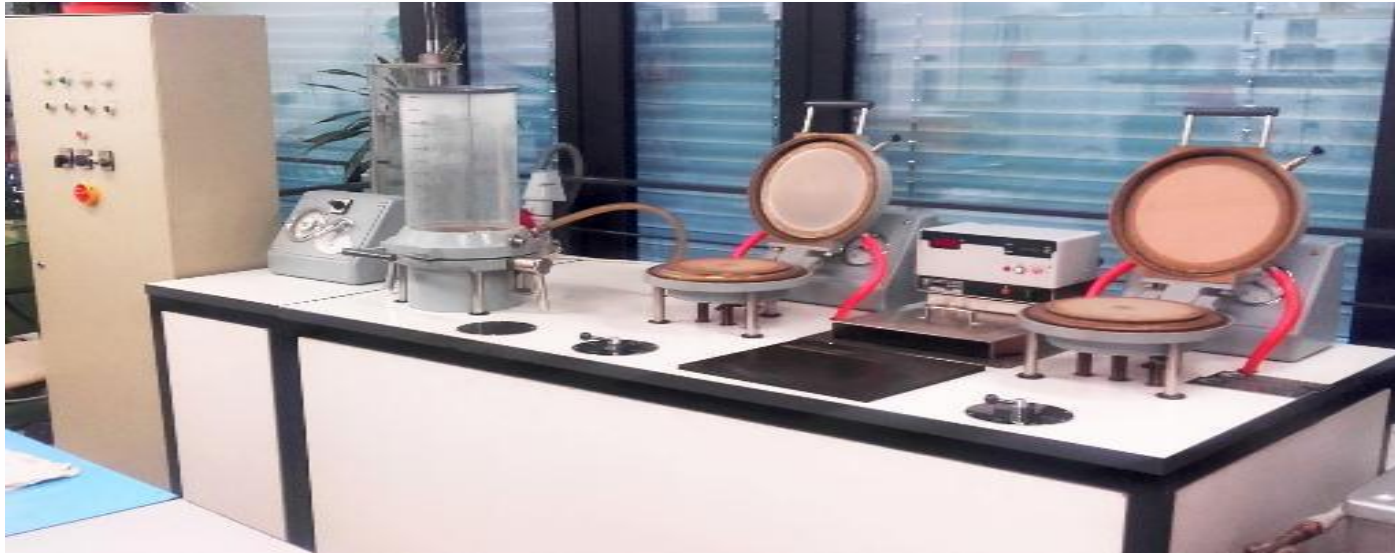
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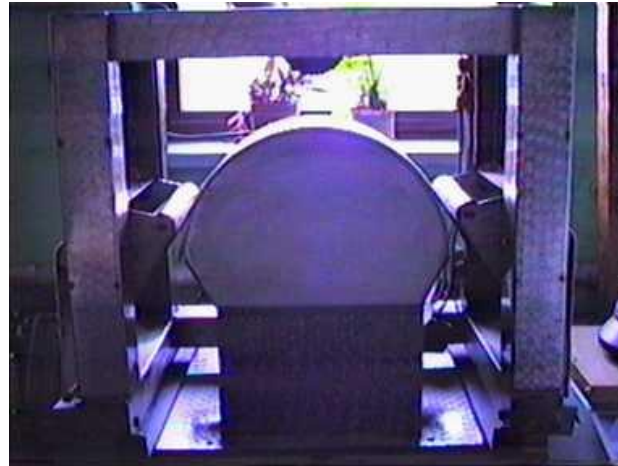
Process simulation in laboratory scale

1. Paper production

Sheeter



Press

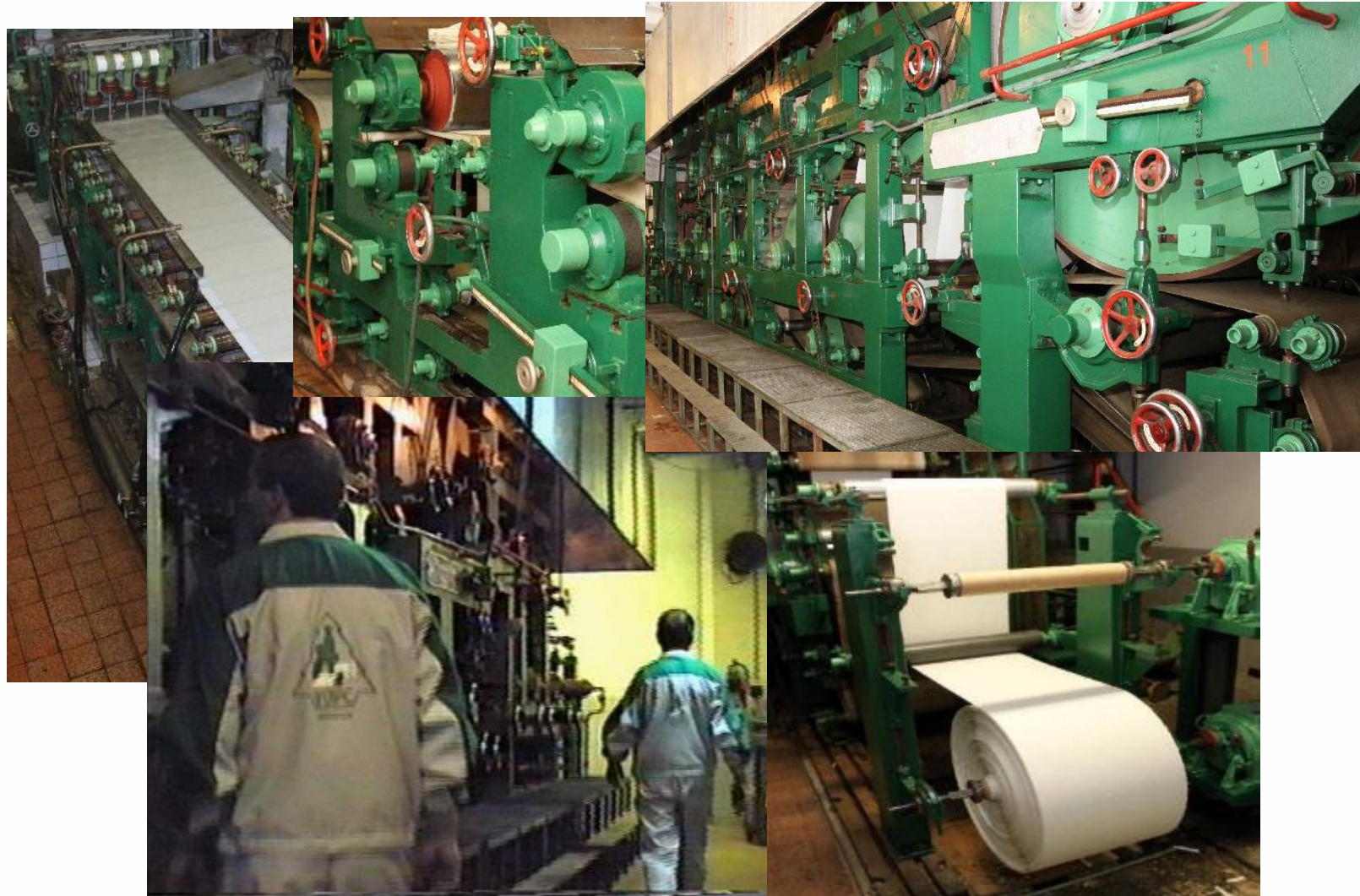


Drying



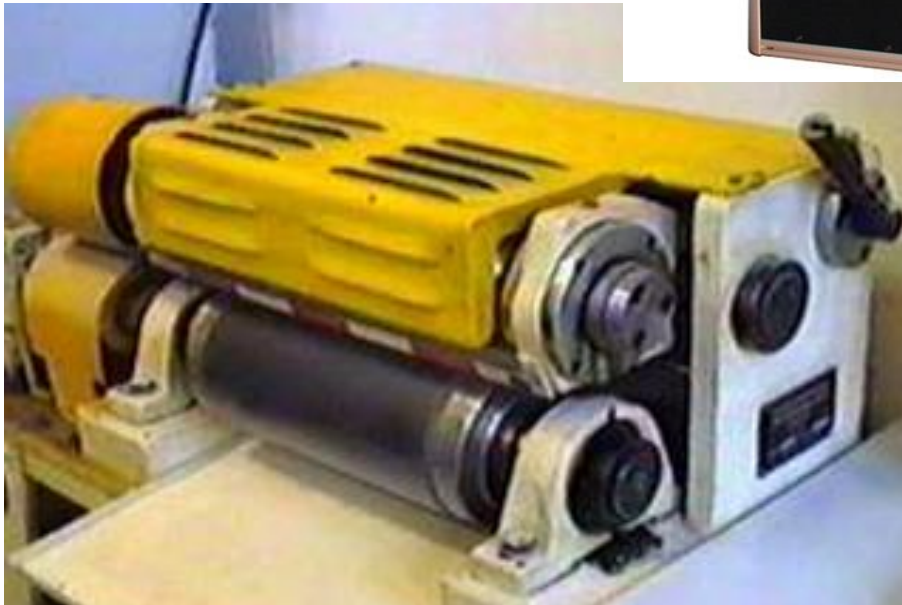
Process simulation in Pilot plant scale

1. Paper production

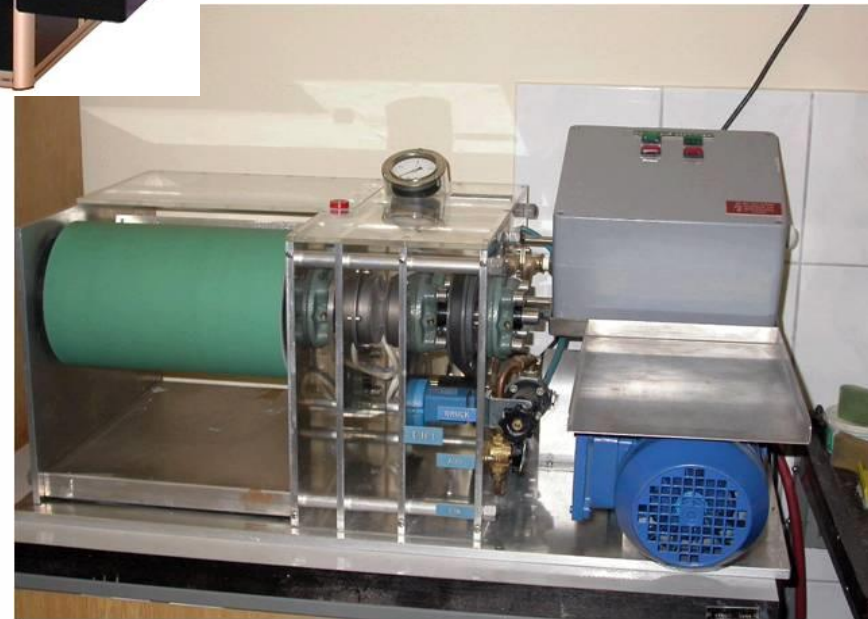


Process simulation in laboratory scale

2. Surface treatment



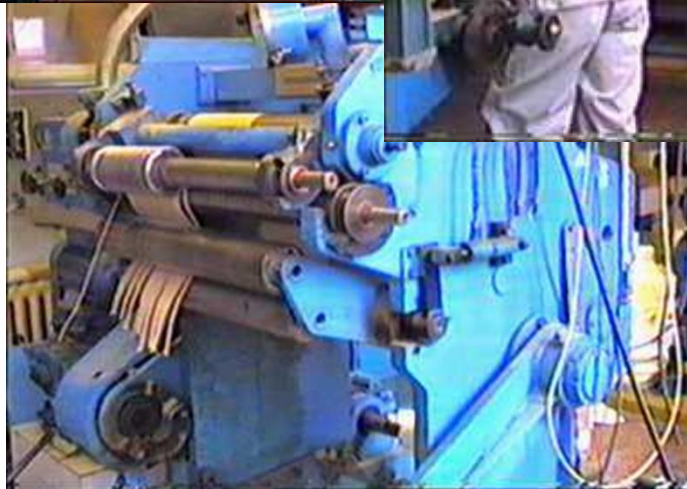
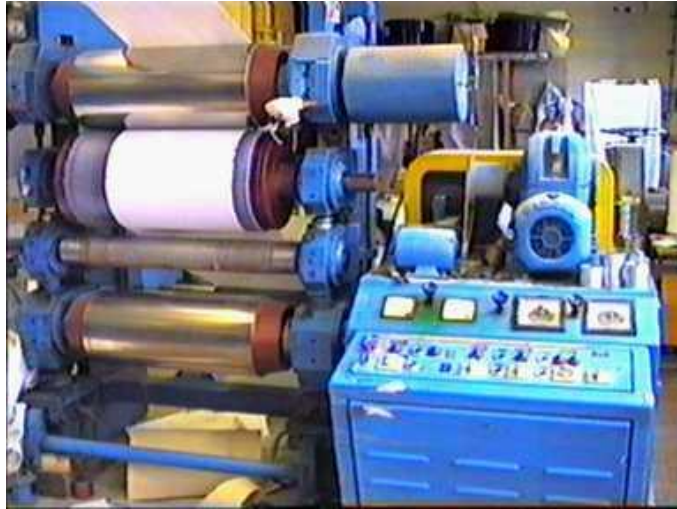
Calander



Coater

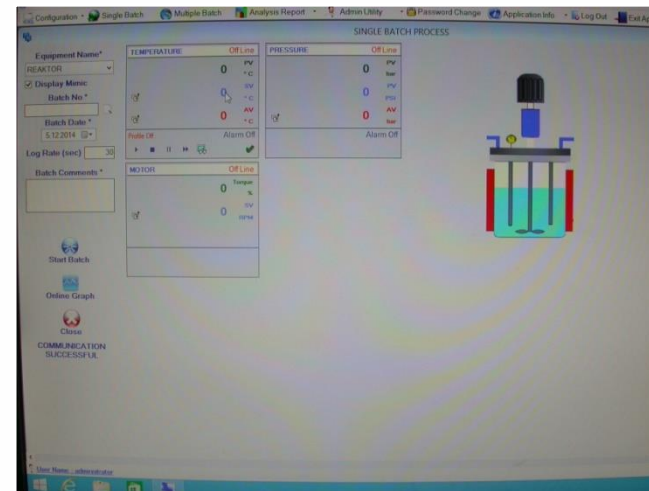
Process simulation in pilot plant scale scale

2. Surface treatment



Process Simulation in Laboratory Scale

3. Discontinuous Steam Explosion Reactor for LC Raw Material Pretreatment



Process Simulation in Laboratory Scale

3. Continuous Steam Explosion Reactor for LC Raw Material Pretreatment



Process Simulation in Laboratory Scale

3. Discontinuous Reactor for Hydrolysis and Fermentation of Pretreated LC Raw Material



Process Simulation in Pilot Plant Scale

3. Continuous Steam Explosion Reactor for LC Raw Material Pretreatment

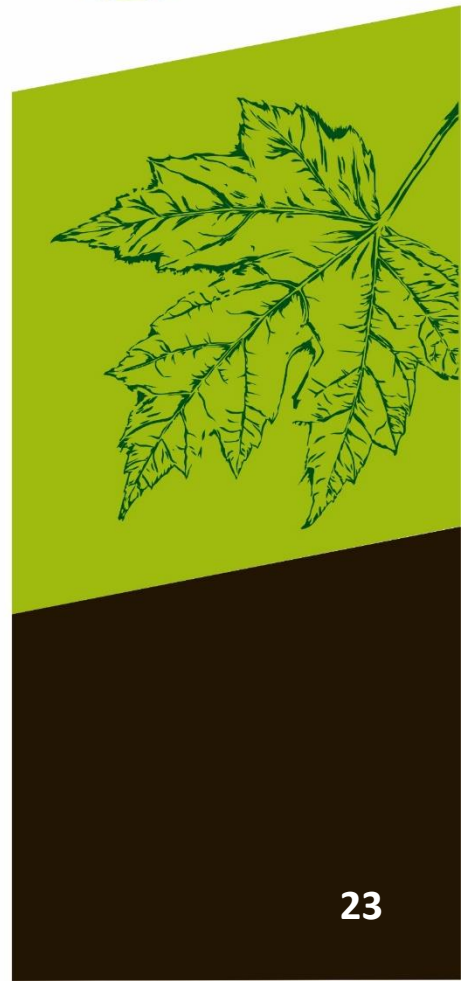


Process Simulation in Pilot Plant Scale

3. Discontinuous Reactor for Hydrolysis and Fermentation of Pretreated LC Raw Material



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



*Publication of research results in **WOOD RESEARCH***

Division of VUPC Bratislava

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(ISSN 1336-4561)

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WOOD RESEARCH

Publisher : VÚPC a.s., Bratislava

Edited by Slovak Forest
Products Research Institute
Bratislava
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The Association was founded for the supporting and developing science, research and education in the field of wood-processing industry. Members of Association shall participate in financing of publishing of the internationally scientific magazin "WOOD RESEARCH" (ISSN 1336-4561)..

Swiss Federal Institute of Technology

Institute for Buildings, Wood Physics HIF E25.2
Schaftmattstrasse 6
CH-8093 Zürich
Swiss

Warsaw University of Life Sciences (SGGW)

Faculty of Forestry
Nowoursynowska 159
PL-02-776 Warsaw
Poland

Poznan University of Life Sciences

Faculty of Wood Technology
ul. Wojska Polskiego 28
PL-60-637 Poznan
Poland

Pulp and Paper Research Institute

Dúbravská cesta 14
SK-841 04 Bratislava
Slovak Republic

Technical University in Zvolen

Faculty of Wood Science and Technology
Masarykova 24
SK-960 53 Zvolen
Slovak Republic

University of Ljubljana

Biotechnical Faculty
Rožna dolina
Cesta VIII/34
SI-1000 Ljubljana
Slovenia

University of West Hungary

Faculty of Wood Science
Ady Endre út 5
H-9401 Sopron
Hungary

BOKU University of Natural Resources and Life Sciences

Institute of Wood Science and Technology
Konrad Lorezstrasse 24
A-3430 Tulln
Austria

University of Zagreb

Faculty of Wood and Forestry Science
Svetošimunska 25
HR-10002 Zagreb
Croatia

Georg August University Göttingen

Faculty of Forest Sciences and Forest Ecology
Wood Biology and Wood Products
Büsgenweg 4
D-37077 Göttingen
Germany

Slovak Technical University in Bratislava

Vazovova 5
SK 812 43 Bratislava
Slovak Republic

Mendel University in Brno

Faculty of Forestry and Wood Technology
Zemědělská 3
CZ-613 00 Brno
Czech Republic

Czech University of Agriculture in Prague

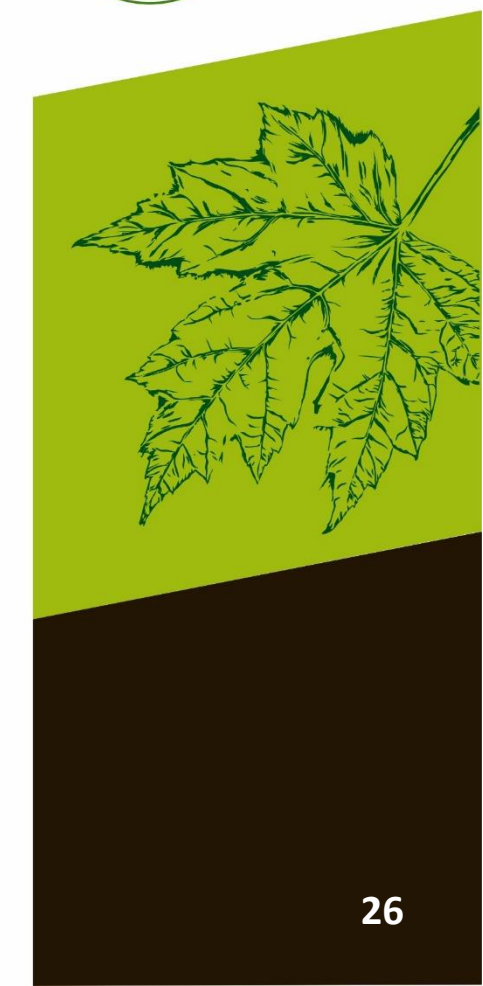
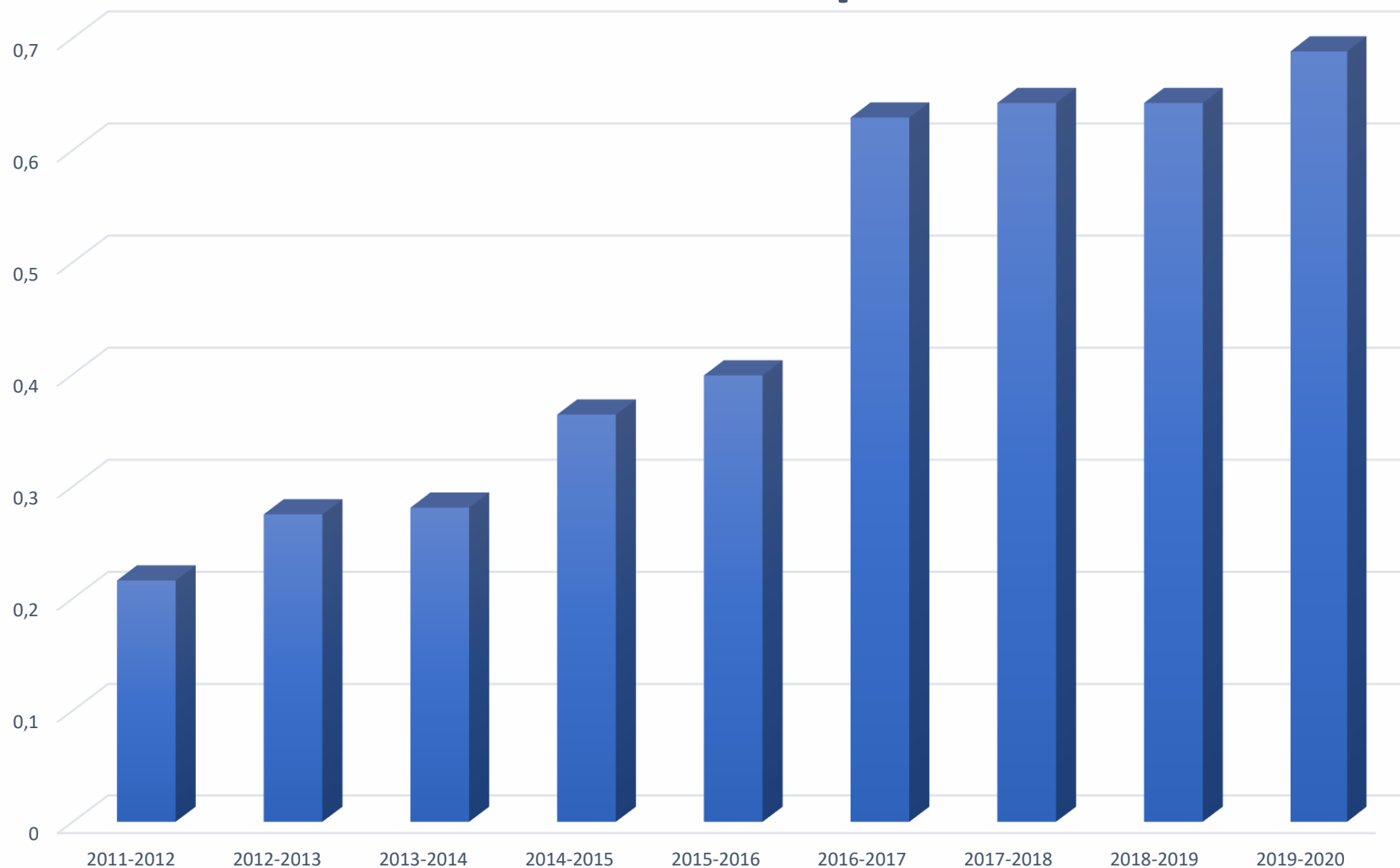
Faculty of Forest and Environment
Kamýčká 1176
CZ-165 21 Praha 6 - Suchbát
Czech Republic

Fraunhofer Institute for Wood Research, Wilhelm-Klauditz-Institut WKI

Bienroder Weg 54 E
D-38108 Braunschweig
Germany



Wood Research - Impact Factor



ACKNOWLEDGMENTS

This publication is the result of the project implementation: Centrum excelentnosti lesnícko-drevárskeho komplexu LignoSilva (ITMS: 313011S735, LignoSilva - Centre of Excellence of Forest-based Industry) supported by the Research & Development Operational Programme funded by the ERDF.





EUROPEAN UNION

European Regional Development Fund
OP Integrated Infrastructure 2014 – 2020



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INDUSTRY



Thank you for your attention



National Forest Centre

T. G. Masaryka 2175/22, 960 01 Zvolen
phone: +421 45 532 03 16,
e-mail: nlc@nlcsk.org
www.nlcsk.org



Pulp and Paper Research Institute a.s.

Dúbravská cesta 14, 84104, Bratislava 4
phone: +421 911 728611
e-mail: sekretariat@vupc.sk
www.vupc.sk