



European Polysaccharide
Network Of Excellence

N°30 - AUGUST 2015



**“Nature makes polysaccharides,
EPNOE turns them into products”**

editorial

Dear Readers of the EPNOE Newsletter,

I wish to focus this Editorial on a delicate task faced by all knowledge transfer and innovation organisations: how to organize in an efficient, not too-consuming-time and profitable manner the building of links between scientists who do not know each other and are working in related, but different fields. This is a general challenge, and of course also a challenge for EPNOE. We tried three different ways, all with their own advantages and drawbacks. Collective brain-storming sessions are fun, and they often lead to opening new paths with building of new projects. But the difficulty is to build an “area of trustiness” where participants are feeling free to speak. We are planning to restart such exercises beginning of 2016. The Dormant Idea initiative was even more complicated to implement, but out of ten “lost” ideas came one real project, which is a big success. EPNOE members are requesting to start again this initiative, probably also beginning of 2016. A description of the dormant Ideas initiative can be found in the n°24 March 2013 issue of the EPNOE Newsletter, available on the EPNOE website. A third method used by EPNOE is the organization of face-to-face meetings. Here confidentiality is easily ensured but the difficulty is to find a way to match the interests of participants, a task which must be conducted well in advance of the meeting. We performed such an exercise in July 2015 in Paris. In this issue of the Newsletter, participants are giving their feelings about this face-to-face meeting.

As can be seen, no method is without difficulties. The most efficient, or better said the less difficult, is probably to use these three methods, as EPNOE is doing.

With my best wishes,



Dr. Patrick Navard
Coordinator of EPNOE
Armines/Mines ParisTech/CNRS
CEMEF - Centre for Material
Forming
Sophia-Antipolis
(France)

news

Member's info



New staff:

- At **ARMINES-C2MA**, France:
 - Cleber Lucius Da Costa (PhD), supervisors : Anne Bergeret, Nicolas Le Moigne, Project : BIOPLASMA, “biocomposites : synergy between biopolymer, natural fiber, vegetable oil and plasma process”
 - Michael Berges (Master), supervisors : Stéphane Corn, Romain Léger, Patrick Ienny in partnership with Drive and FEMTO-ST, “Hydro-thermal ageing of biocomposites: influence of processing parameters”
- At **Friedrich Schiller University of Jena**, Germany:
 - Thomas Elschner finished his PhD thesis entitled “Polysaccharide carbonates - a platform for functional biopolymers”
 - M. Sc. Josiane Bartz from Brazil is carrying out a part of her PhD studies on starch functionalization in the Heinze group
 - Jonas Holste (supervisor Dr. Th. Elschner), Linda Schmidt (supervisor Dr. Th. Elschner), and Florian Schnurrer (supervisor Dr. A. Koschella) joined the group as Bachelor students working in different fields of polysaccharide reserach, in particular in the field of hemicellulose and chitin
 - M. Sc. Benjamin Scherer joined the group as PhD student (supervisor Prof. Dr. Th. Heinze) working on meltable polysaccharide esters
 - Dr. Jan-Markus Teuscher joined the grous as scientific coworker in the field of novel starch derivatives for commercial applications



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EPNOE Activities

EPNOE SpringerBriefs on Biobased Polymer Science and Technology

EPNOE, the European Polysaccharide Network of Excellence and Springer are launching a SpringerBriefs series entitled 'EPNOE SpringerBriefs on Biobased Polymer Science and Technology'.

SpringerBriefs present concise summaries of cutting-edge research and practical applications across a wide spectrum of fields. Featuring compact volumes of 50 to 125 pages, the series covers a range of content from professional to academic.

Typical topics might include:

- A timely report of state-of-the art analytical, biological, physical or mechanical techniques
- A bridge between new research results, as published in journal articles, and a contextual literature review
- A snapshot of a hot or emerging topic
- A description of a new product or concept
- An in-depth case study or clinical example
- A presentation of core concepts that students must understand in order to make independent contributions and to increase their awareness of scientific fields not directly connected to their main interest
- Best practices or protocols to be followed

In addition to the above list, we intend to offer excellent Ph.D. students from recognized institutions, the possibility to extend the state-of-the-art chapter from their Ph.D. dissertation to a minimum of 50 pages (maximum 125 pages) and to have it published as a SpringerBrief. Every manuscript will be peer reviewed by independent senior scientists as per the procedure for journal article publications.

All aspects of basic and applied Biobased Polymer Science and Technology will be considered. The series aims to cover all fields and sectors (such as for example genetics and agronomy of polysaccharides, plant based-concrete or bioplastics).

The series editor is Patrick Navard. Thirty books are now planned.

To have more information or submit a book proposal, contact Patrick Navard at patrick.navard@mines-paristech.fr.

news (continued)

Member's info



Masters & PhD defenses:

• At University of

**Natural Resources and
Life Sciences Vienna (BOKU)**, Austria:

- Assistant Professor Dr. Falk Lieber has successfully defended his habilitation thesis "Value-added Materials from Renewable Resources" (external evaluators: H. Sixta, M. Ek, P. Mischnick, B. Saake) to obtain the Venia Legendi in the field of "Chemistry of Biomaterials" and has been promoted to Associate Professor at the University of Natural Resources and Life Sciences, Vienna.

- Dr. Christine Nagawa has successfully defended her PhD thesis "Chemical Composition and Biological Activity of Essential Oils and Extractives from Selected Tree Species of Uganda" (Supervisors: S. Böhmendorfer, T. Rosenau).

- Dr. Martin Siller has successfully defended his PhD thesis "Oxidative Modification of Cellulosic Fibers" (Supervisors: A. Potthast, T. Rosenau).

New projects:

• At University of Maribor, Slovenia:

- Renewable Materials and Healthy Environments Research and Innovation Centre of Excellence ("InnoRenew CoE"; H2020 – SGA-CSA; 01.06.2015 – 01.06.2015; project partner

- Contrast by Nuclear Quadrupole Enhanced Relaxation ("CONQUER"; H2020, 1.9.2015 – 31.8.2018; project partner)

Award:

Laurent Puech (PhD): Prize for the best poster at Eurofillers / Polymer blends 2015, 26-30 April, Montpellier, "Impact behaviour of natural fibres reinforced biocomposites"



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EPNOE Activities

One-day course on “Bio-based building materials and use of polysaccharide in building and construction materials” in Clermont-Ferrand, June 21, 2015

The 1st International Conference on Bio-based Building Materials (ICBBM 2015) took place in Clermont-Ferrand, 22-24 June 2015. This conference was aimed at being an international forum for information dissemination and exchange, discussions and debates on research and practice related to innovative bio-construction materials and technologies with objectives for sustainable development. The day before, on Sunday 21st, a one-day course on “Bio-based building materials and use of polysaccharide in building and construction materials” was initiated by EPNOE. It was co-organised by **Sofiane Amziane** ICBBM Chairman and **Mohammed Sonebi** ICBBM Co-Chairman, **Patrick Navard** and **Jan van Dam**, EPNOE and **Ellie H. Fini**, North Carolina A&T State University.

The course started at 9 am and finished at 5 pm, followed by the famous “Fête de la Musique” in the streets of the city. The programme was:

- **Jan van Dam.** Introduction to Biomass I – Sustainable and biobased building and new opportunities from the development of biorefineries – Lignocellulosics
- **Jan van Dam.** Introduction to biomass II – Other polysaccharides use in building and construction, e.g. Starch, chitin, xanthan, etc.
- **Patrick Navard.** Review of plant fiber sources, properties and treatments
Mahour Parast. Bio-Adhesive for Construction: Innovation to Commercialization
- **Wolfram Schmidt.** Bio-based additives, resins and polymers roles and performances
- **Ellie Fini.** Investigating Source Dependency of Rheological and Surface Characteristics of Bio-Adhesives
- **Laurent Arnaud.** Mix proportioning, mechanical and multiphysical properties (thermal, hygrothermal and acoustical) of bio based building materials : Example of hemp concretes
- **Tatiana Budtova.** Polysaccharide-based thermal super-insulating materials
- **Patrick Navard.** Using polysaccharide advantages: plant biology/final materials relationships
- **Nima Rahbar.** Multiscale Design of Bio-inspired Structural Materials
- **Laurent Porot.** Renewable additive for aged binder: a sustainable approach to enhance asphalt binder properties

70 participants followed this course, which was the occasion to teach topics from biomass structure to various applications through bio refinery considerations.



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EPNOE Activities

About face to face meetings for boosting collaboration and generating common projects

During the last meeting of EPNOE members in Paris (9/10 July 2015), a face-to-face meeting was organized, with a oral presentation of the new EPNOE members and a poster presentation of the expertise of all participants. Some comments about the efficiency of this meeting are given below.

"We were pleased of the face to face meeting. We have already sent e-mails to contact again few people we met during the face to face meeting. It is very efficient" (**Véronique Bonnet, université de Picardie**).

"I had two face-to-face meetings with two partners, and they both went well. We have planned a Skype meeting with one in September to discuss possible collaborations, and we are discussing with the second a proposal for submission under the BBI JU call. I felt the event was an excellent way of making initial contact and exchanging information" (**Avinash Manian, University of Innsbruck**).

"From my point of view it was an excellent idea to have these face to face meetings, and also the time slots were appropriate and I am sure that they can act as stimulus for future collaborations. As one example: one EPNOE partner will come to Graz for a visit probably in October and vice versa" (**Stefan Spirk, Technical University Graz**).

"Face-to-face meetings is in my opinion the best way to know other members and to explore the possibilities of collaborations. We have detected some interesting points to work with some members and we hope it will become future projects. The only remark is that the time and schedules did not allow us to face-to face meet even more partners. Perhaps a suggestion could be to add short meetings/round tables (in the program of the general meeting) about specific themes within the different subjects included in the EPNOE network (in connection to EU calls or not)" (**José Kovensky, Université de Picardie**).

"It is a good way for exchanging information and knowing better research expertise of other partners because it gives each partner the possibility to actively talk for some time, instead of just listening to presentations. Also, I liked the poster session (even though I forgot to bring mine !), because again, it is a more active way of exchange" (**Ute Henniges, Boku Vienna**).

"Face to face meetings are a good method to generate research collaborations. I am sure that we will benefit from the face to face meetings and we have already booked telephone meetings with partners and induce collaboration between a colleagues in Karlstad and a professor in another EPNOE university" (**Ulf Germgård, Karlstad University**).

"Face to face meetings are a very good to exchange information and expertise in a deeper way with other partners. Posters and presentations before these meetings are very efficient. Many common interests emerged from the meetings I had and they can lead to projects in future" (**Adeline Ranoux, Cosun - CFTC/Research**).



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EPNOE Member's research

“Surface and interface modifications as a key to controlling biocomposites properties”

Nicolas Le Moigne, Belkacem Otazaghine, Rodolphe Sonnier, Stéphane Corn, Anne Bergeret

Centre des Matériaux des Mines d'Alès (C2MA), Ecole des Mines d'Alès, 6 avenue de Clavières, F-30319 Alès CEDEX, France.

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Natural fibres reinforced biocomposites are considered as promising alternative to glass fibre reinforced composites. Indeed, they present excellent specific mechanical properties thanks to their low density as well as interesting acoustic and viscoelastic damping performances. To enhance their performances and better implement this new class of composites at an industrial scale, various strategies are conducted, including: (i) the selection and improvement of intrinsic properties of the raw materials, i.e. natural fibres and matrices, and (ii) the improvement of the interfacial adhesion in between. The quality of the fibre/matrix adhesion is mainly governed by the chemical coupling and the mechanical interlocking at the interface. In this respect, enzymatic, chemical grafting and physical treatments are developed to favour the wettability and the physico-chemical interactions at the fibre/matrix interface. These fibre treatments are usually intended to optimize the dispersion of the fibres within the matrix and improve the mechanical performances [1] of the composites (Figure 1). New functionalities, such as hydrophobicity, flame retardancy [2], can also be achieved via surface and interface modifications (Figure 2). Current research projects on biocomposites conducted at C2MA aim at developing specific chemical grafting and physical treatments and processes to control the localization of the functionalizing molecules, and the consecutive fibre dispersion and interface properties in relation with the functional properties. Efforts are made to investigate the interface by means of microscopic observations, physico-chemical and mechanical cross-analyses, so as to better understand the relationship between the thermal and mechanical behaviour of the biocomposites and their structure from the macromolecular and the microstructural scales.

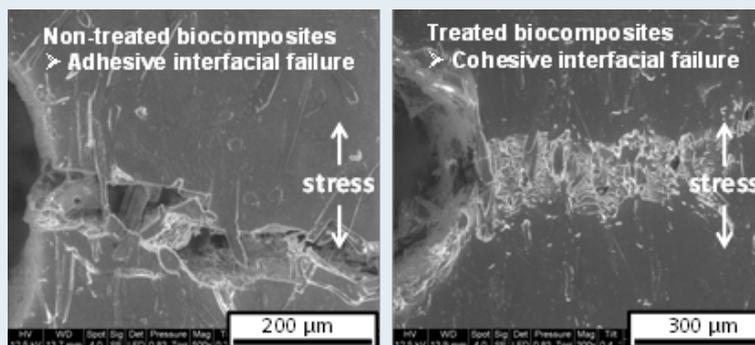


Figure 1: In-situ SEM observations during crack propagation in notched specimens of non-treated and silane treated flax/PLA biocomposites [1]

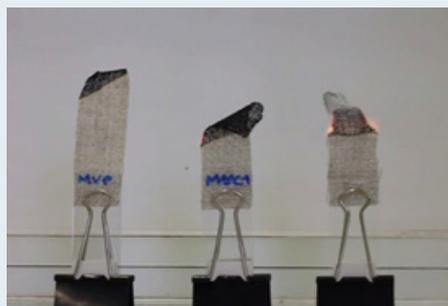


Figure 2: Flammability test on treated (left and middle) and non-treated (right) flax fibre fabrics [2]

[1] Le Moigne N., Longerey M., Taulemesse J-M., Benezet J-C., Bergeret A. *Industrial Crops and Products* 52 (2014) 481–494

[2] Sonnier R., Otazaghine B., Viretto A., Apolinario G., Ienny P. *European Polymer Journal* 68 (2015) 313–325



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EPNOE Member

Margaretha Söderqvist Lindblad (1955-2015)

Our dear colleague and friend Margaretha Söderqvist Lindblad has left us May 8, too early, after a long time fight with her disease. Her closest relatives are her parents and one brother with family. Margaretha was representing Södra in the European Polysaccharide Network of Excellence, since 2012.

Margaretha was borne and grown up in Vetlanda, in the south of Sweden. Her first contact to paper industry was as a summer worker at Pauliström Paper mill, where she also met her husband Gunnar.

Margaretha moved to Stockholm and started a position as technician at the Department of Pulp and Paper Chemistry and Technology, KTH, Stockholm, 1978 –1984. After that she joined STFI (now Innventia), Stockholm, as a research engineer. The thirst for knowledge resulted in a Ph D exam in Polymer Technology, KTH, Stockholm 2003; The thesis topic was "Strategies for Building Polymers from Renewable Sources: Using Prepolymers from Steam Treatment of Wood and Monomers from Fermentation of Agricultural Products" under supervision of Prof. A.-C. Albertsson.

After the Ph D exam Margaretha left Sweden for an Internship at Eastman Chemical Company, Kingsport, TN, USA, followed by a Post-doc position at University of Tennessee, National Renewable Energy Laboratory, Golden, CO, USA.

But Margaretha was missing Sweden and her wish to go back resulted 2005 in a position as specialist and research coordinator at the Swedish pulp company Södra, where she stayed for the rest of her career. The focus for Margaretha's research was development of new and existing products for the pulp- and paper industry in the perspective of sustainability, such as "Utilization of hemicellulose", "Sorption of polysaccharides on paper grade pulp", "Biocomposites" such as the by Södra developed new material Durapulp, but also materials technology for packages based on cellulose fibres: She was project manager for the Swedish project "Functionalized cellulose with extended design possibilities" (Formulosa) where the goal was to develop sustainable, cost-effective and competitive packaging. A demonstrator – a bottle cap - was produced from unmodified kraft pulp fibers and modified polyethylene, using injection moulding.

Margaretha continued her international relations by participating as organizer of European conferences such as EWLP European Workshop on Lignocellulosics and Pulp, together with KTH and Innventia, She also presented Södras research projects as invited plenary speaker at International Symposium on Wood Fiber Pulping Chemistry conference and many American Chemical Society meetings. During the last years she was also a frequent visitor to Brussel, representing Södra in the Biobased Industries Consortium in the general assembly and the BIC-board.



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EPNOE Members

Margaretha Söderqvist Lindblad (1955-2015) (continued)

Margaretha was active in Södras industrial-academic research and founded and organized the Avancell Seminar series, 2005 - 2010. Every Avancell Seminar contained thematic presentations of international and national scientists and also presentations from the Avancell PhD candidates and post docs. Avancell is a research network started by Södra and Chalmers University of Technology in 2005. Margaretha was also a frequent guest as lecturer for the undergraduate at KTH and as lecturer in different courses given by FPIRC (Forest products industry Research College). Margaretha also acted as assistant supervisor for industrial PhD student Espen Ribe at Södra. The final academic goal, a promotion to adjunct professor at KTH, Department of Fiber and Polymer Technology, was expected 2015.

Margaretha was a very warm, colorful and professional person and if you have had the possibility to meet her, you remembered her. She was dedicated to research about processes and products based on renewable materials, mainly from wood. She was target oriented and always well organized, documented and contributed to the conference or meeting discussions with sharp questions; one of the last I remember is "How much wood contains a "wooden house"?"

Although Margaretha worked a lot she also had a private life, she and her late husband Gunnar was active birdwatchers, with great opportunities in Varberg and the surroundings at the Swedish west coast where she lived. She was very interested in design both in her professional projects but also in her private life, her home was decorated with modern and classical design. She was also active in the local handicraft team and travelling around the world visiting her friends and colleagues attending different music events, a favorite was the Stockholm Jazz festival.

We, present and former colleagues at KTH, miss Margaretha and our thoughts go to her today, July 8th, which should have been her 60 year birthday.

This article was proposed by Monica Ek, Professor Wood Chemistry KTH Royal Institute of Technology, Sweden



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EPNOE Future Event

2nd International EPNOE Junior Scientists Meeting

Sophia-Antipolis (France), 13-14 October 2016

hosted by the Materials Forming Center (CEMEF) of Mines ParisTech
and co-organized by

Carmen Freire (University of Aveiro), Martin Gericke (University of Jena), Nicolas LeMoigne (MINES Alès), Zdenka Persin (University of Maribor), Carmen-Mihaela Popescu (Petru Poni Institute) and Stefan Spirk (Graz University of Technology)

The European Polysaccharide Network of Excellence (www.epnoe.eu) is dedicated to connecting academia, research institutes and companies in the areas of polysaccharide related research, education and knowledge transfer. One aspect is to promote young academics at the very beginning of their scientific career. In this context, the 1st International EPNOE Junior Scientists Meeting, held in January 2015 at Wageningen University (The Netherlands), was a great success. It provided a unique platform for junior scientists from different polysaccharide related research areas to present their individual scientific work along with personal visions of what might be the future perspectives in this broad scientific field. The 2nd International EPNOE Junior Scientists Meeting that will be held from October 13-14, 2016 in Sophia Antipolis (France) will continue this idea.

The call for abstracts is explicitly addressed to PhD students, Post-Doctoral scientists and junior Assistant Professors (or equivalent) in an early stage of their scientific career. The participants are invited to present recent results of their individual research, as well as to share their ideas on how polysaccharide research will or should advance in the near future. Likewise, senior scientist as well as industrial researchers are explicitly invited to join the auditorium in order to participate in fruitful discussions.

Registration and fees

For Scientists working in a research center, university, or company member affiliated with EPNOE, a fee of 65€ is charged (to be paid by bank transfer; see web site). For all other participants, the registration fee is 165 €. Further details regarding the registration will be announced in the second circular and posted on the EPNOE website (www.epnoe.eu).

Abstract submission

Junior scientists (as defined in the scope) are welcome to submit abstracts starting from January 2016. Further information will be announced in the second circular.

Types of presentations

The meeting will feature oral and poster presentations. Further details will be announced in the second circular.

Important dates

- 14th of November 2015 Second circular and further information
- 1st of January 2016 Submission of abstracts and registration starts
- 30th of June 2016 Deadline for abstract submission
- 15th of September 2016 Information about acceptance of proposed abstracts

Contacts:

General issues: Martin Gericke (martin.gericke@uni-jena.de)

Local organization: Sylvie Massol (sylvie.massol@mines-paristech.fr)



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Céréales Vallée presentation

CEREALES VALLEE, INNOVATION CATALYST IN CEREALS



Thanks to innovation, Céréales Vallée contributes to give value to cereals chains in order to respond to the major food, non-food and environmental challenges our society is facing. As a key actor of bioeconomy, Céréales Vallée is pushing cereal chains value development at a regional, national and international levels to match with growing needs.

- Territorial : Contributing to a vibrant, dynamic and attractive territory
- National : Improving production efficiency and ensuring the competitiveness of French agriculture and cereal sectors.
- International : Meeting food needs of 9 billion people by 2050, while limiting the environmental impact.

Of the five leading cereal exporting regions (Argentina, Australia, Canada, the United States and the European Union) Europe is indisputably the zone with the most regular production, diversified offer and structured organization.

Within the European Union, French cereal production has reached a very high level of performance, with the capacity to effectively meet a wide variety of needs, from the most specialized (niche markets) to the most standardized (volume markets).

As the only French competitiveness cluster involved in the entire cereal chain - from consumer products to seeds - Céréales Vallée brings together a unique combination of skills with regards to innovation in cereals, and mobilizes both public and private actors, from research, industry and academia.

Céréales Vallée facilitates the setting-up and the coordination of innovative R&D, industrial, training and international projects, in a highly competitive and worldwide business context. Its strategy is based on 4 major strategic priorities, linked to the needs of all stakeholders in agricultural value chains.

Cereals

- 70% of world's food
- 40 years of increase consumption
- 2 months of available stocks for the whole world

Challenges

- A growing world population
- A high quality food exigence
- An emerging economy from renewable carbon resources



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Céréales Vallée presentation (continued)

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CÉRÉALES VALLÉE, FROM USES TOWARDS PRODUCTION



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More information : www.cereales-vallee.org



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EPNOE Member's Scientific Publications

Armines-C2MA, France:

- L. Ferry, G. Dorez, A. Taguet, B. Otazaghine, J.M. Lopez-Cuesta, Chemical modification of lignin by phosphorus molecules to improve the fire behaviour of polybutylene succinate, *Polymer Degradation and Stability*, 113, 135–143 (2015)

- Sonnier R., Otazaghine B., Viretto A., Apolinario G., Jenny P., Improving the flame retardancy of flax fabrics by radiation grafting of phosphorus compounds, *European Polymer Journal*, 68, 313–325 (2015)

- Iggui K., Le Moigne N., Kaci M., Cambe S., Degorce Dumas J.R., Bergeret A., A biodegradation study of poly(3-hydroxybutyrate-co-3-hydroxyvalerate) / organoclay nanocomposites in various environmental conditions, *Polymer Degradation and Stability*, 119, 77–86 (2015)

- Julien J-M., Quantin J-C., Benezet J-C, Bergeret A., Lacrampe M-F., Krawczak P., Chemical foaming extrusion of poly(lactic acid) with chain-extendors: Physical and morphological characterizations, *European Polymer Journal*, 67, 40–49 (2015)

- Djellali S., Sadoun T., Haddadoui N., Bergeret A., Viscosity and viscoelasticity measurements of low density polyethylene poly(lactic acid) blends, *Polymer Bulletin*, 72, 1177-1195 (2015)

BOKU, University of Natural Resources and Applied Life Sciences, Austria:

- Gindl-Altmutter, W., Fürst, C., Mahendran, A.R., Obersriebnig, M., Emsenhuber, G., Kluge, M., Veigel, S., Keckes, J., Liebner, F. Electrically conductive kraft lignin-based carbon filler for polymers (2015) *Carbon*, 89, pp. 161-168.

- Griesser, M., Lawo, N.C., Crespo-Martinez, S., Schoedl-Hummel, K., Wieczorek, K., Gorecka, M., Liebner, F., Zweckmair, T., Stralis Pavese, N., Kreil, D., Forneck, A. Phylloxera (*Daktulosphaira vitifoliae* Fitch) alters the carbohydrate metabolism in root galls to allowing the compatible interaction with grapevine (*Vitis* spp.) roots (2015) *Plant Science*, 234, pp. 38-49.

- Korntner, P., Hosoya, T., Dietz, T., Eibinger, K., Reiter, H., Spitzbart, M., Röder, T., Borgards, A., Kreiner, W., Mahler, A.K., Winter, H., Groiss, Y., French, A.D., Henniges, U., Potthast, A., Rosenau, T. Chromophores in lignin-free cellulosic materials belong to three compound classes. Chromophores in cellulose, XII (2015) *Cellulose*, 22 (2), pp. 1053-1062.

- Mayr, M., Eckhart, R., Sumerskiy, I., Potthast, A., Rosenau, T., Schögl, J.-P., Posch, A., Timmel, T. Flippr® - An industrial research project in Austria (2015) *Tappi Journal*, 14 (3), pp. 209-213.

- Hosoya, T., Kosma, P., Rosenau, T. Theoretical study on the effects of a 4,6-O-diacetal protecting group on the stability of ion pairs from D-mannopyranosyl and D-glucopyranosyl tri-flates (2015) *Carbohydrate Research*, 411, 64-69.

- Nagawa, C., Böhmendorfer, S., Rosenau, T. Chemical composition and anti-termite activity of essential oil from *Canarium schweinfurthii* Engl (2015) *Industrial Crops and Products*, 71, pp. 75-79.

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EPNOE Member's Scientific Publications (continued)

University of Maribor, Slovenia:

- ŠAUPERL, Olivera, KOSTIČ, Mirjana, MILANOVIC, Jovana, FRAS ZEMLJIČ, Lidija. Chemical binding of chitosan and chitosan nanoparticles onto oxidized cellulose. *Journal of engineered fibers and fabrics*, ISSN 1558-9250, 2015, vol. 10, iss. 2, str. 70-77. <http://www.jeffjournal.org/> [COBISS.SI-ID 18728214].
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