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**May 2022**

## ... Editorial

Dear Readers,

The transition from lockdown to “normal” life is almost complete in many European countries and we can enjoy the meetings in person again. EPNOE is organizing four events in June and July. A training school about Aerogels for Biomedical Applications will take place in Leuven and a EPNOE webinar dedicated to career boost for young researchers will be recorded in this event with contributions of EPNOE Jr Group, KU Leuven Career Centre, COST Association and CESAER (association of 58 leading universities of science and technology from 28 countries in Europe and beyond). A Polysaccharide session will be organized at RRB 2022 in Bruges, Belgium with a keynote talk of Prof. Joao Mano about marine polysaccharides for biomedical applications. University of Girona, one of our new members, is organizing the CIADICYP 2022 in Girona, Spain and we will have the pleasure to enjoy a plenary round table session about Polysaccharide Innovations with EPNOE speakers from Lenzing, VTT, INRAe and University of Aveiro. Spain and Barcelona will also be the destination of ca 50 students in July who will attend the EPNOE-ESEIA Summer School about Sustainable Materials for Renewable Energy Applications to be organized by ICMA B. Preparations for the 5<sup>th</sup> EPNOE Jr Conference to take place in September in Aveiro, Portugal are at full speed now and the full program will be available soon. Please check our website and follow us on social media to keep up to date with nice opportunities to collaborate and to co-create. We are looking forward to welcoming you to EPNOE as a new member and as a participant of our events.



Pedro Fardim  
President of EPNOE **ed us on**

Follow us on



## ... News & Announcements



**EPNOE Junior Scientist Meeting 2022**

Scientists from over 25 countries submitted their abstracts for this premier event for young researchers in the polysaccharides field. We were very excited to receive more than 125 abstracts for posters and oral presentations. The team is now working hard to put the program together, abstracts acceptance will be announced around June 3rd.

**Don't forget to register before you are off on your summer break!**

[website](#)



European Polysaccharide  
Network Of Excellence



European Commission

## European Partnerships in Horizon Europe

We are happy to announce that EPNOE is now registered to be a partner in EU Horizon projects!

We offer dissemination and communication support services for European research and technological development projects related to bio-based and circular economy, and polysaccharides related fields in materials science & engineering, food & nutrition and biomedical applications.

We are registered on the EU funding & tender portal as: European Polysaccharide Network of Excellence (EPNOE Association)

[Click here for more details](#)

# Support Ukraine

CLICK TO SEE HOW EPNOE MEMBERS HELP!



See what our members are doing to support



Funded by the Horizon 2020 Framework Programme of the European Union

**KU LEUVEN**



*Training School – Leuven, Belgium*

Tuesday 07<sup>th</sup> June – Friday 10<sup>th</sup> June 2022

## Aerogels for biomedical applications



Co-funded by the European Union



**Flanders**  
State of the Art



**Vlaamse overheid**

website



**SURE2022** INTERNATIONAL SUMMER SCHOOL

# SUSTAINABLE MATERIALS FOR RENEWABLE ENERGY APPLICATIONS

[sure2022.icmab.es](http://sure2022.icmab.es)

11-15 JULY 2022 AT ICMAB - REGISTER BEFORE **30** MAY 2022

**ESEIA** European Sustainable Energy Innovation Alliance

**epnoe**

**MICMAB** EXCELLENCIA 2017 OCHOA INSTITUT DE CIÈNCIES DE MATERIALS DE BARCELONA

**CSIC** CENTRO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

website



**SAPIENZA** UNIVERSITÀ DI ROMA  
DEPARTMENT OF CHEMISTRY AND TECHNOLOGIES OF DRUGS  
DEPARTMENT OF CHEMISTRY

**epnoe**  
European Polysaccharide  
Network Of Excellence

**universidade de aveiro**

**EPNOE WORKSHOP**

## POLYSACCHARIDES IN DRUG DELIVERY - ON THE ROAD TO INNOVATION!

FOR AGENDA AND MORE INFO: [EPNOE.EU](http://EPNOE.EU)

ROME, SAPIENZA UNIVERSITY  
OCTOBER 27-28, 2022

Submit your abstract

**EPNOE is happy to sponsor:**



**25th Austrian Carbohydrate Workshop**  
**Graz University of Technology**  
**July 7–8 2022**

HS „H“ Ulrich Santner  
 Kopernikusgasse 24, Parterre

**Contact:** t.wrodnigg@tugraz.at  
**Registration deadline:** June 20, 2022

website

### News from BOKU, Austria



#### The 2022 ACS CELL Division Graduate Student Award has been awarded to Paul Jusner

Paul Jusner from the Institute of Chemistry of Renewable Resources received the graduate student award 2022 of the American Chemical Society CELL Division for his dissertation.

*Picture credit: BOKU/Paul Jusner*



#### BOKU Teaching Aard 2021 goes to Falk Liebner

Prof. Falk Liebner (Institute of Chemistry of Renewable Resources) received one of the 2021 Teaching Awards bestowed by the University of Natural Resources and Life Sciences, Vienna, for his engagement in laying the foundations in General Chemistry for annually more than 1000 students from various BSc disciplines including Environment and Bio-Resources Management, Environmental Sciences and Civil Engineering, Forestry, and Wood & Fibre Technology.

### Upcoming EPNOE webinar

#### June 9th 2022, at 14:00 CET to 15:15 CET - "Career Boost for Young Researchers"

Special webinar in collaboration with COST Association, CESAER Association and KU Leuven Career Centre  
 Speakers:

- Mattias Björnmalm, CESAER Association
- Julian Sellinger, EPNOE Junior

- Nicole Wedell-von Leupoldt, KU Leuven Career Center
- Carlos A. García-González, COST Association and COST Aerogels

Moderator will be: Pasquale Del Gaudio, Dpt. of Pharmacy, University of Salerno

Register for this webinar

**Save the Dates for Webinars 2022 (from 13:00 to 14:30 CET):**  
Oct 6<sup>th</sup>, November 10<sup>th</sup>, December 1<sup>st</sup>

**EPNOE Webinar April and May - material available now!**



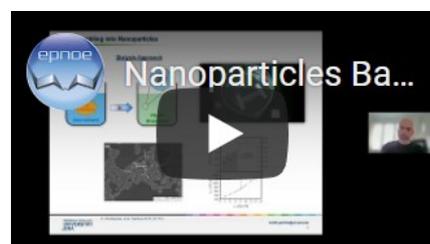
Plenary lecture by **Prof. Anna Roig**, Institut de Ciència de Materials de Barcelona, ICMAB-CSIC, Catalunya ([www.icmab.es](http://www.icmab.es)), Nanoparticles and Nanocomposites Group ([www.icmab.es/nn](http://www.icmab.es/nn))

*Bacteria farming to harvest functional nanocellulose materials*



Research lecture by **Dr. Martin Gericke**, Friedrich-Schiller-University of Jena (Germany)

*Nanoparticles Based on Hydrophobic Polysaccharide Derivatives—Formation Principles, Characterization Techniques, and Biomedical Applications*



Plenary lecture by Prof. **Pietro Matricardi**, Sapienza University, Rome, Italy

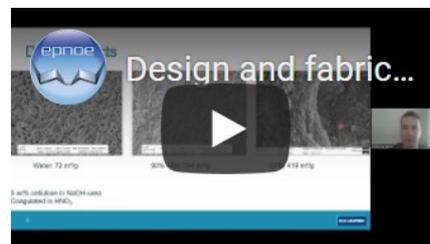
*Polysaccharide nanohydrogels and their use in drug delivery*



Research lecture by **Pieter De Wever**, KU Leuven, Belgium



*Design and fabrication of polysaccharide cryogel beads for advanced applications*



## Projects

### A microcalorimetric and microscopic strategy to assess the interaction between dietary fibers and small molecules

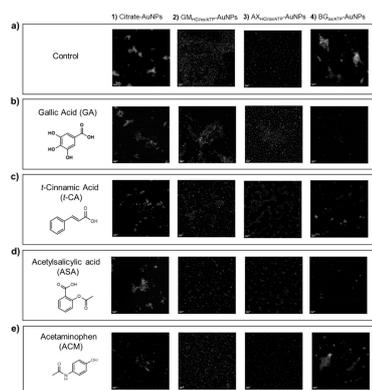
**Grant number** No. 679037

Funding agency: European Research Council ERC

Start date: April 2016

End date: March 2022

The interaction between small molecules and neutral soluble dietary fiber is one of the proposed mechanisms determining the bioavailability of these components in the small intestine. However, the weak nature of these interactions makes it difficult to find an analytical method sensitive enough to detect them. Here, we probed the molecular interaction between galactomannan (GM), arabinoxylan (AX), and  $\beta$ -glucan (BG) with gallic acid, cinnamic acid, acetylsalicylic acid, and acetaminophen, using advanced analytical methods, namely isothermal titration calorimetry (ITC) and in the form of gold-nanoparticles, transmission electron microscopy (TEM) (See Figure 1). The results obtained from ITC analysis were fully consistent with the results obtained from TEM. In short, the interaction of these fibers and small molecules was mainly entropically driven, hence involving hydrophobic type association and possible conformational changes of the polysaccharide. However, the enthalpy contribution (hydrogen interaction) is also significant, especially regarding interactions with the acetylsalicylic acid molecule.



**Figure 1:** TEM images of citrate, GM<sub>SH</sub>, AX<sub>SH</sub>, and BG<sub>SH</sub> glycoconanoparticles. The absolute concentration of each ligand in the particle samples was 50  $\mu$ M. The overall concentration of the nanoparticles in the samples remained constant (7.8 nM Au particles). Scale bar are 0.2  $\mu$ m for all the images.

From the results obtained from the combination of ITC and TEM analysis, we can conclude that direct interactions at the molecular level, which go beyond viscosity and/or gel entrapment mechanisms, exist at least between galactomannan, arabinoxylan, and  $\beta$ -glucan, with gallic acid, acetylsalicylic acid, and trans-cinnamic acid.

[To website](#)

[To article](#)

### Estimation of Iron Availability in Modified Cereal $\beta$ -Glucan Extracts by an in vitro Digestion Model

**Grant number:** I: Project number 406940\_145165, II: no. 679037

Funding agency: Swiss National Science Foundation, National Research Programme NRP 69, II: European Research Council

Start date: June 2015

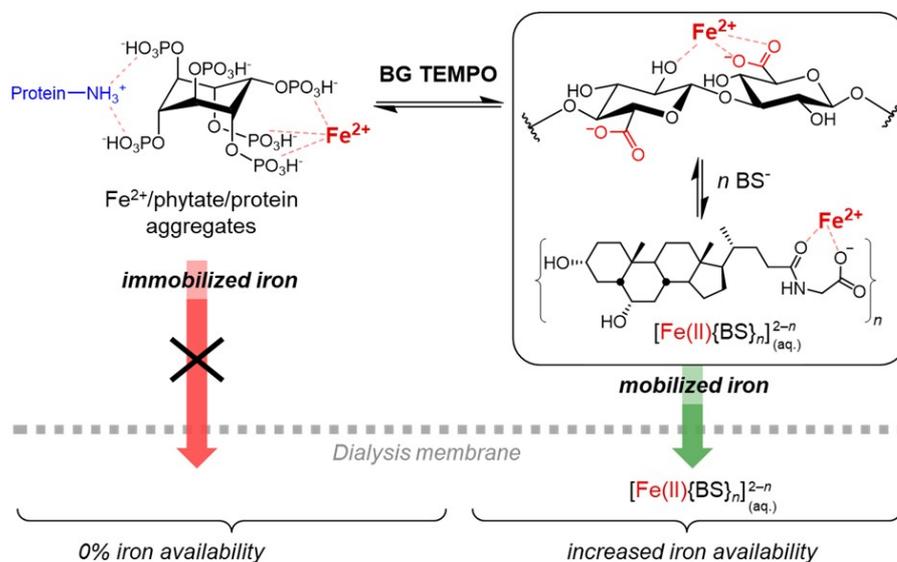
End date: March 2022

Iron bioavailability in cereal foods is an important health factor for animal and human nutrition, and is negatively correlated with levels of phytic acid in cereals. We studied the relationship between cereal  $\beta$ -glucan structure and iron availability directly or

indirectly, next to the role of phytic acid, and assessed the effect of targeted modifications (TEMPO oxidation;  $\text{NaIO}_4$  oxidation; acid hydrolysis) and treatments (phytase  $\pm$  prior Chelex-treatment to remove intrinsic iron) of oat and barley  $\beta$ -glucan extract materials on iron availability. This was accomplished by determining in an *in vitro* digestion model how much of the extrinsically added iron ( $50 \mu\text{M FeSO}_4$ ) in the extract mixtures containing 1% (w/w)  $\beta$ -glucan could be recovered via dialysis, as an indicator for iron availability.

The major impact phytic acid has as an inhibitor of iron availability in cereal foods was underlined, confirming that pure  $\beta$ -glucan polysaccharide itself does not impede iron availability. However, the measured iron dialysability revealed that oxidation of  $\beta$ -glucan extract by TEMPO, but not by  $\text{NaIO}_4$ , may be effective in improving iron availability, even though both materials had virtually the same phytic acid contents. A mechanism explaining this unexpected phenomenon based on the charged polyglucuronan TEMPO-product as an iron-mobilizing transporter was developed.

Interestingly, phytase treatment increased the iron availability for the native extracts only after Chelex treatment, which removed a significant portion of minerals that complex phytic acid (Fe, Ca, Zn), hence making it more accessible for complete enzymatic dephosphorylation. This has major implications when attempting to increase iron availability directly through phytase treatments in cereal  $\beta$ -glucan containing food products.



*Proposed mechanism for the observed effect of increased iron availability despite substantial phytic acid contents when using the TEMPO-oxidised  $\beta$ -glucan material (BG TEMPO), by transferring  $\text{Fe}^{2+}$  from large iron/phytate/protein aggregates to soluble iron/bile salt (BS) complexes that can cross the dialysis membrane.*

To website

To article

## Events



### The international conference on Renewable Resources and Biorefineries

(RRB 2022) will take place on 1<sup>st</sup> - 3<sup>rd</sup> June 2022 in Bruges, Belgium. The conference is expected to welcome about 300 international participants from over 30 countries and is being organized for the 18<sup>th</sup> time. Topics discussed on RRB 2022 are a.o. biobased chemicals, biodegradable materials, biocatalysis, fermentation, polysaccharides, wood and forestry as well as the upcycling of waste streams.

On June 2<sup>nd</sup>, a biobased market will take place, where young entrepreneurs, companies and research institutions can showcase their prototypes, ideas and products. This market is free of cost for exhibitors and conference participants. Additional information on the conference or the biobased market is available on the website: [www.RRBconference.com](http://www.RRBconference.com).

### Advanced Functional Polymers for Medicine (AFPM) Conference 2022

The Advanced Functional Polymers for Medicine (AFPM) 2022 conference will be organised 1 - 3 June 2022 by the Centre for Materials Forming (CEMEF) in Sophia Antipolis, France. The purpose of the AFPM conference series is to strengthen the

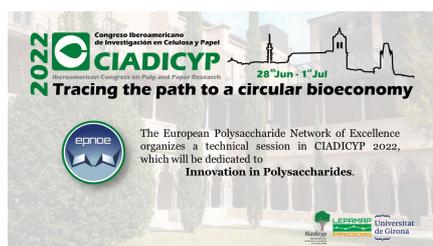
AFPM  
Advanced  
Functional  
Polymers for  
Medicine  
2022  
1-3 June 2022  
CEMEF  
Nice, France



interactions within the community of chemists, material engineers, physicists, biologists and clinicians in the development of Advanced Functional Polymers for Medicine.

The current status, challenges and requirements for future developments of polymers for medicine will be presented by leading experts. The conference provides an outstanding opportunity to help young scientists in their career development and offers them an interdisciplinary discussion forum within an exclusive circle. The AFPM 2022 conference will offer delegates innovative and stimulating topics with a well-balanced programme of invited speakers and poster presentations.

website



### CIADICYP 2022

The twelfth edition of the Iberoamerican Congress on Pulp and Paper Research (CIADICYP 2022) will take place in Girona (Spain) from 28th June to 1st July 2022. EPNOE will organize a session on "Innovation in Polysaccharides" in the frame of the conference, where renowned speakers in the field of polysaccharides will discuss about the challenges and opportunities in this field.

We hope to meet you in Girona in June and work together on the definition of the path that will bring us closer to a more sustainable society.

For further details on topics, submission guidelines and registration, please visit [the website](#) or contact [ciadicyp2022@udg.edu](mailto:ciadicyp2022@udg.edu)

International Society for Plant Spectroscopy  
[www.plantspec.org](http://www.plantspec.org)



## 3<sup>rd</sup> International Plant Spectroscopy Conference

### Third Edition

Sharing new developments and original applications:  
**Spectroscopies and Spectral Imaging in the field of Plant Sciences.**

**2022 September 12-15**  
**La Cité, Nantes Congress Centre - France**

### 2022 International Symposium on Polymer Nanocomposites: 28-30<sup>th</sup> September 2022 @ Lorient

In collaboration with the International Society for Plant Spectroscopy (<https://plantspec.org/>), the Biopolymers, Interactions & Assemblies (BIA) research unit is organising the "Third International Plant Spectroscopy Conference" (IPSC) at the Cité des Congrès in Nantes from 12 to 15 September 2022.

**We have a very nice selection of keynote speakers and topics and will even have practical technical workshops in several topics. In addition, the journal Biomolecules will dedicate a special issue for the conference**

The topics include (but are not limited to):

- FTIR (micro)spectroscopy
- Raman (micro)spectroscopy

Both beginners and experienced researchers are also invited to participate in technical workshops:

- Data analysis techniques

- Autofluorescence spectroscopy and imaging
  - Mass spectrometry and imaging
  - NMR spectroscopy and imaging
  - Related chemometric approaches
- Sample preparation
  - Spectral technique selection
  - Correlative and multimodal imaging

The goal is to encourage discussion, share experiences, and questions about your practice, and improve your technical skills and knowledge. Updates on the conference, registration, and lodging are available on the event website

website



website

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## Research

### Nanostructurally Controllable Strong Wood Aerogel toward Efficient Thermal Insulation

Jonas Garemark<sup>1</sup>, Jesus E. Perea-Buceta<sup>2</sup>, Daniel Rico del Cerro<sup>2</sup>, Stephen Hall<sup>3</sup>, Barbara Berke<sup>4</sup>, Ilkka Kilpeläinen<sup>2</sup>, Lars A. Berglund<sup>1</sup>, Yuanyuan Li<sup>1\*</sup>

<sup>1</sup>Wallenberg Wood Science Center, Department of Fiber and Polymer Technology, KTH Royal Institute of Technology, Sweden

<sup>2</sup>Department of Chemistry, University of Helsinki, A.I. Virtasen aukio 1, Finland

<sup>3</sup>Lund University, Division of Solid Mechanics, Sweden

<sup>4</sup>Department of Physics, Chalmers University of Technology, Sweden

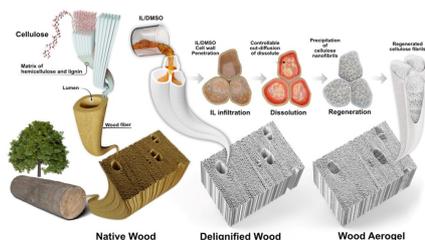
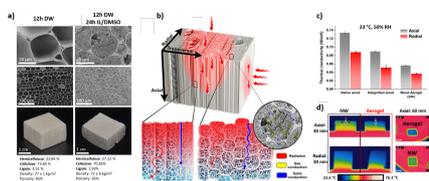


Figure 1. Illustration of wood aerogels formation.

Heating and cooling of buildings represents one of society's largest carbon footprints, rendering >10% of the global CO<sub>2</sub> emissions.<sup>1</sup> Developing efficient thermal insulators of low embodied energy is key to energy savings in buildings and sustainable development. Cellulosic aerogels with structural anisotropy are promising candidates in this context, as their lightweight and ultra-porous frameworks can combine low thermal conductivity with high mechanical strength. However, processing and high energy demand are challenges for scaling-up.

We developed a non-additive, top-down fabrication of anisotropic cellulosic aerogels directly from wood with high strength and excellent thermal insulation functions. The aerogel exhibits a unique structure with lumen filling by nanofibril networks, leading



to specific surface areas up to 280 m<sup>2</sup>/g, high yield strengths >1.2 MPa, and low thermal conductivities in both axial (0.057 W/mK) and radial (0.037 W/mK) directions. The aerogel was achieved by cell wall dissolution and controlled precipitation within the wood pores, using a guanidinium phosphorous-based ionic liquid (IL) [MTBD][MMP] mixed with DMSO. The energy efficient and scalable fabrication and rare combination of strength and thermal insulating properties show promise in energy efficient buildings and beyond.

Figure 2. a) scanning electron microscope images of (Left) delignified wood, and (right) a wood aerogel. b) Illustration depicting the thermal conduction within the aerogel. c) thermal conductivity values for native wood, delignified wood and the aerogel, followed by a demonstration of the heat conduction when placed on a hot disk at 70 °C.

We acknowledge the funding from Vetenskapsradet (2017-05349), Knut & Alice foundation via the Wallenberg Wood Science Center, European Research Council (No. 742733), Wallenberg Foundations, and the support from Treesearch and Chalmers Material Analysis Laboratory (CMAL).

Article: <https://pubs.acs.org/doi/10.1021/acsami.2c04584>

(1) *Transition to Sustainable Buildings*; International Energy Agency, 2013. DOI: 10.1787/9789264202955-en.

## Call for Papers

### Polymers | Submission Invitation to Special Issue of Polymers [IF 4.329] “Starch and Starch-Based Materials: Food and Non-Food Application”

Special Issue: Starch and Starch-Based Materials: Food and Non-Food Application

Guest Editors: Dr. Arkadiusz Zarkasi; Dr. Sergiu Coseri; Prof. Dr. Janusz Kapusniak

Submission deadline: 31 October 2022

More info: [click here](#)

### Special Issue "Advances in Bacterial Nanocellulose-Based Materials"

Special Issue Editors: Professor Armando J. D. Silvestre, Doctor Carmen S. R. Freire, Doctor Carla Vilela

Submission deadline: 10 September 2022

More info: [click here](#)

### Special Issue "Advanced Nanocellulose-Based Materials: Production, Properties and Applications II"

Special Issue Editors: Doctor Carla Vilela, Doctor Carmen S.R. Freire

Deadline: 31 December 2022

More info: [click here](#)

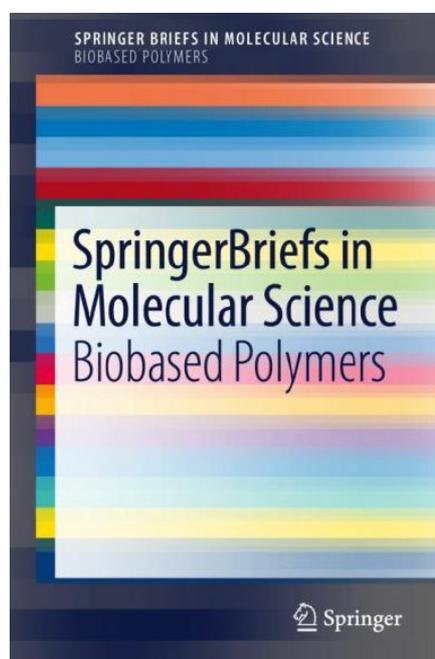
Advertisement for the Special Issue "Advances in Bacterial Nanocellulose-Based Materials" in the journal *materials*. The journal is an Open Access Journal by MDPI with an Impact Factor of 3.623 and is covered in PubMed. The Special Issue is edited by Prof. Dr. Armando J. D. Silvestre, Prof. Dr. Carmen S. R. Freire, and Dr. Carla Vilela. The submission deadline is 10 September 2022. The URL is [mdpi.com/si/82301](https://mdpi.com/si/82301). A QR code is provided for more information.

Advertisement for the Special Issue "Advanced Nanocellulose-Based Materials: Production, Properties and Applications II" in the journal *nanomaterials*. The journal is an Open Access Journal by MDPI with an Impact Factor of 5.076 and is covered in PubMed. The Special Issue is edited by Dr. Carla Vilela, Prof. Dr. Carmen S. R. Freire. The submission deadline is 31 December 2022. The URL is [mdpi.com/si/116429](https://mdpi.com/si/116429). A QR code is provided for more information.

### Biobased Polymers

### Subseries of SpringerBriefs in molecular science

Series Ed.: N. Le Moigne, L. Shen, M. Gericke, S. Spirk and R. Kargl



Published under the auspices of EPNOE\*, Springerbriefs in Biobased polymers covers all aspects of polysaccharide sciences, starting from their production and isolation from native sources (i.e. biosynthesis, genetics, agronomy, plant cell biology, biorefinery), over their characterization and processing (chemical / enzymatic modification, shaping, biodegradation) to the many applications in which they are used (food & feed, materials & engineering, biomedical).

The focus of this book series lies on publications related to all kinds of native or synthetic polysaccharides, polysaccharide-derived polymers, and composites containing polysaccharides as a fundamental component. Moreover, topics related to natural fibres, wood, polysaccharide containing biomass and bioplastics, life cycle assessments are within the scope.

[More info click here](#)



## SpringerBriefs: Authored volumes



**Springer Briefs** are designed to get your ideas to market as fast as possible. They are concise summaries of cutting-edge research and practical applications across a wide spectrum of fields. Featuring compact volumes of 50 to 125 pages, each series covers a range of professional and academic topics. Briefs have a quick turnaround time and will be available as eBooks and MyCopy editions. Print editions have a softcover binding.

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### ...

## Education

### ***Welcome to new students and researchers*** **University of Jena - Germany.**

- M. Sc. Shirin Naserifar, PhD student at Chalmers University of Technology, is visiting the group in order to characterize quarternary ammonium salts as solvents for cellulose
- Prof. Dr. Olayide Samuel Lawal, Federal University Oye-Ekiti, Nigeria, joined the group as an Alexander von Humboldt scholar. He is working in the field of utilizing agricultural waste materials as novel cellulose source.
- M. Sc. Zakaria Atmani joined the group at PhD student working in the field of preparation of functional polysaccharide hydrogels by selective cross-linking reactions (supervised by Martin Gericke and Thomas Heinze).

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## Open Positions

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### Career position in the field of Bioplastics Technology with a focus on Development of Bioplastics (Synthesis, Processing, Characterisation, Biodegradability, Recycling)

University of Natural Resources and Life Sciences Vienna (BOKU), the Department of Agrobiotechnology, IFA-Tulln, Austria  
Apply by June 1st, 2022

For more information, [click here](#)

### Position for a Process Research Engineer (m/w/d)

DDP Specialty Products Germany GmbH & Co KG, in Bomlitz, Germany.

The IFF Pharma Solutions business produces and sells high-performance cellulose derivatives and related chemistries used for formulations across a broad variety of applications in the Pharmaceuticals, Food, and Industrial Specialties and Personal Care markets.

Apply by June 15th, 2022

For more information, [click here](#)

### Looking for applicants to tenured CNRS researcher positions

The Glycochemistry, Antimicrobials and Agroresources Laboratory (LG2A, UMR 7378, Amiens, France) is searching for candidates to apply to tenured CNRS researcher positions within the lab.

Apply before August 31st, 2022

For more information, [click here](#)

### Open position for a Research Professor in molecular physical chemistry of polymers and polymer based materials

Chemistry department, KU Leuven, Belgium

Apply by September 15th, 2022

For more information, [click here](#)

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