

Dear readers,

Happy New Year! Our plan of activities for this year is very exciting and dynamic and you certainly cannot miss to join our events and many opportunities for collaboration. Please take note: EPNOE can be your trusted partner for dissemination in EU and national project applications. Having us in your team will increase your chances to be successful because we can offer unique tailored activities to your consortium that will make you stand out of the crowd. This year we will organize summer schools, workshops, special book series, sessions in conferences, our junior conference, joint activities with other associations and webinars. You will find the information about our activities below. We are also very proud to announce that our EPNOE Research and Education Roadmaps will be published in March. These strategic policy documents are the result of joint efforts of more than 20 excellent scientists from 14 European countries. The Education roadmap is a unique tool to EPNOE members to improve and boost their education programs. The Research Roadmap is a high-level strategic document with vision and recommendations for polysaccharide research in Europe for the next 20-30 years. EPNOE members will have exclusive access to the documents. You are very welcome to join EPNOE and help us to build a more sustainable future.



Pedro Fardim President of EPNOEd us on Follow us on



## News & Announcements



### **Call for Abstracts NOW OPEN**

### EPNOE Junior Scientist Meeting 2022

#### Abstract Submission is now open

Our major event in 2022 will be the EPNOE Junior Scientist Meeting in Aveiro, Portugal. the website for abstract submissions is now available! The 5th EPNOE Junior Scientist Meeting 2022 will be held from 8th to 9th of September 2022 at the University of Aveiro, Aveiro, Portugal. This is a biannually organized conference designed for young researchers (i.e., PhD students, Post-Doctoral Researchers, Junior Assistant Professors at an early stage of their scientific career) to meet and build their personal network in the polysaccharide field, while also presenting their recent work and brainstorming the direction and future of polysaccharides research. Senior scientists and industrial researchers are invited to join for transfer of knowledge beyond generations of scientists.

To the website

Submit your abstract





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



#### EnXylaScope explores xylan's potential for greener consumer products

*EnXylaScope* is a project funded by the European Commission under Horizon 2020 research and innovation programme.

EnXylaScope will find and optimise novel enzymes for producing a debranched form of xylan with properties that make it a suitable ingredient for consumer products. Three types of enzymatically modified xylan will be made and tested for application in six consumer products from the cosmetics, personal care and nutraceuticals sectors. Researchers will use advanced techniques for the discovery, production and formulation of these enzymes. EnXylaScope will maximise research output and reduce the time frame required to launch these products onto the marketplace. https://youtu.be/3pW4eayurSM

click for more info



### Call for posters - ZELLCHEMING-Conference - Cellulose-Based Materials – From Science to Technology



Download document to submit your poster

CONFERENCE

For More infomation



#### PosaNova - a start-up working in the field of polysaccharides was founded

Polysaccharides are not only the most important renewable resources but also fascinating polymers with structural diversity and functional versatility. The majority of moneymaking products based on polysaccharides are cellulose ethers and esters obtained by chemical modification in kiloton scale worldwide. Moreover, fiber, membranes, and sponges made via the state of dissolution of polysaccharide derivatives like cellulose acetate, nitrocellulose, and viscose are important commercial products.

Even more important is the fact that chemical modification of polysaccharides is a key issue in order to make our world more sustainable and greener. Polysaccharides and their derivatives may contribute to solve the waste problem like the micro plastics problem.

PosaNova's vision is to provide modified polysaccharides with designed structures to take full advantages from these natural resources. The whole set of advanced organic chemistry and advanced structure characterization is available based on our experiences in the field for many decades.

The products provided are of high quality and can be applied in many fields; an important area of application is bio-analytics for our reactive polysaccharide derivatives offered.

Reactive polysaccharide derivatives for easy chemical modification, polysaccharide nanoparticles with various functionality including combinations of reactive moieties and (fluoresce) dyes as well as building blocks are developed and offered. A main issue are novel reactive polysaccharides for all field in the development of immunoassays.



The CEO Dr. Peter Miethe has long-standing experiences in the research and development of antibody based technologies. This comprises the development, the characterization, conjugation and immobilization of antibodies. He was responsible for development for rapid immunoassays (magnetic read out, ABICAP micro column technology, lab ion chip).

Another issue are polysaccharide nanoparticles that carrying reactive groups like carbonates, dyes, and anchors moieties as well as specific groups for targeting.



The CSO Prof. Dr. Th. Heinze made outstanding contributions to the research of polysaccharides including new concepts for polysaccharide chemistry, efficient solvents for cellulose shaping and homogeneous phase reactions, structure-property relationships of polysaccharide derivatives, and structure characterization of biopolymers by advanced analytical tools.

Carbohydrates and their derivatives are offered and may be prepared on request that includes structure characterization. Do not hesitate to contact us for any polysaccharide derivative of interest and analytical issues you may have in this field: https://www.posanova.de/



### Brazil - EU Workshop about Circular Bioeconomy

We had a very successful workshop with various speakers from Brazil and Europe, companies and research and universities. A presentation about the European Bioeconomy Strategy was also given by European Commission. More than 120 attendees from 17 countries joined the workshop. We will organize workshop follow up activities, like partner matchmaking and strategic high level meetings with all participants.

The videos of the presentations we are allowed to share, are available on the EPNOE member area!



### EPNOE Webinar November - recordings available now!

Plenary lecture by Prof. Magnus Norgren, Mid Sweden University, Sweden "Cellulose in emulsions and functional composites"

Cellulose in emulsions and functional composites





Research presentation by Rajesh Koppolu, Åbo Akademi, Finland **"Nanocellulose in packaging"** 



#### Upcoming EPNOE Webinar – February 3rd, from 13:00 to 14:30 CET



Plenary lecture by Prof. Tanja Wrodnigg, TU Graz, Austria

Glycomimetics: Useful Tools and Potential Therapeutics



Ignacio Alvarez, doctoral candidate BOKU, Austria

Chemoenzymatic Synthesis of Monodisperse Xylan Oligosaccharides

To register for this webinar

## Save the Dates for Webinars 2022 (from 13:00 to 14:30 CET):

March 3<sup>rd</sup>, April 7<sup>th</sup>, May 5<sup>th</sup>, June 2<sup>nd</sup>, Oct 6<sup>th</sup>, November10<sup>th</sup>, December 1<sup>st</sup>

## Projects

### SEPPIC - EnXylaScope – Mining Microbes and Developing Advanced Production Platforms for Novel Enzymes To Rapidly Unleash Xylans' Potential In a Scope Of Products For the Consumer Market

grant number: 101000831 funding agency: REA start date: 1 May 2021 end date: 30 April 2025

Xylan is an important structural component of plant cells. The EU-funded EnXylaScope project will find and optimise novel enzymes for producing a debranched (water-insoluble) form of xylan with properties that make it a suitable ingredient for consumer products. In total, three types of enzymatically modified xylan will be made and tested for application in six consumer products that span three sectors: cosmetics, personal care and nutraceuticals. Researchers will use advanced techniques for the discovery, production and formulation of these enzymes. EnXylaScope is designed to maximise research output and reduce the time frame required to launch these products onto the marketplace. www.enxylascope.eu

#### Biodegradable and environmentally friendly hydrogels for sustainable agriculture

grant number: 075-03-2021-287/6 funding agency: Ministry of Education and Science of the Russian Federation start date: 2021 end date: 2023

Part of the project is dedicated to the development of methods and technologies for designing innovative materials in the form of hydrogels by using organic waste from the food and agriculture sectors.

Considering the new directive, especially in the European Union related to the limitation in the use of fertilizers, in particular, mineral one, part of the project is focused on the optimization of the release of mineral fertilizers following the plant needs with a reduction in the loss and the relative environmental impact. In addition, the hydrogels, with their ability to hold a large amount of water and release it only when needed, permit to reduce the frequency and the volume of the irrigation water.

In conclusion, the aim is to valorize waste materials to produce high-value formulations for agriculture to enhance the efficacy of water and mineral fertilizers to reduce their use.

## University of Nottingham: Biophysical defence in the mammalian gut: Unlocking the molecular mechanisms of dietary fibre interaction with mucin glycoproteins.

grant number: BB/T006404/1 funding agency: BBSRC start date: 01 Oct 2020 end date: 30 Sep 2023

Mucus plays pivotal role in gut health, including its role in maintaining healthy microbiota. Despite the importance of mucus biofluids to human health and well-being, there is a limited knowledge about how dietary fibre interact with mucus. The emerging evidence suggests that fibre-rich diet can support mucus integrity and boost its barrier function.

This project considers the effect of dietary fibre on biophysical properties of mucus, such as rheology (flow, viscoelasticity), hydration, lubrication and permeability. The key scientific question is to uncover the interaction mechanisms between dietary fibre polymers / fibre assemblies (e.g., plant cell walls) and mucus. Common dietary fibre with proven health benefits (e.g., oat b-glucan) display no mucoadhesive properties when tested using instrumental techniques commonly employed in drug delivery research. The emerging hypothesis is that interactions are mediated by the bound water and are physical in nature amplified by polymer entanglement.

By bringing key capabilities in analytical centrifugation, rheology, micromechanical testing and advanced microscopy, the project aims to tackle this fundamental problem by addressing three specific research questions: (a) uncover the role of DF molecular architecture on hydration, viscoelasticity, and responsiveness of mucus/dietary fibre complexes; (b) by controlling the molecular architecture of fibre polymers, unlock the potential of fibre to control mucus rheological properties; and (c) design dietary fibre composites to tune and modulate mucus barrier functionality.

Methodologically, the project focuses on three groups of fibre materials: (a) soluble fibre polymers, (b) model dietary fibre assemblies (soluble/insoluble fibre composite), as well as (c) natural dietary fibre from wheat endosperm cell walls. The research platform enables delivering impact in the areas of food structure design, dietary recommendation policy, and biomedical areas.

#### University of Nottingham: Sustainable Future Foods: Mechano-Enzymatic Assembly of Complex Food Structures

grant number: BB/T008369/1 - 2604202 funding agency: BBSRC start date: 01 Oct 2021 end date: 30 Sep 2025

Soft Matter Biomaterials and Biointerfaces Team in collaboration with Diamond Light Source, Sir Peter Mansfield Imaging Centre and Motif FoodWorks, a Massachusetts-based animal-free ingredient innovation company, are looking forward to train an early stage researcher to PhD level as part of a highly prestigious BBSRC DTP CASE PhD Studentship Programme. Designing sustainable foods requires novel plant-based ingredients that enable creating new textures, whilst unlocking product's functionality in the body. This calls for discovery and development of new fibre materials with highly ordered structures that mimic some of nature's most wondrous fibres such as silk, collagen and myofibrils.

This project seeks to discover and develop new methods for controlling enzymatic cross-linking during extensional flow and characterise ordered structures using small angle scattering and nuclear magnetic resonance imaging, as well as diving into understanding fibre's mechanical and functional properties, focusing on applications in foods. The successful candidate will: 1) Research cross-linking reaction between proteins and polysaccharides (dietary fibre) and evaluate the impact of crosslinking on the rheological (flow) and mechanical properties of fibre. 2) Develop a new extensional flow sample environment system at the I22 Small Angle Scattering and Diffraction Beamline, Diamond Light Source, thus enabling measurements of biopolymer structuring during fluid elongation and formation of a fibre filament. 3) Characterise polymer and water dynamics using NMR spin relaxation and multi-scale imaging techniques at the Sir Peter Mansfield Imaging Centre. 4) During a research experience placement at the lab facilities of Motif FoodWorks (Boston, MA, USA), research on enzyme functionality and synthetic biology-based approaches for identifying new targets for strain engineering and designing enzymes with targeted activity and specificity will be undertaken. The primary host of this Studentship is the Soft Matter Biomaterials and Biointerfaces (SMBB) Team at the University of Nottingham, School of Biosciences. SMBB is a highly dynamic, interdisciplinary team focusing on biomolecular composites, which underpin development of sustainable and healthy foods. The successful candidate will be encouraged to participate in the activities of the British Society of Rheology, Institute of Physics Food Physics Group and European Polysaccharide Network of Excellence (EPNOE). Previous experience in (bio)polymers, soft matter systems or colloids is highly appropriate. Experience of bimolecular characterisation and some level of COMSOL/MATLAB/Python skills are highly beneficial. The successful candidate will have a positive approach to collaborative research and the drive to make a significant contribution to innovation and sustainable food systems.

## University of Nottingham: Australia Partnering Award: Delving down-under using advanced plant phenotyping to uncover how roots grown in hard soils

grant number: BB/V018124/1 funding agency: BBSRC start date: 01 Aug 2021 end date: 31 Jul 2025

The overarching aim of this project is to share UK-Australian expertise in plant phenotyping with the goal to improve compaction tolerance and global food security (supporting Bioscience for Sustainable Agriculture and Food from the BBSRC Delivery Plan and the BBSRC Agriculture and Food Security Strategic Priority Area and the priority areas of Food, Soil and Water of the Australia Research Council.

### University of Nottingham: EPSRC and SFI Centre for Doctoral Training in Sustainable Chemistry: Atoms-2-Products an Integrated Approach to Sustainable Chemistry

grant number: EP/S022236/1 funding agency: EPSRC start date: 01 Oct 2019 end date: 31 Mar 2028

Advanced economies are now confronted with a serious challenge that requires us to approach problem solving in a completely different way. As our global population continues to rise we must all consider several quite taxing philosophical questions, most pressingly we must address our addiction to economic growth, our expectation for longer, healthier lives and our insatiable need to collect more stuff! Societies demand for performance molecules, ranging from pharmaceuticals to fragrances or adhesives to lubricants, is growing year-on-year and the advent of competition in a globalised market place is generally forcing the market price downward, cutting margins and reducing the ability for some industry sectors to innovate. Atoms to Products (A2P) is an exciting opportunity to forge a new philosophy that could underpin the next phase of sustainable growth for the chemicals manufacturing industry in the UK and further afield. An overarching driving force in the development of A2P was the desire to apply the knowledge and learning of Green and Sustainable Chemistry to the creative phases embedded in the discovery and development of performance molecules that deliver function in applications as diverse as pharmaceuticals, agrochemicals and food.

## University of Nottingham: Visualisation and motion analysis of in mouth processes and oral behaviours associated with wearing dentures

grant number: BB/V509553/1 - 2453626 funding agency: BBSRC start date:01 Oct 2020 end date: 30 Sep 2024

This Project focusses on combining new advances in motion capture, computer-based analysis (including the use of novel deep learning algorithms) and Oral Processing analysis, to provide fundamental and genuinely new underpinning insights into facial motions during use of dental devices, denture adhesives and dental patches.

# Events

#### 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 next June and work together in 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** 



### Save the dates for two upcoming Summer Schools! More information about these events will be available on the EPNOE Website soon!

## **KU LEUVEN**



*Training School – Leuven, Belgium* Tuesday 07<sup>th</sup> June – Friday 10<sup>th</sup> June 2022

Aerogels for biomedical applications



eseia – EPNOE summer school - ICMAB Barceclona Monday July 11th – Friday July 15th

Sustainable Materials for Renewable Energy Applications



## Research



### Hydrophobic Starch-Based Films Using Potato Washing Slurries and Spent Frying Oil

Sílvia Petronilho; André Oliveira; M. Rosário Domingues; Fernando M. Nunes; Manuel A. Coimbra; Idalina Gonçalves (2021) , Foods 2021(10):2897. http://dx.doi.org/10.3390/foods10122897

#### 1/31/22, 2:40 PM

#### Issue

This article was published in the Foods Special Issue *Rethinking Agri-Food and Marine Waste and Byproducts for Circular and Sustainable Bio-Based Food Packaging*, where it was hypothesized that starch can be hydrophobized and plasticized during the starch-based film production using a single-step approach and following transesterification principles. In this work, KOH powder and spent frying oil (SFO) were used as an alkaline catalyst and a source for triacylglycerides, respectively, to promote the modification of starch. The incorporation of KOH during the starch/SFO-based films production revealed to be a promissory strategy for developing water tolerant biobased materials with enhanced stretchability and elasticity without changing their transparency, opening the possibility to extend the use of starch-based bioplastics to fields that include packaging applications. FTIR and 1H NMR suggested the possible modification of the starch structure by the presence of chemically bonded SFOderived fatty acids. The results obtained with the casting process used paves the way for the application of starch/SFO/KOH formulations by the plastic industries in their extrusion processes.

#### Microwave hydrodiffusion and gravity as a sustainable alternative approach for an efficient apple pomace drying

Pedro A. R. Fernandes, Rita Bastos, João Calvão, Fernando Neto, Elisabete Coelho, Dulcineia F. Wessel, Susana M. Cardoso, Manuel A. Coimbra, Cláudia P. Passos (2021), Bioresource Technology, 2021(333):125207. https://doi.org/10.1016/j.biortech.2021.125207

The article "Microwave hydrodiffusion and gravity as a sustainable alternative approach for an efficient apple pomace drying" was published in Bioresource Technology, where it was hypothesized that microwave hydrodiffusion and gravity technology allows to dry apple pomace more efficiently than conventional drying while allowing to obtain compounds along with the diffused water. Carbohydrates were the target compounds as they represent an economically relevant component from apple pomace. The microwave-hydrodiffusion technology yielded carbohydrate-rich extracts, including pectic polysaccharides. The dried pomace, stable up to two years, also presented a relevant source of pectic polysaccharides and xyloglucan degraded material.

### The Antidiabetic Effect of Grape Pomace Polysaccharide-Polyphenol Complexes

Filipa Campos, Andreia F. Peixoto, Pedro A. R. Fernandes, Manuel A. Coimbra, Nuno Mateus, Victor de Freitas, Iva Fernandes, Ana Fernandes (2021), Nutrients, 2021, 13(12):4495. https://doi.org/10.3390/nu13124495

The article "The Antidiabetic Effect of Grape Pomace Polysaccharide-Polyphenol Complexes" was published in Nutrients, where it was hypothesized that the grape pomace might be valued as a source of anti-diabetic agents. Carbohydrate/polyphenol complexes were the target compounds as they combine both the properties of polysaccharides and polyphenols. Besides affecting sugar composition and phenolic content of polysaccharide/polyphenol complexes, the extraction method also has implications on the antidiabetic effect of grape pomace polysaccharide/polyphenol complexes. The inhibition  $\alpha$ -glucosidase activity, antiglycation effect and attenuation of glucose uptake were identified to be possible mechanisms of action of the novel polysaccharide structures.



# Polysaccharide-based formulations as potential carriers for pulmonary delivery - A review of their properties and fates

Sara A. Valente, Lisete M. Silva, Guido R. Lopes, Bruno Sarmento, Manuel A. Coimbra & Cláudia P. Passos (2022) . *Carbohydrate Polymers*, 2022(277):118784. https://doi.org/10.1016/j.carbpol.2021.118784

This review was published in the Carbohydrate Polymers 40th anniversary special issue. It covers important aspects of polysaccharide-based carriers in the pulmonary delivery field. The review addresses how polysaccharides can form micro-, nano-in-micro-, and large porous particles, aerogels, and hydrogels, and the reasons why these are advantageous for pulmonary delivery. By reviewing the characteristics of the polysaccharides used in this type of delivery route, it provides insights into certain structure-function relationships. Also, several particle formation techniques are covered, showing the necessity for appropriate choosing of the methodology in order to obtain specific particle characteristics. The fate of the polysaccharide-based carriers, a topic that is often unconsidered in the pulmonary delivery field, but is very important for formulation approval, is discussed in terms of the enzyme-triggered hydrolytic and/or oxidative mechanisms of polysaccharide degradation.



## Brewer's yeast polysaccharides — A review of their exquisite structural features and biomedical applications.

Rita Bastos, Patricia G. Oliveira, Vítor M. Gaspar, João F. Mano, Manuel A. Coimbra, Elisabete Coelho, (2022). *Carbohydrate Polymers*, 2021 (277): 118826. https://doi.org/10.1016/j.carbpol.2021.118826

This article was published in the Carbohydrate Polymers 40th anniversary special issue. This review covers a comprehensive structure-biofunctional relationship between yeast cell wall polysaccharides and their biological targets.

It focuses on the polysaccharide structural features and their interaction with antigen presenting cells (dendritic cells and macrophages) in the initiation of adaptive immune responses beyond biomedical activities. In particular, brewer's yeast cell wall polysaccharides have unraveled exquisite structural features and diverse composition with ( $\beta$ 1 $\rightarrow$ 3), ( $\beta$ 1 $\rightarrow$ 6), ( $\alpha$ 1 $\rightarrow$ 4), ( $\beta$ 1 $\rightarrow$ 4)-mix-linked glucans. These exquisite polysaccharides modifications, promoted by the brewing process, open new perspectives for BSY valuation in biomedical fields, as immune response modifiers, anti-tumoral activity, for bone implant and regeneration field or as promising drug delivery carrier systems.



### Impact of growth medium salinity on galactoxylan exopolysaccharides of Porphyridium purpureum

Andreia S. Ferreira, Inês Mendonça, Inês Póvoa, Hélia Carvalho, Alexandra Correia, Manuel Vilanova, Tiago H. Silva, Manuel A. Coimbra, Cláudia Nunes (2021), *, Algal Research*, 59 (2021): 102439.

#### https://doi.org/10.1016/j.algal.2021.102439

The article "Impact of growth medium salinity on galactoxylan exopolysaccharides of *Porphyridium purpureum*" was published in Algal Research. It was hypothesized that the red microalga *P. purpureum* could change its growth behavior and polysaccharides composition in response to environmental variations. To fulfill these hypotheses, *P. purpureum* was cultivated at 3 different salinity levels (18, 32, and 50 g/L NaCl). It was observed that a maximum growth was achieved at a salinity of 32 g/L NaCl. Although the biomass composition has not been greatly changed, the yield of exopolysaccharides excreted (sEPS) was higher for 32 g/L of NaCl. Moreover, the salinity of the growth medium slightly changed the sulfation pattern of the glucuronoglucogalactoxylan excreted. These sEPS showed immunostimulatory effect on B lymphocytes *in vitro*. The results obtained pave the way for the use of *P. purpureum* sEPS for fish aquaculture to enhance humoral immune activity.

## Education

#### Welcome to new students and researchers

#### The Laboratory of Agro-Industrial Chemistry in Toulouse has 2 new PhD students in its team:

- Jérôme BAUTA "Transformation of brown algae of the genus Sargassum for an integrated valorisation" supervised by Virginie BUTHOD CUAM.
- Julie CAVAILLES "Fractionation of sugarcane bagasse for the valorisation of the cellulosic residue and aqueous extracts" supervised by Pierre-Yves PONTALIER.

#### University of Jena, Germany

B. Sc. Patrick Schuchardt defended his Bachelor Thesis entitled "Immobilization of the histondeacetylase inhibitor Vorinostat on polysaccharide-based nanoparticles".

### LGP2 - Laboratoire Génie des Procédés Papetiers, Laboratory of Pulp and Paper Science and Graphic Arts

## Cellulose Valley, a new chair in industrial excellence

A new industrial excellence chair has been signed in the framework of the Grenoble INP Foundation. Dedicated to cellulose, the chair is held by Julien Bras, teacher at Grenoble INP – Pagora, UGA, and researcher at LGP2. **click here**More information:

Functionalized nanocelluloses for biomedical applications
 On December 3, 2021, Bastien Michel, PhD student at LGP2, defended his thesis: "Cyclodextrin-functionalized nanocelluloses for biomedical applications".
 **click here**More information:
 Chemical modification and multi-function applications of papagelluloses

Chemical modification and multi-function applications of nanocellulose
 On October 27, 2021, Ge Zhu, PhD student at LGP2, defended his thesis: "Chemical modification and multi-function applications of nanocellulose".
 More information: click here

## University of Aveiro, Portugal

# PhD Thesis recently finished:Chlorella vulgaris and Porphyridium purpureum: two microalgae with polysaccharides and other potential valuable compounds, Andreia S. Ferreira

## Supervisors: Doctor Cláudia Nunes, Professor Manuel A. Coimbra, Doctor Tiago H. Silva

"Chlorella vulgaris and Porphyridium purpureum: two microalgae with polysaccharides and other potential valuable compounds" PhD thesis contributed to highlight the potential of microalgae to produce polysaccharides and pigments for food and feed applications. C. vulgaris can be an unconventional source of starch that can be co-extracted with chlorophylls, increasing its interest in the commercial point of view. C. vulgaris chlorophylls were extracted with a food grade solvent and showed to be more stable in 96% ethanolic solution, protected from light at room temperature or below. C. vulgaris ethanolic extract showed to be a suitable natural food additive to coloring foodstuffs. Moreover, C. vulgaris excreted a galactan to the growth medium with similar structural characteristics to its cell wall related polysaccharides. These polysaccharides are able to in vitro stimulate B lymphocytes. Similarly to C. vulgaris, the microalga P. purpureum also showed the ability to release polysaccharides to the growth medium, namely sulfated galactoxylans, whose structure slightly changed with the salt concentration of the culture medium: at 18 g/L the sEPS tended to be more sulfated in O-3 position of xylose and O-6 position of glucose, while at 50 g/L the sEPS tended to be more sulfated in O-4 position of xylose and glucose. At 32 g/L NaCl, the salinity naturally occurring at Ria Formosa, Portugal, the salinity has an intermediate effect on the sEPS, closer to the effect of 50 g/L. At this intermediate salinity, P. purpureum were able to produce higher amounts of sEPS at a pilot scale (800 L). Moreover, the sulfated galactoxylans have also revealed immunostimulatory effect in B cells in vitro, strongly related to the presence of sulfate esters in their structure. The exploitation of EPS produced by these two microalgae showed a sustainable and economic feasible source of polysaccharides with immunostimulatory activity. They are easily recovered from growth medium by centrifugation and purified by ethanol precipitation, increasing their commercial viability for functional food and feed applications.

## Ana Barra, PhD student of Nanosciences and Nanotechnology Doctoral Programme at the University of Aveiro

(Portugal), under supervision of Doctor Paula Ferreira (CICECO - Aveiro Institute of Materials), Doctor Cláudia Nunes (CICECO - Aveiro Institute of Materials) and Professor Eduardo Ruiz Hitzky (ICMM - Materials Science Institute of Madrid), was awarded with the best poster presentation at the XXVII Meeting of Spanish Clay Society (SEA) that took place in Madrid (Spain) on 19th November 2021 with the topic "Electrically conductive carbon-clay bionanocomposites: Application in food packaging".

# Open Positions

3 year PhD position starting in spring 2022: Impacts of contaminant cocktails originating from plastics in soil ecosystems

Université Côte d'Azur, Institut de Chimie, Nice, France - Mines ParisTech, Center for Materials Forming (CEMEF) Sophia Antipolis, France. Apply before January 31, 2022

For more information, click here

## Scientific Researcher (m/f/d) in the Field of Polymer Chemistry and Biomaterials (part-time position of 50%)

*Friedrich Schiller University of Jena Apply before February 6th, 2022* For more information, **click here** 

PhD Studentship: 3D-Printable Functional Biopolymer Composite Materials Newcastle University, UK Apply by 31 March 2022 For more information: click here

**Field Application Scientist** *WYATT Belgium* For more information, **click here** 

## **Recent Scientific Publications of EPNOE Members**



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## Call for Papers

**Carbohydrate Polymers** | You can submit your articles to Carbohydrate Polymers virtual special issue (VSI) devoted to the conference:

- When submitting your article, please select this option from the very beginning

- All articles will undergo regular reviewing process

- The dead-line for submissions is March 1st, 2022

More Info about the journal, **click here** 

## **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 Zarski; Dr. Sergiu Coseri; Prof. Dr. Janusz Kapusniak

Submission deadline: 30 April 2022

#### More info: click here

Keywords: native starch; starch derivatives; starch nanoparticles; starch composites; structure properties; modifications; functions; food applications; non-food applications

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