22nd International Conference on
POLYSACCHARIDES-GLYCOSCIENCE

Programme

11–13 November 2026



Novotného lávka 5, Prague,
Czech Republic

EuChemS
European Chemical Society

UNIVERSITY OF CHEMISTRY AND TECHNOLOGY PRAGUE

Chem Plus Chem

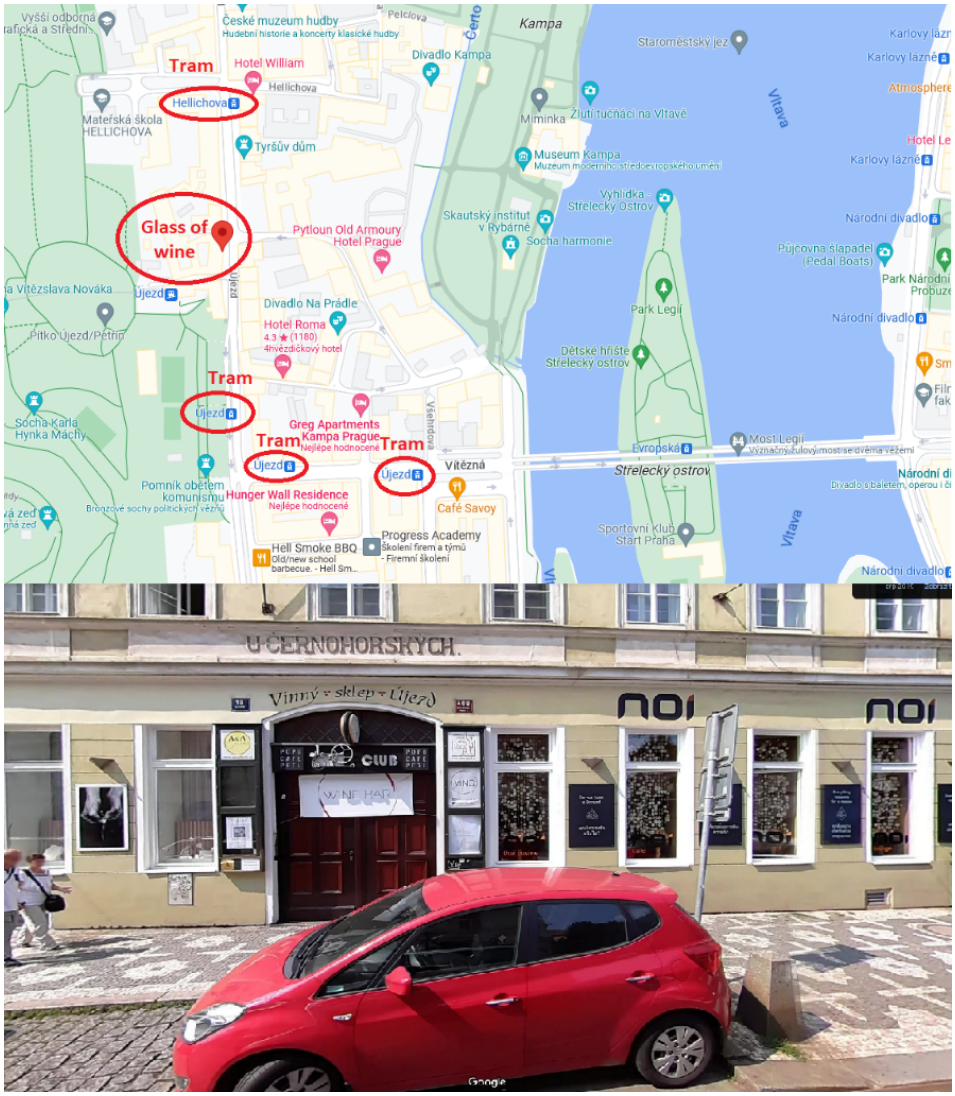
Chemistry Europe

11th November 2026

18:00 Glass of wine – unofficial openings
Vinný újezd
Újezd 19, 150 00 Malá Strana

https://www.vinnyujezd.cz/

Tram stop – Újezd, Pražské Jezulátko or Tyršův dům - (Tram numbers: 1, 5, 9, 12, 15, 18, 20, 22, 23, 25)



This place is in the historical centre of Prague under Petřín hill, at about 800 meters from Charles Bridge.

12th November 2026

8:00 - 9:00 Registration
9:00 - 9:10 Opening Ceremony
Novotného Lávka 5, Prague 1

- Keynote lecture: 30+10 min. discussion
- Oral presentation: 10+5 min. discussion
- Poster size is recommended max. width 90 cm and max. height 110 cm.

9:00 WELCOME
ROMAN BLEHA and **PAVEL NOVÁK, UNIVERSITY OF CHEMISTRY AND TECHNOLOGY, PRAGUE**

ORAL SESSION

9:10 – 12:30	**Oral session 1** **Chairwoman: ROMAN BLEHA**

9:10 – 9:50 *Ulrica Edlund*
Keynote lecture: From native tissues to bioproducts: 3D visualization of polysaccharides and other biopolymers in biomass

9:50 – 10:05 *R. Guo*, J. A. Cain, J. H. Fitton, P. Winberg, E. S.X. Moh, N. H. Packer*
In-depth characterization of a unique Australian seaweed-derived polysaccharide and protein extract

10:05 – 10:20 *M. Fiedot*, A. Junka, A. Bastrzyk, Z. Stępnicka, M. Ahmed, M. Mohamed, M. Wojtas, A. Lewińska, R. Jędrzejewski, J. Cybulska, A. Zdunek, M. Brożyna, B. Dudek, K. Szustakiewicz*
Intrinsic pectin architecture governs silver nanoparticle formation and antimicrobial function

10:20 – 10:35 *J. Elleuch*, F. Hadjkacem, P. Michaud, I. Fendri, G. Pierre, S. Abdelkafi*
Bioactive polysaccharides from the tunisian brown seaweed *Halopteris scoparia*

10:35 – 11:00	**Coffee break / poster section**

11:00 – 11:40 *Jian-Yong Wu*
Keynote lecture: Current trends and important directions of research on natural polysaccharides and nutraceutical functions

11:40 – 11:55 *K. K. Santhil Nathan, L. Ee Low, N. Wan Rasdi, N. Abdul Hadi**
Evaluation of the efficiency of native and modified *Dioscorea hispida* Dennst (*D. hispida*) starches in structuring stable Pickering emulsion gels

11:55 – 12:10 *S. Abdullah**
Polysaccharide-based nanogels for targeted drug delivery and tissue regeneration: From cancer therapy to advanced wound healing

12:30 – 13:30	Lunch break

13:30 – 16:00	Oral session 2 Chairman: EVŽEN ŠÁRKA

13:30 – 14:10 *Pedro Fardim*
Keynote lecture: Engineering microbial polysaccharides for human health applications

14:10 – 14:25 *J. Zieher, B. Benetková, L. Fliri, A. Potthast, T. Rosenau, H. Hettegger**
Selective de-crosslinking of cellulose fibers for improved textile recycling

14:25 – 14:40 *R. Khiari**, *J. Barros, E. Coelho, M. A. Coimbra*
Impact of solar drying on carbohydrate composition of "Pingo de Mel" figs

14:40 – 14:55 *M. Chiorean**, *N. Fasching, A. Winter, T. Rosenau, M. Beaumont*
From aquatic biomass to functional paper materials: conversion of *Myriophyllum spicatum* into polysaccharide-based papers

14:55 – 15:10 *N. Dilrukshi, O. Adiamo, E. Bobasa, Y. Sultanbawa, D. Grice, O. Cooper, J. Tiralongo**
The effect of in vitro gastrointestinal digestion on the structure and immunomodulatory activity of *Grifola frondosa* (Maitake) β-glucans

15:10 – 15:25 *B. Ivens**, *J. Delcour, B. Goderis*
An advanced SAXS and WAXS study on starch gelatinization under limited water conditions reveals mechanistic aspects

15:25 – 15:40 *N. Minh Ta, T. Thao Le, X. Qi**, *R. Tester*
Carbohydrate engineering in sweet oat-based biscuits

15:40 – 15:55 *M. Tsirigotis-Maniecka**
Tuning structure to control function: polysaccharide hydrogel microcarriers for phytochemical protection and delivery

16:00 – 16:30	Coffee break / poster section

16:30 – 19:00	Oral session 3 Chairman: Jacek Lewandowicz

16:30 – 16:45 *M. Wimmerová**
Microbial lectins in host–pathogen interactions: from glycan recognition to structural diversity

16:45 – 17:00 *I. Pozzan, S. Jarząbek, I. Pawlaczyk-Graja**
Optimization of NADES-assisted pectin extraction from celeriac pomace

17:00 – 17:15 *P. K. Borah*, A. H. Irani, D. Russo, J. Smiatek, M. Sarter, M. A. K. Williams, G. E. Yakubov*
Preferential solvation drives polysaccharide conformation in miscible heterogeneous solvents

17:15 – 17:30 *G. E. Yakubov*, P. K. Borah, J. E.S.J. Reid, T. MacCalman, V. Dinu, J. Hunger, M. Sarter, D. Russo, F. Natali, M. W. Boehm, S. E. Harding, M. A.K. Williams, S. K. Baier*
From solvation to rheology: non-monotonic conformational transitions of okra pectin in water–glycerol mixtures

17:30 – 17:45 *M. Rihova*, L. Hromadko, V. Cicmancova, J. M. Macak*
Gum arabic fibers by centrifugal spinning for cosmetic and dermatologic application

17:45 – 18:00 *J. Obradović, N. Münstermann, O. Weichold**
Investigating the rheology of chitosan and its derivative blends in solution

18:00 – 18:15 *E. Brandão*, J. Vieira, M. Jesus, A. S. Pires, C. Guerreiro, L. Gonçalves, S. Soares*
Agri-food pectic polysaccharides as potential sustainable ingredients for flavour improvement

18:15 – 18:30 *B. A. C. Ferreira*, M. Rendeiro, R. Silva, K. Oliveira, P. A. R. Fernandes, J. A. Lopes da Silva, M. A. Azevedo, C. Nunes, M. A. Coimbra*
How carrageenan composition influences gelation in cooked ham and vegan analogues

18:30 – 18:45 *H. Khalili, A. P. Mathew**
Surface chemistry-directed assembly of zif-8 on cellulose nanofibers

20:00 – 24:00	**Conference dinner**

19:30 Departure from Novotného lávka (We will walk across Charles Bridge)
19:50 Arrival to BRICK'S Restaurant
20:00 Welcome and start of dinner
24:00 Expected end

The social evening will take place at BRICK'S Restaurant, an elegant riverside venue in Prague's historic district, just a short walk from the iconic Charles Bridge. Located on the banks of the Vltava River, the restaurant offers beautiful views of Prague's historic skyline and combines contemporary style with the unique atmosphere of the city.

BRICK'S is situated next to the Franz Kafka Museum, dedicated to one of the most influential writers of the 20th century. The museum explores Kafka's life, literary works, and strong connection to Prague, adding a distinctive cultural character to this historic location.

BRICK'S Restaurant, Cihelná 2b, 118 00 Malá Strana, https://bricksprague.com/







Explanatory note: Participants in the Young Scientists Competition

13th November 2026

Novotného Lávka 5, Prague 1

ORAL SESSION

9:00 – 10:30	**Oral session 4** **Chairman: Andrej Sinica**
9:00 – 9:40	*Alexei V. Demchenko* **Keynote lecture:** Automated synthesis and purification of glycans
9:40 – 9:55	*D. Giguère** Synthesis of a hexasaccharide epitope towards a vaccine against Group B *Streptococcus*
9:55 – 10:10	*P. Marten, O. Weichold** Plasticisation of polylactide using chitin and lecithin
10:10 – 10:25	*R. Korman*, R. Bleha, D. Avcı, M. Sogel, A. Synytsya* Isolation, fractionation and structural analysis of polysaccharides from *Pleurotus ostreatus „Black pearl"*
10:30 – 11:00	**Coffee break / poster section**
11:00 – 13:10	**Oral session 5** **Chairman: Simon Leonhartsberger**
11:00 – 11:40	*Cláudia P. Passos* **Keynote lecture:** Polysaccharide-based formulations as potential carriers for pulmonary delivery
11:40 – 11:55	*M. Sogel*; R. Korman; D. Avcı; P. Smrčková; I. Švec; P. Skřivan; M. Sluková; R. Bleha; A. Synytsya* Structural characterization of polysaccharide fractions from brewer's spent grain, with a focus on cold-water extracts
11:55 – 12:10	*A. Zvirgzdins, A. Zile, A. Lends** Multidimensional solid-state NMR of intact fungal polysaccharides: from structure to fungal cell-wall architecture
12:10 – 12:25	*D. Avcı*, R. Korman, M. Sogel, R. Bleha, A. Synytsya* Exploring polysaccharides from the green microalga *Micractinium inermum* through extraction, fractionation and structural characterisation
12:25 – 12:40	*C. T. P. Coelho, S. Gang, N. Binney, S. Mugica, J. Clare, D. A. Fulton** Mechanochemically synthesised chitosan Schiff bases as sustainable Pro-Perfume delivery systems for laundry applications
12:40 – 12:55	*N. Münstermann, O. Weichold** Chitosan-based interpolyelectrolyte complexes as wood adhesives
12:55 – 13:10	*J. Hasjim** Roquette clean-label starches

13:10 – 13:25 P. *Jankowska, H. M. Baranowska, J. le Thanh-Blicharz, J. Lewandowicz**
Starch-stabilised vegan mayonnaise-type emulsions: complementary insights from SMLS, DWS microrheology and low-field NMR

13:25 – 14:00	**Coffee break / poster section**

14:00 – 16:00	**Oral session 6** **Chairman: Andrej Sinica**

14:00 – 14:40 *Christian Stanetty*
Keynote lecture: Engineering functional polysaccharides for sustainable adhesives and water treatment

14:40 – 14:55 *S. Leonhartsberger*, R. Dobre, C. Stanetty, M. D. Mihovilovic*
Beyond the plastic bottle – The overlooked footprint of synthetic polymer flocculants

14:55 – 15:10 *B. Basu*, R. Sarkar, C. Kundu, B. Prajapati*
Design and optimization of a dual-drug chitosan-based buccal patch of amlexanox and vitamin B12 for enhanced aphthous/oral ulcer treatment

15:10 – 15:25 *Luise Ernst*, O. Müller, N. Heise, A. Furch, D. Wefers*
A closer look at bacterial α-glucans: new tools for the analysis of their fine structures

15:25 – 15:40 *C. I. Idumah**
Emerging advances in polysaccharides hydrogel bionanoarchitectures for biomedical applications

16:00 – 16:30	**Young Science Award**

16:30 – 16:45	**ICPG closing**

POSTERS

1.	*L. E. Nita*, L. E. Grigoriu, A. Vieru, A. G. Rusu, A. M. Serban, R. N. Darie-Nita*	Supramolecular hydrogels based on carrageenan and amino acids
2.	*L. E. Grigoriu, A.G. Rusu*, R. D. Niță, C. N. Yilmaz, A. M. Șerban, L. E. Niță*	Injectable GMA-modified alginate-based gels loaded with rhein-cysteine conjugate for biomedical applications
3.	*M. Amrani*, P. Bucki, N. S. Shimoni, N. Gorohovsky, T. Sayas, M. Kleiman, S. B. Miyara, N. Lachman-Senesh, I. Braslavsky*	Polysaccharide-Based biomimetic root system for investigating Root-Knot nematode behavior

4.	*P. Jara*, S. Salazar-Sandoval, N. Yutronic, M. Kogan*	Controlled drug release from a superparamagnetic β-cyclodextrin nanosponge by applying an external alternating magnetic field
5.	*T. Pedramrad*, P. Ferreira, P. Duarte, I. Gonçalves*	Upcycling tomato pomace into carbon dots for active thermoplastic Starch/Bentonite composite films
6.	*I. Švec, M. Havrlentová*, D. Jánoška, K. Hrčková, M. Sluková*	Influence of harvest year and soil protection technology on starch content in corn grain
7.	*I. Uhliariková*, Z. Košťálová, P. Capek*	Phytochemical and antioxidant profile of alkaline fractions from wild blackthorn (*Prunus spinosa* L.)
8.	*L. Vu*, M. Mujtaba, K. Marjamaa*	Developing cellulose-based sustainable alternatives for titanium dioxide in paint coating
9.	*I. Amraoui, A. Duong*, M. Benazza, R. Abidi*	Glycoconjugation of PyDAT: A platform for the design of Heterocycle–Sugar hybrids using a therapeutic "Trojan Horse" strategy against cancer
10.	*A. Kaczmarska-Król*, J. Matusiak, J. Cybulska, A. Zdunek, W. Franus*	RG-I architecture of apple-derived diluted alkali-soluble pectin (DASP) determines pH-dependent rheology and emulsion stability
11.	*J. E. Reyes-Calderón, K. Cuero-Amu, N. León-Salamanca, R. Santillan, N. Farfán, Z. J. Rivera-Monroy, J. E. García-Castañeda**	Tricomponent NSAID-Glycopeptide chimeras as potential dual antibacterial and anticancer agents
12.	*T. Tutková, D. Biriukov**	Saccharide interactions with functionalized polyurethane and their relevance to bacterial adhesion
13.	*S. Gillarová*, S. Henke, M. Kosťová, V. Pour, M. Sluková*	Application of chromatographic techniques for the analysis of xanthan hydrolysates
14.	*S. Gillarová, S. Henke*, M. Panchenko, V. Pour, M. Sluková*	Analysis of sugar juices for pectin content
15.	*D. Gumul*, M. Kruczek*	Quality and content of bioactive compounds in emulsion (oil/water) with a share of maltodextrin derived from color potatoes starch and black cumin press-cake
16.	*S. Leonhartsberger*, R. Dobre, C. Stanetty, M. D. Mihovilovic*	From Fossil-Based to Bio-Based: Towards environmentally responsible polymer flocculants

17.	*B. Ivens*, J. Delcour, B. Goderis*	An advanced SAXS and WAXS study on starch gelatinization under limited water conditions reveals mechanistic aspects	
18.	*K. Kozerska*, A. Smolarkiewicz-Wyczachowski, J. Piskorz, M. Ziegler-Borowska*	Hemoglobin- and bovine serum albumin-modified chitosan films functionalized with BODIPY as Potential Materials for Photodynamic Therapy (PDT)	
19.	*E. Šárka, L. Jelínek, A. Osvaldová, P. Smrčková**	Rheology and digestibility of extrudates with added quercetin	
20.	*R. Dobre, C. Stanetty*, M. D. Mihovilovic*	Biobased high-performance adhesives	
21.	*M. Dohnalová, B. Pokorná, I. Vacková, L. Luptaková, E. Petrovová, L. Bačáková, A. Kovalcik**	In Situ and Ex Situ functionalization of bacterial cellulose with spent coffee grounds extract	
22.	*M. Ibrahimov, V. Nováková, K. Mylkie, P. Zimčík, M. Ziegler-Borowska**	Molecular dispersion of zinc phthalocyanine in chitosan matrices: morphology, surface energy, and spectroscopic insights	
23.	*C. Albrechts*, B. Goderis*	Effect of short-chain alcohols on maize starch gelatinization and V-type crystal formation	
24.	*N. Gerspitzerová*, D. Špačková, Y. Nagaraj, V. Passoth, I. Márová*	Optimizing the isolation of cell-wall polysaccharides from carotenogenic yeast	
25.	*S. Baş*, T. Farzali, D. Avcı, R. Bleha, L. Vápenka*	Advanced re-evaluation of rapeseed meal waste through organosolv lignin valorization for active packaging	
26.	*R. Marín-Sánchez, L. David*, F. Lux, O. Tillement, R. Olayo-Valles, M. C. Acosta-García, K. Shirai**	Chitosan-based porous membranes with tunable edta functionalization for Hg(II) removal from water	
27.	*D. Špačková*, J. Holuba, N. Gerspitzerová, R. Bleha, I. Márová*	Beyond yeast biomass: exploring bioactive extracellular polysaccharides	

28.	*B. Dribňáková*, P. Bober, A. Kovalčík*	Comparative study of ppy and quercetin-functionalized phbh/bacterial cellulose hydrogels for advanced wound dressing applications	
29.	*A. Vojvodić Cebin*, D. Šeremet, I. Lončar, M. Svetinović, D. Komes*	Delignification pretreatment for enhancing extractability of hemicellulose from spent coffee grounds and coffee silverskin	
30.	*O. Zapadlo, T. Kotala**	Purification of cellobiose UF-permeate solution by conventional electrodialysis at elevated temperature	
31.	*R. Korman*, D. Avcı, M. Sogel, S. de Leão Rodrigues Mota*, M. Jozífek, R. Bleha, A. Synytsya*	Polysaccharide isolation and structural evaluation in two *Hericium erinaceus* strains (H5200, H5130)	
32.	*D. Avcı*, Y. Harada, M. Sogel, R. Korman, R. Bleha, A. Synytsya*	Structural characterisation of hot-water-extracted polysaccharides from the green microalga B*racteacoccus bullatus*	
33.	*M. Zhovnarenko, P. Hoang, T. Svoboda*, T. Moucha, M. Sluková, I. Švec, T. Hlavatý*	Bread crust browning: A kinetic study under controlled experimental conditions	
34.	*B. T. Hoangová*, P. Lovecká, T. Bočková, R. Bleha*	Utilization of waste raw materials as a source of nutrients for the cultivation of microorganisms	

35.	*R. Bleha, A. Osvaldová, R. Korman, M. Karabín, L. Jelínek, A. Sinica**	Starch-based extrudates with added quercetin: Structure and thermal properties
36.	*L. V. Ponsoni*, M. Beaumont, F. Liebner, M. V. G. Zimmermann*	Development of oxidized cellulose from native Brazilian species for hemostatic foam applications
37.	*H. Khalili*, A. P. Mathew*	Nanocellulose–ZIF8 biohybrids: Revealing morphology and self-assembly using advanced microscopy
38.	*E. Aharodnikau*, M. V. Kisliuk, S. O. Solomevich*	Multicomponent Phosphorylation of Pullulan for Tunable Bioresorbable Hydrogel Formation
39.	*A. Mocová*, B. Vacková, A. K. Patel, L. Matsakas, I. Jarošová Kolouchová*	Ethylene glycol utilization and DHA production by thraustochytrids: Potential of microbubble-assisted cultivation
40.	*B. Vacková*, A. K. Patel, L. Matsakas, I. Jarošová Kolouchová*	Utilization of microbubbles in the cultivation of *Haematococcus* and *Chlorella* microalgae for astaxanthin production

Poster size is recommended max. width 90 cm and max. height 110 cm.

Follow us on our web or LinkedIn:

Thank you for joining our 22nd ICPG conference. We look forward to meeting you at 23rd ICPG, which will be from

10th to 12th November 2027 in Prague.

On behalf of the Scientific and Organising Committees
Roman Bleha, Jana Čopíková, Evžen Šárka

22nd ICPG Sponsors


Steiner & Kovarik
PRAGUE CHOCOLATE


KONEKO
marketing, spol. s r. o.


BIOSTER


CHROMSPEC

Abstracts

POLYSACCHARIDE-BASED NANOGELS FOR TARGETED DRUG DELIVERY AND TISSUE REGENERATION: FROM CANCER THERAPY TO ADVANCED WOUND HEALING

SAMAA ABDULLAH[a,b]

[a]*Faculty of Pharmacy, Applied Science Private University, Amman 11937, Jordan*
[b]*Innovative NanoBioTech & Translational Drug Delivery Research Group, Faculty of Pharmacy, Applied Science Private University, Amman 11937, Jordan*
sa_abdallah@asu.edu.jo

Polysaccharide-based nanomaterials have emerged as versatile platforms for precision drug delivery, combining biocompatibility, mucoadhesion, controlled release, and multifunctionality. This keynote highlights our recent research on sodium alginate, chitosan, carrageenan, casein, and related polymeric systems for targeted cancer therapy and regenerative medicine. The presentation integrates findings from studies on oral pH-responsive nanogels for colorectal and gastric cancer, bioadhesive polymeric micelles for enhancing poorly soluble drugs, and alginate-based hydrogels loaded with bioactive molecules for chronic wound healing. These polysaccharide platforms demonstrated improved dissolution, site-specific delivery, enhanced therapeutic efficacy, and reduced systemic toxicity, while supporting tissue regeneration through antioxidant and anti-inflammatory mechanisms. The lecture will also discuss translation toward intellectual property, patented technologies, and future opportunities in glycoscience-driven pharmaceutical innovation. The author acknowledges collaborators and funding agencies supporting the cited research.

MULTICOMPONENT PHOSPHORYLATION OF PULLULAN FOR TUNABLE BIORESORBABLE HYDROGEL FORMATION

ULADZISLAU E. AHARODNIKAU*[a], MATSVEI V. KISLIUK[a], SERGEY O. SOLOMEVICH[b]

[a]*Research Institute for Physical Chemical Problems of the Belarusian State University, Minsk, Belarus, 220073*
[b]*Cardiovascular Research Center, Brown University Health Cardiovascular Institute, The Warren Alpert Medical School of Brown University, Providence, RI, USA, 02903*
aharodnikau.u@gmail.com

Pullulan phosphorylation remains insufficiently explored, particularly as a direct route to covalently crosslinked hydrogels. Here, we developed a multicomponent phosphorylation system that converts neutral pullulan into water-soluble derivatives and hydrogel networks with controllable structure. By varying the reaction parameters, we tuned phosphate content, swelling, viscoelastic properties and enzymatic degradation behavior. These results establish pullulan phosphate as a promising bioresorbable platform for drug delivery, wound dressings and soft tissue engineering.

EFFECT OF SHORT-CHAIN ALCOHOLS ON MAIZE STARCH GELATINIZATION AND V-TYPE CRYSTAL FORMATION

CHRISTOPHE ALBRECHTS*, BART GODERIS

KU Leuven, Department of Chemistry, Celestijnenlaan 200J, 3001 Heverlee (Leuven)
Christophe.albrechts@kuleuven.be

The influence of short-chain alcohols on maize starch gelatinization and V-type crystal formation was investigated by DSC. Maize starch was analysed with ethanol, propanol or butanol at different concentrations in water. Increasing alcohol concentration initially decreased the gelatinization temperature, followed by an increase at higher concentrations. The decrease is tentatively attributed to alcohol-induced lipid removal, whereas the increase reflects limited water conditions. The V-type crystal melting endotherm increased with the alcohol concentration, revealing alcohol-induced V-type crystal formation.

POLYSACCHARIDE-BASED BIOMIMETIC ROOT SYSTEM FOR INVESTIGATING ROOT-KNOT NEMATODE BEHAVIOR

MICHAL AMRANI*[a,b], PATRICIA BUCKI[b], NATALIA SICHOV SHIMONI[b], NICOLE GOROHOVSKY[c], TALI SAYAS[b], MAYA KLEIMAN[b], SIGAL BRAUN MIYARA[b], NOA LACHMAN-SENESH[c], IDO BRASLAVSKY[a]

[a]*The Hebrew University of Jerusalem, Faculty of Agriculture, Food and Environment, Rehovot, 7610001, Israel*
[b]*Agricultural Research Organization (ARO), Volcani Institute, Rishon LeZion, 7505101, Israel*
[c]*Tel Aviv University, Department of Materials Science and Engineering, Tel Aviv, 6997801, Israel*
Michal.Amrani@mail.huji.ac.il

Plant cell walls are complex polysaccharide networks whose composition, architecture, and physical properties play critical roles in plant-pathogen interactions. Root-knot nematodes (*Meloidogyne* spp.) are among the most destructive plant-parasitic nematodes worldwide, yet the specific root parameters governing their attraction, penetration, and early interactions with the plant cell wall remain poorly understood.
To address this challenge, we developed a biomimetic root system composed of nano-fibrillated cellulose (NFC), xyloglucan, and pectin, crosslinked with citric acid, tannic acid, and calcium ions. These polysaccharide-based materials mimic key compositional and physical features of natural root cell walls while allowing precise control over individual parameters. Mechanical characterization and contact angle measurements confirmed that varying the crosslinking density generated films with distinct physical and surface properties, providing a tunable platform for investigating nematode interactions with polysaccharide-based root mimetics. Nematode penetration was observed in all systems, while glucose-

mediated inhibition reduced penetration, suggesting the involvement of cell wall-degrading enzymes.
These findings demonstrate the potential of polysaccharide-based biomimetics for elucidating plant-nematode interactions and developing sustainable root-protective materials.

GLYCOCONJUGATION OF PyDAT: A PLATFORM FOR THE DESIGN OF HETEROCYCLE–SUGAR HYBRIDS USING A THERAPEUTIC "TROJAN HORSE" STRATEGY AGAINST CANCER

IMEN AMRAOUI[a,b], ADAM DUONG*[a], MOHAMMED BENAZZA[a], RYM ABIDI[b]

[a]Université de Picardie Jules Verne
[b]Université de Carthage
adam.duong@u-picardie.fr

The developpment of sustainable and biologically active molecules from renewable resources is a key objective in modern medicinal chemistry. In this work, glucose and mannose were utilized as biocompatible scaffolds and potential delivery vectors to enhance the cellular uptake of conjugated compounds, taking advantage of their recognition by sugar transport systems. These carbohydrate platforms were functionalized with PyDAT motifs, heterocyclic units known for their diverse biological activities and affinity for nucleic acids. A series of protected sugar-PyDAT conjugates was synthesized through a multistep strategy and fully characterized. Preliminary molecular docking studies revealed favorable interactions within DNA grooves, suggesting potential nucleic acid-targeting properties. However, further investigations are required to clarify their mechanism of action and biological activity. Overall, this work introduces a bio-based platform combining carbohydrate carries with active heterocyclic motifs, providing a foundation for the development of novel therapeutic candidat.

EXPLORING POLYSACCHARIDES FROM THE GREEN MICROALGA *MICRACTINIUM INERMUM* THROUGH EXTRACTION, FRACTIONATION AND STRUCTURAL CHARACTERISATION

DAMLA AVCI*, RASTISLAV KORMAN, MAREK SOGEL, PETRA SMRČKOVÁ, ROMAN BLEHA, ANDRIY SYNYTSYA

Department of Carbohydrates and Cereals, University of Chemistry and Technology, Prague, Technická 5, 16628 Prague, Czech Republic
avcid@vscht.cz

The green microalga *Micractinium inermum* was investigated as a source of structurally diverse polysaccharides, which were isolated by hot-water extraction following pretreatment and separated by preparative chromatography. FTIR confirmed the carbohydrate-rich nature of the extracts, while GC-FID revealed mannose- and galactose-rich profiles. GC-MS showed mainly 1,4-linked Man (40%) and 1,4-linked Gal (18.1%), along with 1,4,6-linked Man (6.7%) and 1,6-linked Gal (5.2%), indicating a branched galactomannan-like structure. These findings support the potential of the isolated extract as a functional ingredient in food formulations.
This work was supported by the grant of Specific university research - grant No. A1_FPBT_2025_010, with additional support from grant No. A2_FPBT_2026_003.

STRUCTURAL CHARACTERISATION OF HOT-WATER-EXTRACTED POLYSACCHARIDES FROM THE GREEN MICROALGA *BRACTEACOCCUS BULLATUS*

DAMLA AVCI*[a], YUMA HARADA[b], MAREK SOGEL[a], RASTISLAV KORMAN[a], ROMAN BLEHA[a], ANDRIY SYNYTSYA[a]

[a]Department of Carbohydrates and Cereals, University of Chemistry and Technology, Prague, Technická 5, 16628 Prague, Czech Republic
[b]Ohsugi Laboratory, Department of Biological Sciences, Graduate School of Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-8654, Japan
avcid@vscht.cz

Polysaccharides isolated from the green microalga *Bracteacoccus bullatus* by hot-water extraction were characterised using FTIR, GC-FID and GC-MS. FTIR showed a carbohydrate-rich spectral profile, while GC-FID identified glucose (76.4%) as the predominant monosaccharide in the resulting extract. Linkage analysis by GC-MS further revealed 1,4-linked Glc (68.5%) as the major linkage, together with 1,4,6-linked Glc (5.7%), which is consistent with a branched glucan-like structure. These findings highlight the potential of *B. bullatus* polysaccharides for use in food supplements.
This work was supported by the grant of Specific university research - grant No. A1_FPBT_2025_010, with additional support from grant No. A2_FPBT_2026_003.

ADVANCED RE-EVALUATION OF RAPESEED MEAL WASTE THROUGH ORGANOSOLV LIGNIN VALORISATION FOR ACTIVE PACKAGING

SEZİN BAŞ[a], TEYMUR FARZALI[b], DAMLA AVCI[c], ROMAN BLEHA[c], LUKÁŠ VÁPENKA[a]

[a]Department of Food Preservation, Faculty of Food and Biochemical Technology, University of Chemistry and Technology, Prague, Czech Republic
[b]Department of Dairy, Fat and Cosmetics, Faculty of Food and Biochemical Technology, University of Chemistry and Technology, Prague, Czech Republic
[c]Department of Carbohydrates and Cereals, Faculty of Food and Biochemical Technology, University of Chemistry and Technology, Prague, Czech Republic
bass@vscht.cz

Rapeseed meal was valorised via mild acid-catalysed organosolv extraction following alcohol pretreatment. FTIR spectroscopy confirmed the recovery of an intact syringyl/guaiacyl (S/G) lignin network, while revealing co-extracted protein interference. Alkaline deproteinisation successfully eliminated peptide impurities without cleaving β-O-4 ether linkages, restoring free phenolic hydroxyl moieties in the post-isolation fractions. Spectroscopic benchmarking against beech lignin validated high structural homology, highlighting its potential for antioxidant and UV-protective active

packaging.
This work was supported by the University of Chemistry and Technology, Prague, Faculty of Food and Biochemical Technology, Department of Food Preservation.

DESIGN AND OPTIMIZATION OF A DUAL-DRUG CHITOSAN-BASED BUCCAL PATCH OF AMLEXANOX AND VITAMIN B12 FOR ENHANCED APHTHOUS/ORAL ULCER TREATMENT

BISWAJIT BASU*[a], RIFAJ SARKAR[a], CHAYAN KUNDU[a], BHUPENDRA PRAJAPATI[b]

[a]Department of Pharmaceutical Technology, School of Health and Medical Sciences, Adamas University, Kolkata-700126, West Bengal, India
[b]Department of Pharmaceutics, Parul Institute of Pharmacy, Faculty of Pharmacy, Parul University, Waghodia, Vadodara, 391760, Gujarat, India
biswajit.basu1@adamasuniversity.ac.in

Aphthous ulcers can be painful, inflamed, and slow to heal. They occur on the inside of the mouth (oral mucosa) and require an effective localized treatment regimen for successful healing. In this study, the design and optimization of a dual-drug chitosan-based buccal patch that contains both amlexanox and vitamin B12 (cyanocobalamin) will be discussed to maximize therapeutic benefit from the combined use of these two active pharmaceutical ingredients (APIs). Chitosan is a leading candidate for use as a mucoadhesive polymer because of its biocompatibility and film-forming capabilities. Buccal patches were prepared using the solvent casting method, and then optimized from the physicochemical properties identified through the experimental design approach to achieve the ideal physicochemical properties for a dual API buccal patch. Quality control tests performed on the physical properties of the completed patches included thickness, folding endurance, swelling index, uniform drug content, and surface pH. The pharmacokinetic properties were evaluated using in-vitro drug release with two methods, USP dissolution apparatus and a Franz diffusion cell, and both APIs demonstrated sustained and controlled release (SR/CR) over time. Drug release kinetics demonstrated the presence of a diffusion-controlled drug release mechanism. The properties of the optimized formulation are favorable for mucoadhesion to the oral mucosa; satisfactory for stability. The results of this study suggest that the dual-drug chitosan buccal patch developed, will offer a potential successful, patient-compliant approach in the management of aphthous ulcers.
The authors sincerely acknowledge Adamas University, Kolkata for allowing conducting the study smoothly.

STARCH-BASED EXTRUDATES WITH ADDED QUERCETIN: STRUCTURE AND THERMAL PROPERTIES

ROMAN BLEHA[a], ALENA OSVALDOVÁ[b], RASTISLAV KORMAN[a], MARCEL KARABÍN[b], LUKÁŠ JELÍNEK[b], ANDREJ SINICA*[a]

[a]Department of Carbohydrates and Cereals, University of Chemistry and Technology Prague, Technická 5, 16628 Prague, Czech Republic
[b]Department of Biotechnology, University of Chemistry and Technology Prague, Technická 5, 16628 Prague, Czech Republic
blehar@vscht.cz

This study aimed to characterise starch-based extrudates with added quercetin (0.5–8%). The contribution of phenolics was evaluated using FTIR, Raman and NMR spectra. A quercetin-free extrudate was used for comparison. Added quercetin was detected and quantified by characteristic spectroscopic features. NOESY NMR analysis in d_6-Me_2SO confirmed interaction between starch and quercetin. Thermal properties of the extrudates were characterised by DSC and TG analyses.
This work was financially supported by the Czech Science Foundation (Project No. 25-16506S) and by Specific University Research – grants No. A1_FPBT_2025_010 and No. A2_FPBT_2026_003.

PREFERENTIAL SOLVATION DRIVES POLYSACCHARIDE CONFORMATION IN MISCIBLE HETEROGENEOUS SOLVENTS

PALLAB KUMAR BORAH*[a,b], AMIR H. IRANI[c], DANIELA RUSSO[d], JENS SMIATEK[e], MONA SARTER[f], MARTIN A.K. WILLIAMS[g], GLEB E. YAKUBOV[h]

[a]Division of Physical Chemistry, Lund University, Naturvetarvägen 22, 22100, Lund, Sweden
[b]Heinz Maier-Leibnitz Zentrum, Technical University of Munich, Lichtenbergstraße 1, 85748, Germany
[c]School of Arts and Science, American International University, Jahrah, 13034, Kuwait
[d]CNR-Istituto Officina dei Materiali and INSIDE@ILL, Institut Laue Langevin, Grenoble, 38042, France
[e]Institute for Computational Physics, University of Stuttgart, Allmandring 3, Stuttgart, 70569, Germany
[f]ISIS Neutron and Muon Source, STFC Rutherford Appleton Laboratory, Didcot, OX11 0QX, United Kingdom
[g]School of Fundamental Sciences, Massey University, Palmerston North, 4442, New Zealand
[h]Food Colloids and Bioprocessing Group, School of Food Science and Nutrition, University of Leeds, Leeds, LS2 9JT, United Kingdom
pallab_kumar.borah@chem.lu.se, pallab.borah@tum.de

Addition of a poorer cosolvent, such as glycerol, to aqueous polysaccharide solutions induces flexible-coil → swollen → collapsed conformational transitions, challenging conventional Flory-type mean-field descriptions of solvent quality. Using simulations, Kirkwood-Buff theory, and inelastic neutron scattering, we show that these transitions are governed by preferential solvation of either water or glycerol, while chain's water-accessible surface area remains conserved. Similar behaviour across complex polysaccharides, such as pectin, agar, dextran, and carboxymethylcellulose, suggests a tentatively unified mechanism.
PKB thanks funding received from the EU Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No. 101034266. Abstract is part of published research: https://doi.org/10.1016/j.carbpol.2026.125726

AGRI-FOOD PECTIC POLYSACCHARIDES AS POTENTIAL SUSTAINABLE INGREDIENTS FOR FLAVOUR IMPROVEMENT

ELSA BRANDÃO*, JOANA VIEIRA, MÓNICA JESUS, ANA SOFIA PIRES, CARLOS GUERREIRO, LEONOR GONÇALVES, SUSANA SOARES

LAQV-REQUIMTE, Department of Chemistry and Biochemistry, Faculty of Sciences of the University of Porto, Rua do Campo Alegre, 4169-007 Porto, Portugal
elsa.brandao@fc.up.pt

Flavour is a key driver of food acceptability and consumer choice, encompassing the integration of aroma, taste, and oral tactile sensations. In plant-based foods and polyphenol-rich beverages (e.g., red wine, beer, and tea), specific mouthfeel attributes like astringency, which is characterized by dryness, puckering, and roughness sensations felt in the oral cavity, play a pivotal role in overall flavour quality. Biologically, astringency acts as an oral defence mechanism to detect anti-nutritional or toxic compounds, such as polyphenols. While balanced astringency enhances product complexity, excessive intensity leads to consumer rejection, posing a major bottleneck for the adoption of healthy and polyphenol-rich diets. Although classically attributed to polyphenol binding and precipitation of salivary proteins (SP), recent advances show that polyphenols also bind directly to oral epithelial cells, mucin, and the mucosal pellicle, collectively driving astringency perception.
This work aimed to evaluate pectic polysaccharides isolated from agri-food side-streams (grape skins and fruit peels) as sustainable astringency modulators. Sequential pectic fractions obtained using water, chelator agents (CSP), and sodium carbonate were evaluated in an advanced *in vitro* oral model containing tongue epithelial cells (HSC-3 line), mucosal pellicle, mucin, and human saliva.
Results showed that polysaccharides significantly decreased polyphenol adsorption onto oral epithelial cells and mucosal surfaces in a concentration-dependent manner. Furthermore, polysaccharides inhibited polyphenol-induced precipitation of specific SP families (e.g., PRPs, statherin, and cystatins). Structural analysis revealed that high-molecular-weight and uronic acid-rich pectic fractions exhibited high binding affinity for specific red wine polyphenols, disrupting their oral interactions. Overall, agri-food pectic polysaccharides represent high-value functional ingredients to tailor flavour profiles and improve consumer acceptance of sustainable foods.
This work was developed under the project WASTE2TASTE, funded by FEDER funds (COMPETE 2030) and national funds through FCT/MECI, operation no. 15462, with reference COMPETE2030-FEDER-00914400. This work also received financial support from the PT national funds (FCT/MECI, Fundação para a Ciência e Tecnologia and Ministério da Educação, Ciência e Inovação) through the project UID/50006/2025 DOI 10.54499/UID/50006/2025 -LAQV.

FROM AQUATIC BIOMASS TO FUNCTIONAL PAPER MATERIALS: CONVERSION OF *MYRIOPHYLLUM SPICATUM* INTO POLYSACCHARIDE-BASED PAPERS

MIHAELA CHIOREAN*, NORA FASCHING, ARMIN WINTER, THOMAS ROSENAU, MARCO BEAUMONT

Institute of Chemistry of Renewable Resources, Department of Natural Sciences and Sustainable Resources, BOKU University, Konrad-Lorenz-Strasse 24, A-3430 Tulln, Austria
mihaela.chiorean@boku.ac.at

Locally harvested *Myriophyllum spicatum* was investigated as a renewable feedstock to produce paper-based materials. Compositional analysis confirmed cellulose, hemicellulose and pectin as major polysaccharide fractions. After optimized biomass pretreatment, the polysaccharide-rich material was processed into fiber sheets and, after fibrillation, cellulose microfiber (CMF) sheets. The mechanical properties highlight fibrillation as an effective approach for converting waterplant-derived biomass into paper-based packaging materials.

MECHANOCHEMICALLY SYNTHESISED CHITOSAN SCHIFF BASES AS SUSTAINABLE PRO-PERFUME DELIVERY SYSTEMS FOR LAUNDRY APPLICATIONS

CARLA T. P. COELHO[a], SI GANG[b], NICOLA BINNEY[b], SUSANA MUGICA[b], JONATHAN CLARE[b], DAVID A. FULTON*[a]

[a]Chemistry School of Natural and Environmental Sciences, Newcastle University, UK
[b]The Procter & Gamble Company, Newcastle Innovation Centre, Newcastle Upon Tyne, UK
c3060347@newcastle.ac.uk

Poor perfume deposition remains a major challenge in fabric care formulations. Although polymer-based delivery systems are widely used to improve perfume deposition and retention, renewable and biodegradable alternatives remain limited. Here, renewable chitosan Schiff bases (CSBs) were synthesised mechanochemically using vanillin, phenylacetaldehyde, and cinnamaldehyde on chitosans of varying molecular weight. Freshness performance on cotton and polyester was assessed by trained sensory panels under damp, dry, re-bloom, and malodour conditions. Vanillin-CSBs showed the highest olfactory intensity, re-bloom performance, and malodour suppression, highlighting CSBs as promising pro-perfume delivery systems.
This work was supported by Newcastle University, Procter & Gamble, and the UKRI EPSRC. The authors gratefully acknowledge their contributions to this research.

AUTOMATED SYNTHESIS AND PURIFICATION OF GLYCANS

ALEXEI V. DEMCHENKO

Department of Chemistry, Saint Louis University, 3501 Laclede Ave, St. Louis, Missouri 63103, USA
alexei.demchenko@slu.edu

With improved understanding of functions of glycans, the demand for robust methods to produce both natural glycans and their mimetics has increased. Glycans can be obtained by isolation from natural sources, prepared

enzymatically, and/or chemically. Manufacturers are also interested in glycans due to their prebiotic, therapeutic, and diagnostic potential. The discovery of glycans is accelerating aided by advances in glycosiciences. Still, the availability of glycans remains low. The discovery of new methods and accessible technologies that offer new capabilities for obtaining pharmaceutically relevant glycans is at the heart of this presentation. This work has been generously supported by the National Institutes of Health (USA).

THE EFFECT OF IN VITRO GASTROINTESTINAL DIGESTION ON THE STRUCTURE AND IMMUNOMODULATORY ACTIVITY OF *GRIFOLA FRONDOSA* (MAITAKE) β-GLUCANS

NIROSHA DILRUKSHI[a], OLADIPUPO ADIAMO[b], ESHETU BOBASA[b], YASMINA SULTANBAWA[b], DARREN GRICE[a,c], OREN COOPER[a], JOE TIRALONGO*[a]

[a]*Institute for Biomedicine and Glycomics, Griffith University, Parklands Drive, Gold Coast, QLD, 4222, Australia*
[b]*Center for Nutrition and Food Sciences, Queensland Alliance for Agriculture and Food Innovation, University of Queensland, Indooroopilly, QLD, 4068, Australia*
[c]*School of Pharmacy and Medical Science, Griffith University, Gold Coast, QLD, 4222, Australia*
J.Tiralongo@griffith.edu.au

Mushroom β-glucans exhibit structure-dependent immunomodulatory activity, yet how gastrointestinal (GI) digestion affects this relationship remains unclear. To address this, we simulated the digestion of *Grifola frondosa* mushroom powder using an *in vitro* human mouth-to-colon model. Crude β-glucan fractions were isolated, structurally characterized (NMR, FT-IR, DLS), and evaluated for cytokine production in human macrophages (ELISA). Results indicated that GI digestion caused limited structural changes in β-glucans across digestion stages, while molecular weight was a more prominent determinant of their structural and immune properties. The work provides novel insights into how digestion shapes β-glucan-mediated immune modulation.

BIOBASED HIGH-PERFORMANCE ADHESIVES

RALUCA DOBRE, CHRISTIAN STANETTY*, MARKO D. MIHOVILOVIC

Institute of Applied Synthetic Chemistry, TU Wien, Getreidemarkt 9, 1060, Vienna, Austria
christian.stanetty@tuwien.ac.at

Starch-based adhesives are widely used in the paper industry, due to their natural origin and ease of handling. However, their ability to form hydrogen bonds reduces the adhesives' water resistance, which makes them unfit for weather-proof applications. Starch acetoacetates, which can be synthesized through a simple transesterification reaction[1], can be promising derivatives: they can react with amines to form various enamine starches. These materials have improved water resistance and can be hot-pressed to form films, properties which make suitable development candidates for water-resistant adhesives.

[1] Weng et al., *Carbohydr. Polym.*, 2022, *289*, 119468-119477.

***IN SITU* AND *EX SITU* FUNCTIONALIZATION OF BACTERIAL CELLULOSE WITH SPENT COFFEE GROUNDS EXTRACT**

MARIE DOHNALOVÁ[a], BRONISLAVA POKORNÁ[b,c], IRENA VACKOVÁ[c], LENKA LUPTAKOVÁ[b], EVA PETROVOVÁ[d], LUCIE BAČÁKOVÁ[c], ADRIANA KOVALCIK*[a]

[a]*Faculty of Chemistry, Brno University of Technology, Purkynova 118, 612 00 Brno, Czech Republic*
[b]*Department of Biology and Physiology, University of Veterinary Medicine and Pharmacy in Kosice, Komenskeho 68/73, 041 81 Kosice, Slovakia*
[c]*Laboratory of Biomaterials and Tissue Engineering, Institute of Physiology of the Czech Academy of Sciences, Videnska 1083, 142 00 Prague 4-Krc, Czech Republic*
[d]*Department of Morphological Disciplines, University of Veterinary Medicine and Pharmacy in Kosice, Komenskeho 68/73, 041 81 Kosice, Slovakia*
kovalcik@fch.vut.cz

Bacterial cellulose (BC) was functionalized with spent coffee grounds (SCG) extract using *in situ* incorporation during cultivation and *ex situ* physical absorption. The *ex situ* approach resulted in approximately fourfold higher phenolic content after 24 h than *in situ* functionalization (0.067 vs. 0.017 mg_{GAE}/mg), while antioxidant activity remained comparable (225.12 vs. 200.23 mg_{TE}/g). Both SCG-modified BC materials supported adhesion and growth of normal human dermal fibroblasts, confirming their cytocompatibility.

COMPARATIVE STUDY OF PPY AND QUERCETIN-FUNCTIONALIZED PHBH/BACTERIAL CELLULOSE HYDROGELS FOR ADVANCED WOUND DRESSING APPLICATIONS

BARBORA DRIBŇÁKOVÁ[a], PATRYCJA BOBER[b], ADRIÁNA KOVALČÍK[a]

[a]*Brno University of Technology, Faculty of Chemistry, Institute of Food Chemistry and Biotechnology, Purkyňová 464/118, 612 00 Brno*
[b]*Institute of Macromolecular Chemistry, Czech Academy of Sciences, 162 00, Prague, Czech Republic*
barbora.dribnakova@vut.cz

Polyhydroxyalkanoates (PHA) are biodegradable and biocompatible materials whose hydrophobicity and limited functionality can be overcome by incorporation of hydrophilic nanofibrillar polysaccharide - bacterial cellulose (BC). In this study PHBH/BC hydrogels were functionalized with polypyrrole (PPy) or quercetin (QUE). The prepared systems were compared in terms of their physicochemical properties and biological performance. This study aims to evaluate the influence of BC incorporation and PPy and QUE functionalization on the hydrogels and assess their potential for biomedical applications.
This research was supported by the Grant Agency of the Czech Republic (GA 25-15806S).

FROM NATIVE PLANT TISSUES TO MATERIALS: 3D VISUALIZATION OF POLYSACCHARIDES AND OTHER BIOPOLYMERS IN BIOMASS

ULRICA EDLUND*[a,b,c], AGNETA RICHTER-DAHLFORS[a,b,c]

[a]Department of Fibre and Polymer Technology, KTH Royal Institute of Technology, SE-100 44, Stockholm, Sweden
[b]Department of Neuroscience, Karolinska Institutet, SE-171 77, Stockholm, Sweden
[c]AIMES - Center for the Advancement of Integrated Medical and Engineering Sciences, Karolinska Institutet and KTH Royal Institute of Technology, Stockholm, Sweden
edlund@kth.se

Optotracing combined with multimodal fluorescence microscopy enables real-time, spatiochemical mapping of plant and algal biomass. Applied to algae, plant straw, and wood-based systems, the method visualizes biomass fractionation, fiber liberation, and compositional heterogeneity at sub-cellular resolution. Distinct fluorescence signatures differentiate cellulose, other glucans, and autofluorescent polymers such as lignin while simultaneously revealing morphological features, integrating chemical and structural information across scales.

BIOACTIVE POLYSACCHARIDES FROM THE TUNISIAN BROWN SEAWEED *HALOPTERIS SCOPARIA*

JIHEN ELLEUCH*[a], FARAH HADJKACEM[a,b], PHILIPPE MICHAUD[b], IMEN FENDRI[c], GUILLAUME PIERRE[b], SLIM ABDELKAFI*[a]

[a]Laboratoire de Génie Enzymatique et Microbiologie, Equipe de Biotechnologie des Algues, Ecole Nationale d'Ingénieurs de Sfax, Université de Sfax, 3038 Sfax, Tunisia
[b]Institut Pascal, Université Clermont Auvergne, CNRS, Clermont Auvergne INP, F-63000 Clermont-Ferrand, France
[c]Laboratory of Plant Biotechnologies Applied to the Improvement of Plants, Faculty of Sciences, University of Sfax, 3038 Sfax, Tunisia
jihen.elleuch@enis.tn, slim.abdelkafi@enis.tn

Two water-soluble polysaccharides, alginates and fucoidans, were extracted from the Tunisian brown seaweed *Halopteris scoparia*. Structural characterization by FTIR, GC-MS, HPAEC-PAD and NMR analyses revealed a guluronic acid-rich alginate fraction and a sulfated fucose-rich fucoidan fraction. Both polysaccharides exhibited significant anti-inflammatory, anticoagulant, antihyperglycemic and anti-trypsin activities, while fucoidans also showed antiviral activity against HSV-1. These results highlight the strong potential of *H. scoparia* polysaccharides for pharmaceutical and nutraceutical applications.
This work was supported by the Tunisian Ministry of Higher Education and Scientific Research. The authors acknowledge the Hubert Curien Partnership (PHC Maghreb) EXPLORE 19–21 (19MAG36) and Campus France (41423UC) for their financial support.

A CLOSER LOOK AT BACTERIAL α-GLUCANS: NEW TOOLS FOR THE ANALYSIS OF THEIR FINE STRUCTURES

LUISE ERNST*[a], OLIVER MÜLLER[b], NIELS HEISE[b], ALISA FURCH[a], DANIEL WEFERS[a,c]

[a]Martin Luther University Halle-Wittenberg, Institute of Chemistry, Food Chemistry, Kurt-Mothes-Straße 2, 06120 Halle (Saale), Germany
[b]Martin Luther University Halle-Wittenberg, Institute of Chemistry, Organic Chemistry, Kurt-Mothes-Straße 2, 06120 Halle (Saale), Germany
[c]Karlsruhe Institute of Technology, Institute of Applied Biosciences, Functional Food Chemistry, Adenauerring 20a, 76131 Karlsruhe, Germany
luise.ernst@chemie.uni-halle.de

The fine structures of bacterial α-glucans are diverse and determine their physicochemical properties and, consequently, their applicability. The structural analysis of these homopolysaccharides is challenging, particularly for water-insoluble ones. We have therefore developed a new protocol for the NMR spectroscopic analysis of water-soluble and water-insoluble bacterial α-glucans, using the solvent system tetrabutylphosphonium acetate ($P_{4444}OAc$) in DMSO-d_6[1]. Additionally, quantifying the oligosaccharides liberated by *endo*-dextranase provides information on side-chain length[2].

[1] Ernst, L., Müller, O., Heise, N., Furch, A., & Wefers, D. (2026). Comprehensive NMR spectroscopic characterization of water-insoluble and water-soluble α-glucans. *Carbohydrate Research*, 109908.
[2] Müller, O., Furch, A., Scholz, L. S., & Wefers, D. (2026). Assessing the side chain architecture of dextrans by quantifying enzymatically liberated oligosaccharides. *Carbohydrate Polymers*, 125314.

ENGINEERING MICROBIAL POLYSACCHARIDES FOR HUMAN HEALTH APPLICATIONS

PEDRO FARDIM*, FEMKE DE CEULAER, HAO-CHUN CHIU, XIAOYAN QING

KU Leuven, Department of Chemical Engineering, Celestijnenlaan 200F, 3001, Leuven, Belgium
pedro.fardim@kuleuven.be

Microbial polysaccharides have emerged as an important class of sustainable biomaterials for advanced healthcare technologies because of their biocompatibility, tunable functionality, and structural diversity. Guided by topochemical engineering principles, this work focuses on designing bioinspired materials whose surface chemistry, molecular architecture, and interfacial interactions can be precisely tailored for biomedical applications. Through selective chemical modification and hierarchical structuring, we develop microbial polysaccharides into functional platforms that bridge fundamental materials science and translational healthcare solutions.
This research focuses on developing pullulan-based hydrogels and nanostructured coatings with tailored mechanical, swelling, and biological properties. These materials provide highly hydrated environments that mimic native extracellular matrices, making them attractive for tissue engineering, wound healing, and cell culture applications. Such materials combine the favorable biological characteristics of polysaccharide networks with electrical conductivity, opening opportunities for wearable

biosensors, physiological monitoring devices, strain sensors, and next-generation bioelectronic interfaces.
The work further investigates dextran palmitate and dextran-chitooligosaccharide conjugates as versatile biomaterials for cell culture and regenerative medicine. The amphiphilic nature of dextran palmitate enables self-assembly into structures and bioactive interfaces, while dextran-chitooligosaccharide systems introduce biological recognition motifs that promote cell adhesion and proliferation. By controlling the topochemistry of these materials, researchers can modulate cell-material interactions to support the growth, differentiation, and organization of mammalian cells.
Furthermore, these engineered polysaccharide systems exhibit rheological characteristics suitable for 3D bioprinting and additive manufacturing, enabling the fabrication of complex, customized architectures for tissue models, in vitro platforms, and regenerative medicine applications. The combination of precise molecular engineering, controlled interfacial functionality, and sustainable microbial feedstocks demonstrates the potential of topochemical engineering to create a new generation of multifunctional biomaterials. Collectively, this work highlights how microbial polysaccharides can be transformed into hydrogels, coatings, bioinks, and sensing materials that address emerging challenges in human health, tissue engineering, biomedical devices, and bioelectronics.

HOW CARRAGEENAN COMPOSITION INFLUENCES GELATION IN COOKED HAM AND VEGAN ANALOGUES

BERNARDO A. C. FERREIRA*[a,b,c], MARTA RENDEIRO[b], RICARDO SILVA[b], KAYANE OLIVEIRA[b], PEDRO A. R. FERNANDES[b], JOSÉ A. LOPES DA SILVA[b], MARIA A. AZEVEDO[a], CLÁUDIA NUNES[c], MANUEL A. COIMBRA[b]

[a]Colab4Food – Collaborative Laboratory, Vila do Conde, Portugal
[b]LAQV-REQUIMTE – Associate Laboratory for Green Chemistry, University of Aveiro, Aveiro, Portugal
[c]CICECO – Aveiro Institute of Materials, University of Aveiro, Aveiro, Portugal
bacferreira@ua.pt

Carrageenans—sulphated galactans derived from red algae—serve as texturizing agents in meat and meat-alternative food products. Meat substitutes typically depend on protein gelation or other hydrocolloids to provide the firmness and textural properties required to mimic conventional meat products. While vegetarian formulations can utilize animal-derived gelling agents like egg whites to achieve the necessary firmness, vegan alternatives rely on plant-based proteins or carbohydrates. Consequently, carbohydrate-based hydrocolloids like carrageenan could be utilized in vegan formulation to effectively mimic conventional meat texture, forming stable and robust gel networks, depending on their chemical-structure.
This study evaluated the effectiveness of two different carrageenans in cooked ham and a meat-free analogue properties. The results show that carrageenans demonstrate strong potential as gelling hydrocolloids in both conventional meat and plant-based analogues. The authors acknowledge LAQV-REQUIMTE (UID/50006/2025 DOI 10.54499/UID/50006/2025 - Laboratório Associado para a Química Verde - Tecnologias e Processos Limpos) and CICECO-Aveiro Institute of Materials, UID/50011/2025 (DOI 10.54499/UID/50011/2025) & LA/P/0006/2020 (DOI 10.54499/LA/P/0006/2020) & UID/PRR/50011/2025 (DOI 10.54499/UID/PRR/50011/2025), financed by national funds through the FCT/MCTES (PIDDAC). B. A. C. Ferreira and P.A.R.F. acknowledge the FCT grant (ref. 2023.03733.BDANA - https://doi.org/10.54499/2023.03733.BDANA) and research contract funding (project Agenda VIIAFOOD), respectively. Thanks are also due to Grupo Primor (Portugal) for providing the meat formulation and ingredients. This research was funded by PT national funds (FCT/MCTES, Fundação para a Ciência e Tecnologia and Ministério da Ciência, Tecnologia e Ensino Superior) and the European Union (NextGenerationEU) through the project Agenda VIIAFOOD - Plataforma de Valorização, Industrialização e Inovação comercial para o AgroAlimentar (n.º C644929456-00000040). This work was developed within the scope of project "Missão Interface" funded by the Portuguese Recovery and Resilience Plan (PRR) and the Next Generation EU European Fund.

INTRINSIC PECTIN ARCHITECTURE GOVERNS SILVER NANOPARTICLE FORMATION AND ANTIMICROBIAL FUNCTION

MARTA FIEDOT*[a], ADAM JUNKA[b], ANNA BASTRZYK[c], ZUZANNA STĘPNICKA[b], MOHAMED AHMED[a], MUNZER MOHAMED[a], MAGDALENA WOJTAS[d], AGNIESZKA LEWIŃSKA[e], ROMAN JĘDRZEJEWSKI[f], JUSTYNA CYBULSKA[g], ARTUR ZDUNEK[g], MALWINA BROŻYNA[b], BARTŁOMIEJ DUDEK[b], KONRAD SZUSTAKIEWICZ[a]

[a]Department of Engineering and Technology of Polymers, Faculty of Chemistry, Wrocław University of Science and Technology, Wybrzeże Wyspiańskiego 42, Wrocław 50-370, Poland
[b]Platform for Unique Models Application (PUMA), Division of Translational Technologies, Department of Pharmacy, Wroclaw Medical University, Borowska 211, 50-534 Wrocław, Poland
[c]Department of Process Engineering and Technology of Polymer and Carbon Materials, Faculty of Chemistry, Wroclaw University of Science and Technology, Wybrzeże Wyspiańskiego 42, Wrocław 50-370, Poland
[d]Department of Biochemistry, Molecular Biology and Biotechnology, Faculty of Chemistry, Wroclaw University of Science and Technology, Gdańska 7/9, Wrocław 50-344, Poland
[e]Faculty of Chemistry, University of Wrocław, Joliot-Curie 14, 50-383 Wrocław, Poland
[f]Łukasiewicz Research Network - PORT Polish Center for Technology Development, Stabłowicka 147, Wroclaw 54-066, Poland
[g]Bohdan Dobrzański Institute of Agrophysics of the Polish Academy of Sciences, Doświadczalna 4, 20-290 Lublin, Poland
marta.fiedot@pwr.edu.pl

Non-healing wounds remain a major clinical challenge due to microbial biofilms and limited control of antimicrobial delivery. DLS, UV-vis, EPR, FTIR and XRD studies demonstrates that pectin acts as an active regulator of

green silver nanoparticle (NPs) synthesis, where its structural features determine NPs yield, size, and functionality. Reducing sugar-rich pectins promoted AgNPs formation, whereas highly esterified and branched structures stabilized reaction intermediates. The resulting composites exhibited strong antimicrobial and antibiofilm activity, high biocompatibility, and efficacy in *ex vivo* tissue models.
This research was funded by Wrocław University of Science and Technology (50AP/0003/26).

OPTIMIZING THE ISOLATION OF CELL-WALL POLYSACCHARIDES FROM CAROTENOGENIC YEAST

NELA GERSPITZEROVÁ*[a], DOMINIKA ŠPAČKOVÁ[a], YASHASWINI NAGARAJ[b], VOLKMAR PASSOTH[b], IVANA MÁROVÁ[a]

[a]Department of Food Science and Biotechnology, Brno University of Technology, Brno, 612 00, Czech Republic
[b]Department of Molecular Sciences, Swedish University of Agricultural Sciences, Uppsala, 750 07, Sweden
nela.gerspitzerova@vut.cz

Cell-wall polysaccharides of non-conventional yeasts represent insufficiently explored source of structurally diverse bioactive compounds. This study aimed to optimize an efficient protocol for polysaccharides isolation from a red yeast species while preserving their native structure. Different cell disruption approaches were compared, followed by lipid removal and protease treatments. The isolated fractions were evaluated for lipid, carbohydrate, and protein content and characterized by FTIR and HPLC-RID. The obtained polysaccharides will serve as a basis for further structural and biological analyses.
This work is supported by Project of the Internal Grant Agency of BUT (FCH-S-26-9000).

SYNTHESIS OF A HEXASACCHARIDE EPITOPE TOWARDS A VACCINE AGAINST GROUP B STREPTOCOCCUS

DENIS GIGUÈRE*

Université Laval, Département de chimie, Québec, Qc, G1V 0A6, Canada
denis.giguere@chm.ulaval.ca

Group B Streptococcus (GBS) is a major cause of neonatal infections, with the type III capsular polysaccharide (CPS) representing an attractive target for carbohydrate-based vaccine development. We developed a convergent 3 + 3 strategy for the synthesis of a minimal hexasaccharide epitope derived from the GBS type III CPS. The approach avoids benzyl protecting groups and incorporates an azide anchoring functionality, enabling efficient global deprotection and subsequent conjugation. Key 3 + 3 glycosylation provided the protected hexasaccharide in 91% yield and enabled preparation on a >500 mg scale. The fully deprotected hexasaccharide was subsequently conjugated to CRM197 and BSA using click chemistry.

APPLICATION OF CHROMATOGRAPHIC TECHNIQUES FOR THE ANALYSIS OF XANTHAN HYDROLYSATES

SIMONA GILLAROVÁ*, SVATOPLUK HENKE, MARKÉTA KOSTOVÁ, VLADIMÍR POUR, MARCELA SLUKOVÁ

Department of Carbohydrates and Cereals, University of Chemistry and Technology, Prague, Technická 5, 16628 Prague 6
simona.gillarova@vscht.cz

This work deals with the use of chromatographic techniques for the detailed analysis of xanthan hydrolysates. The aim of the study was to develop and optimize a methodology for verifying the authenticity of the original source of xanthan gum based on characteristic carbohydrate profiles obtained from its acid hydrolysates. The samples collected during reaction were analyzed using HPAEC/PAD for the rhamnose, arabinose, galactose, glucose, mannose, fructose, galacturonic and glucuronic acid content. Subsequently, the molar ratios of the main structural components of xanthan (Glc:Man:GlcA) were determined.

ANALYSIS OF SUGAR JUICES FOR PECTIN CONTENT

SIMONA GILLAROVÁ*, SVATOPLUK HENKE, MARK PANCHENKO, VLADIMÍR POUR, MARCELA SLUKOVÁ

Department of Carbohydrates and Cereals, University of Chemistry and Technology, Prague, Technická 5, 16628 Prague 6
simona.gillarova@vscht.cz

This work deals with the analyses of pectin content and other technologically important substances in raw beet sugar juice. The raw juice obtained in the sugar factory was analyzed for refractometric dry content, polarimetric sucrose content, pH, reducing substances, ash, organic acids using isotachophoresis and the carbohydrates using HPCEC-RID and HPAEC-PAD. Finally, the pectin content was analyzed using both the ICUMSA GS8-23 method and the HPAEC-PAD quantification of galacturonic acid after the acid hydrolysis.

INJECTABLE GMA-MODIFIED ALGINATE-BASED GELS LOADED WITH RHEIN-CYSTEINE CONJUGATE FOR BIOMEDICAL APPLICATIONS

LORENA ELENA GRIGORIU[a], ALINA GABRIELA RUSU*[a], RALUCA DARIE NIȚĂ[b], CĂTĂLINA NATALIA YILMAZ[b,c], ALEXANDRU MIHAIL ȘERBAN[a], LOREDANA ELENA NIȚĂ[a]

[a]Department of Natural Polymers, Bioactive and Biocompatible Materials, "Petru Poni" Institute of Macromolecular Chemistry, 41-A Grigore Ghica Voda Alley, 700487 Iasi, Romania
[b]Department of Physical Chemistry of Polymers, Petru Poni Institute of Macromolecular Chemistry, 41 A Grigore Ghica Voda Alley, 700487, Iasi, Romania
[c]Biochemistry Division, Department of Chemistry, Faculty of Science, Dokuz Eylul University, Buca 35390, Izmir, Türkiye
rusu.alina@icmpp.ro

The paper presents injectable gels with potential antibacterial and antitumor properties, obtained from

alginate modified with glycidyl methacrylate (GMA) and poly(ethylene brassylate) (PEB), a bio-based polyester, loaded with rhein-cysteine conjugate with therapeutic potential. The materials were evaluated in terms of absorption, rheology and release capacity of bioactive substances. Controlled release studies have highlighted the efficiency of these systems for local administration. The results support the potential of the new gels as innovative platforms in the medical field.
This research is carried out and financed within the framework of the Second Swiss Contribution MAPS (project code: F-RO-CH-2024-0081).

QUALITY AND CONTENT OF BIOACTIVE COMPOUNDS IN EMULSION (OIL/WATER) WITH A SHARE OF MALTODEXTRIN DERIVED FROM COLOR POTATOES STARCH AND BLACK CUMIN PRESS-CAKE

DOROTA GUMUL*, MAREK KRUCZEK

Department of Carbohydrate Technology and Cereal Processing, Faculty of Food Technology, University of Agriculture in Krakow, 122 Balicka St., 30-149 Krakow, Poland
dorota.gumul@urk.edu.pl

The aim of the study was to analyze the quality and content of bioactive polyphenolic compounds in a reduced-fat oil-in-water (O/W) emulsion formulated with maltodextrin with black cumin press-cake. The application of maltodextrins obtained from colored-fleshed potato starch enabled a reduction in the fat content of the emulsion formulations, and the microbiological stability of the products. The color of the emulsions was strongly affected by the incorporation of black cumin press-cake. The incorporation of maltodextrin and black cumin press-cake evidently modified the textural properties of the emulsions. The enrichment of the emulsions with black cumin press-cake considerably increased their content of bioactive compounds. Compared with the control, the content of polyphenols and phenolic acids increased by up to 4.3-fold and 3-fold, respectively, while the flavonols content also increased substantially.

IN-DEPTH CHARACTERIZATION OF A UNIQUE AUSTRALIAN SEAWEED-DERIVED POLYSACCHARIDE AND PROTEIN EXTRACT

RUNSHENG GUO[a], JOEL A. CAIN[b], J. HELEN FITTON[c], PIA WINBERG[c], EDWARD S.X. MOH[b], NICOLLE H. PACKER[a,b]

[a]*Australian Research Council Industrial Transformation Training Centre for Facilitated Advancement of Australia's Bioactives (FAAB), Macquarie University, Sydney, NSW 2109, Australia*
[b]*ARC Centre of Excellence in Synthetic Biology, School of Natural Sciences, Faculty of Science and Engineering, Macquarie University, North Ryde, Sydney, NSW 2109, Australia*
[c]*Venus Shell Systems Pty Ltd., Nowra, NSW 2540, Australia*
This study outlines advanced methods for characterizing and differentiates sulphated polysaccharides isolated from green seaweed extracts. A significant challenge in the field remains accurately identifying and validating functional molecular traits such as molecular weight, degree of sulfation, monosaccharide composition, glycosidic linkages, viscosity and gelling property. This work specifically addresses the development of robust and precise analytical techniques to reliably differentiate polysaccharide-rich and protein-rich fractions based on these molecular and physiochemical properties.
Financial support from the scholarship and travel grant from Macquarie University is gratefully acknowledged. We thank FAAB and MUCAB at Macquarie University for helpful technical support on polysaccharide analysis.

ROQUETTE CLEAN-LABEL STARCHES

JOVIN HASJIM*

Département Fonctionnalisation des Amidons, Sucres et Polyols, Roquette Frères, 62136 Lestrem, France
jovin.hasjim@roquette.com

Clean label is a growing consumer trend favoring familiar, recognizable and minimally processed ingredients. Physical and enzymatic processing can extend starch functionality while maintaining a starch declaration. This presentation illustrates Roquette's clean-label approach through pregelatinized, thermally inhibited, porous and mechanically sheared starches. These examples include both established and more recent solutions that can be positioned within the clean-label concept. They demonstrate how starch processing can combine functionality with evolving consumer expectations.

UTILIZATION OF WASTE RAW MATERIALS AS A SOURCE OF NUTRIENTS FOR THE CULTIVATION OF MICROORGANISMS

BICH THUY HOANGOVÁ[a,b], PETRA LOVECKÁ[a], TEREZA BOČKOVÁ[a], ROMAN BLEHA[b]

[a]*Department of Biochemistry and Microbiology, University of Chemistry and Technology, Prague, Technická 5, 166 28 Czech Republic*
[b]*Department of Carbohydrates and Cereals, University of Chemistry and Technology, Prague, Technická 5, 166 28 Czech Republic*
hoangovab@vscht.cz

Cold-water extracts from wheat bran, a food industry by-product, were characterized using FTIR and GC-FID, indicating the presence of arabinoxylans and β-D-glucans. Their potential as culture media supplements for industrially relevant microorganisms was evaluated. With nutrient supplementation, bacterial growth was comparable to that in reference Luria–Bertani (LB) medium, whereas yeast growth remained lower than in reference Potato Dextrose Broth (PDB). These findings highlight the potential of wheat bran valorization for sustainable culture media development.
This work was supported from the research grant - TN 02000044 Technology Agency of the Czech Republic.

MOLECULAR DISPERSION OF ZINC PHTHALOCYANINE IN CHITOSAN MATRICES: MORPHOLOGY, SURFACE ENERGY, AND SPECTROSCOPIC INSIGHTS

MEHDI IBRAHIMOV[a], VERONIKA NOVÁKOVÁ[b], KINGA MYLKIE[a], PETR ZIMČÍK[b], MARTA ZIEGLER-BOROWSKA*[a]

[a]*Department of Biomedical Chemistry and Polymer Science, Faculty of Chemistry, Nicolaus Copernicus University in Toruń, Gagarina 7, 87-100 Torun, Poland*
[b]*Department of Pharmaceutical Chemistry and Pharmaceutical Analysis, Faculty of Pharmacy in Hradec Kralove, Charles University in Prague, Heyrovskeho 1203, Hradec Kralove, 500 05, Czech Republic*
mehdi.ibrahimov@doktorant.umk.pl

Structurally homogeneous chitosan biopolymer films incorporating 1 wt% zinc phthalocyanine (ZnPc) were fabricated via a controlled dropwise co-solvent casting method to effectively suppress macro-aggregation. SEM and AFM analyses revealed a dense morphology and nanoscale dispersion (R_q = 6.28 ± 0.12 nm). Surface free energy decreased by 13% (27.01 ± 0.11 mN/m) due to polar group shielding, while FTIR confirmed robust matrix–photosensitizer intermolecular interactions and perturbation of native biopolymer hydrogen bonding, establishing a promising light-activated biomaterial platform.

EMERGING ADVANCES IN POLYSACCHARIDES HYDROGEL BIONANOARCHITECTURES FOR BIOMEDICAL APPLICATIONS

CHRISTOPHER IGWE IDUMAH*

Department of Polymer Engineering, Faculty of Engineering, Nnamdi Azikiwe University Awka, Anambra State, Nigeria
idugoldengate@yahoo.com

Polysaccharide-based hydrogels have emerged as leading candidates for biomedical applications owing to their inherent biocompatibility, biodegradability, renewability, and structural similarity to the native extracellular matrix. However, pristine polysaccharide hydrogels such as chitosan, alginate, cellulose, hyaluronic acid, and starch are limited by poor mechanical robustness, uncontrolled degradation, and insufficient biofunctionality. This paper presents emerging advances in polysaccharide hydrogel bionanoarchitectures engineered through the integration of nanoclays, metal oxide nanoparticles, carbon-based nanomaterials, and bioactive nanofibers via physical, chemical, ionic crosslinking, and 3D bioprinting strategies. These bionanoarchitectured hydrogels exhibit significantly enhanced compressive modulus, tunable swelling, stimuli-responsiveness, and electrical conductivity, as validated by FTIR, SEM/TEM, rheological, and thermal analyses. Biologically, they demonstrate superior cell adhesion, proliferation, >90% cell viability, controlled drug release, and broad-spectrum antimicrobial activity. Applications in wound healing, tissue engineering scaffolds, controlled drug delivery, and biosensing are critically evaluated. The work establishes polysaccharide hydrogel bionanoarchitectures as a versatile, sustainable, and multifunctional platform for next-generation biomedical devices, while highlighting future perspectives in 4D bioprinting, AI-driven design, and translational scale-up.

AN ADVANCED SAXS AND WAXS STUDY ON STARCH GELATINIZATION UNDER LIMITED WATER CONDITIONS REVEALS MECHANISTIC ASPECTS

BRONWEN IVENS[a], JAN DELCOUR[b], BART GODERIS*[a]

[a]*Polymer Chemistry and Materials, Department of Chemistry, KU Leuven, Celestijnenlaan 200 F, Box 2404, B-3001 Leuven, Belgium*
[b]*Laboratory of Food Chemistry and Biochemistry, Department of Microbial and Molecular Systems, KU Leuven, Kasteelpark Arenberg 20, B-3001 Leuven, Belgium*
bronwen.ivens@kuleuven.be

Starch gelatinization under excess and limited water conditions was studied using DSC and time-resolved SAXS/WAXS. Decreasing water content increased gelatinization temperatures and changed the DSC response from a unimodal, to a bimodal endotherm. SAXS/WAXS did not show two sequential events corresponding to distinct helix-helix and helix-coil transitions as in the SCLP model. Instead, the temperature range between the two DSC peaks reflects a temporary arrest of gelatinization, where partially gelatinized material with smectic-like order coexists with native crystalline and fully gelatinized starch.

AN ADVANCED SAXS AND WAXS STUDY ON STARCH GELATINIZATION UNDER LIMITED WATER CONDITIONS REVEALS MECHANISTIC ASPECTS

BRONWEN IVENS[a], JAN DELCOUR[b], BART GODERIS[a]

[a]*Polymer Chemistry and Materials, Department of Chemistry, KU Leuven, Celestijnenlaan 200 F, Box 2404, B-3001 Leuven, Belgium*
[b]*Laboratory of Food Chemistry and Biochemistry, Department of Microbial and Molecular Systems, KU Leuven, Kasteelpark Arenberg 20, B-3001 Leuven, Belgium*
bronwen.ivens@kuleuven.be

Starch gelatinization under excess and limited water conditions was studied using DSC and time-resolved SAXS/WAXS. Decreasing water content increased gelatinization temperatures and changed the DSC response from a unimodal, to a bimodal endotherm. SAXS/WAXS did not show two sequential events corresponding to distinct helix-helix and helix-coil transitions as in the SCLP model. Instead, the temperature range between the two DSC peaks reflects a temporary arrest of gelatinization, where partially gelatinized material with smectic-like order coexists with native crystalline and fully gelatinized starch.

STARCH-STABILISED VEGAN MAYONNAISE-TYPE EMULSIONS: COMPLEMENTARY INSIGHTS FROM SMLS, DWS MICRORHEOLOGY AND LOW-FIELD NMR

PATRYCJA JANKOWSKA[a], HANNA MARIA BARANOWSKA[b], JOANNA LE THANH-BLICHARZ[a], JACEK LEWANDOWICZ*[a]

[a]*Department of Food Concentrates and Starch Products, Prof. Wacław Dąbrowski Institute of Agriculture and Food Biotechnology — State Research Institute, 40 Starołęcka Street, 61-361 Poznań, Poland*

[b]*Department of Physics and Biophysics, Poznan University of Life Sciences, 60-637 Poznań, Wojska Polskiego Str. 38/42*
jacek.lewandowicz@ibprs.pl

The aim of the work was to assess the effect of starch type on stability, molecular dynamics and microrheological properties of vegan mayonnaise-type emulsions. The experimental material consisted of emulsions containing 35% rapeseed oil, stabilised with native normal or waxy potato starch, or with commercial modified starches. Stability was evaluated by SMLS, microrheology by diffusing wave spectroscopy (DWS) and water mobility by low-field NMR. It was found that starch type influenced water mobility and microrheological properties more strongly than lipid-phase relaxation.

CONTROLLED DRUG RELEASE FROM A SUPERPARAMAGNETIC β-CYCLODEXTRIN NANOSPONGE BY APPLYING AN EXTERNAL ALTERNATING MAGNETIC FIELD

PAUL JARA*[a], SEBASTIAN SALAZAR-SANDOVAL[b], NICOLÁS YUTRONIC[a], MARCELO KOGAN[b]

[a]*Facultad de Ciencias, Universidad de Chile, Las Palmeras 3425, Ñuñoa, Santiago, 7800003, Chile*
[b]*Facultad de Ciencias Químicas y Farmacéuticas 1025000, Chile*
pjara@uchile.cl

We report the preparation of an inclusion complex consisting of a β-cyclodextrin (β-CD) polymer, called a nanosponge (NS), with the antitumor drug cyclophosphamide (CYC), thus obtaining the NS-CYC system. Subsequently, NS-CYC was associated with magnetite nanoparticles (MNPs) to develop the ternary MNP-NSs-CYC system. The resulting product was characterized to confirm the deposition of the MNPs on the organic matrix and the preservation of their superparamagnetic nature after association using different techniques.
This work was funded by the ANID FONDECYT 1251002 and ANID FONDECYT Postdoctoral 3240172

RG-I ARCHITECTURE OF APPLE-DERIVED DILUTED ALKALI-SOLUBLE PECTIN (DASP) DETERMINES pH-DEPENDENT RHEOLOGY AND EMULSION STABILITY

ADRIANNA KACZMARSKA-KRÓL*[a], JAKUB MATUSIAK[a], JUSTYNA CYBULSKA[b], ARTUR ZDUNEK[b], WOJCIECH FRANUS[a]

[a]*Lublin University of Technology, Nadbystrzycka 38d, 20-618 Lublin, Poland*
[b]*Institute of Agrophysics, Polish Academy of Sciences, Doświadczalna 4, 20-290 Lublin, Poland*
a.kaczmarska@pollub.pl

Apple-derived diluted alkali-soluble pectin (DASP) was enzymatically modified to remove rhamnogalacturonan-I (RG-I) side chains and partially cleave the backbone. Debranching reduced neutral sugar content and viscosity. Native, more branched DASP showed stronger pH-dependent rheological behavior and better long-term stability of oil-in-water emulsions, particularly at pH 2.5. Despite more negative ζ-potentials at pH 6.0, emulsions were less stable, demonstrating that pectin architecture and continuous-phase structuring govern long-term stability beyond surface charge alone.
This work was supported by the National Science Centre, Poland, grant no. UMO-2023/49/N/NZ9/01701.

SURFACE CHEMISTRY-DIRECTED ASSEMBLY OF ZIF-8 ON CELLULOSE NANOFIBERS

HOUSSINE KHALILI, AJI P. MATHEW*

Department of Chemistry, Stockholm University, Stockholm SE-106 91, Sweden
houssine.khalili@su.se

Surface chemistry governs the formation and interfacial properties of cellulose nanofiber-ZIF-8 hybrids. ZIF-8 was synthesized on phosphorylated (PCNF) and unmodified cellulose nanofibers (CNF) using a stepwise route. XPS revealed efficient Zn^{2+} anchoring by phosphate groups, whereas CNF showed limited Zn retention. PCNFZIF8 preserved the high surface area of ZIF-8 (1537 $m^2\ g^{-1}$), while CNFZIF8 reached 327 $m^2\ g^{-1}$. AFM revealed stronger time-dependent adhesion for CNFZIF8 and hydration-mediated repulsion for PCNFZIF8, demonstrating that surface chemistry controls MOF assembly, porosity, and interfacial stress transfer.

IMPACT OF SOLAR DRYING ON CARBOHYDRATE COMPOSITION OF "PINGO DE MEL" FIGS

RAMLA KHIARI*, JOANA BARROS, ELISABETE COELHO, MANUEL A. COIMBRA*

LAQV-REQUIMTE, Department of Chemistry, University of Aveiro, 3810-193 Aveiro, Portugal
ramla.khiari@ua.pt

This study evaluated fresh and solar-dried "Pingo de Mel" figs at 50 °C, focusing on changes in carbohydrate composition and plant-cell-wall polysaccharide extractability. Monosaccharides and oligosaccharides were extracted using ethanol-water mixture, while polysaccharides were fractionated through sequential cold- then hot- water extraction. Drying increased the content of glucose, fructose, oligosaccharides as well as pectic-polysaccharide. These findings suggest that solar drying could be considered as a sustainable approach for valorizing figs rich in oligosaccharides and polysaccharides.
The authors are grateful for the financial support from project PrOSFig (HORIZON-WIDERA-2023-TALENTS-02-01), supported by the European Union, Grant Agreement ID: 101180656.

ISOLATION, FRACTIONATION AND STRUCTURAL ANALYSIS OF POLYSACCHARIDES FROM *PLEUROTUS OSTREATUS* "BLACK PEARL"

RASTISLAV KORMAN*[a], DAMLA AVCI[a], MAREK SOGEL[a], MIROSLAV JOZÍFEK[b], ROMAN BLEHA[a], ANDRIY SYNYTSYA[a]

[a]*Department of Carbohydrates and Cereals, University of Chemistry and Technology, Prague, Technická 5, 166 28 Czech Republic*
[b]*Department of Gardening, Czech University of Life Sciences, Prague, Kamýcká 129, 165 21 Prague, Czech Republic*
kormanr@vscht.cz

Polysaccharide extracts were obtained from the hybrid strain *Pleurotus ostreatus* Black Pearl by cold- and hot-water extraction, followed by purification, fractionation, and structural characterization. The extracts were fractionated by size-exclusion chromatography (SEC), and the resulting fractions were characterized using FT-IR spectroscopy, GC-FID, and GPC. The results will provide a basis for relating the structural features of these polysaccharides to their potential applications in functional foods and dietary supplements. This work was supported from the internal student research grant - grant No A2_FPBT_2026_013 and grant of Specific university research – grant No A1_FPBT_2026_005.

POLYSACCHARIDE ISOLATION AND STRUCTURAL EVALUATION IN TWO *HERICIUM ERINACEUS* STRAINS (H5200, H5130)

RASTISLAV KORMAN*[a], DAMLA AVCI[a], MAREK SOGEL[a], SOFIA DE LEÃO RODRIGUES MOTA*[c], MIROSLAV JOZÍFEK[b], ROMAN BLEHA[a], ANDRIY SYNYTSYA[a]

[a]*Department of Carbohydrates and Cereals, University of Chemistry and Technology, Prague, Technická 5, 166 28 Czech Republic*
[b]*Department of Gardening, Czech University of Life Sciences, Prague, Kamýcká 129, 165 21 Prague, Czech Republic*
[c]*Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal*
kormanr@vscht.cz

This study focuses on the isolation and structural characterization of polysaccharides from the fruiting bodies of two *Hericium erinaceus* strains, H5200 and H5130. Polysaccharides were extracted using cold- and hot-water extraction methods, and the resulting extracts were separated into defined fractions by ion exchange chromatography (IEC). The extracts and their corresponding fractions were characterized by FT-IR spectroscopy, while monosaccharide composition was determined by gas chromatography with flame ionization detection (GC-FID) and molecular-weight distributions were evaluated by gel permeation chromatography (GPC). This work was supported from the internal student research grant – grant No A2_FPBT_2026_013 and grant of Specific university research – grant No A1_FPBT_2026_005.

HEMOGLOBIN- AND BOVINE SERUM ALBUMIN-MODIFIED CHITOSAN FILMS FUNCTIONALIZED WITH BODIPY AS POTENTIAL MATERIALS FOR PHOTODYNAMIC THERAPY (PDT)

KAROLINA KOZERSKA*[a,b,c], ALEKSANDER SMOLARKIEWICZ-WYCZACHOWSKI[b,c], JAROSŁAW PISKORZ[d], MARTA ZIEGLER-BOROWSKA[b,c]

[a]*Doctoral School of Exact and Natural Sciences "Academia Scientiarum Thoruniensis", Nicolaus Copernicus University in Torun, 87-100 Torun, Poland*
[b]*Department of Biomedical Chemistry and Polymers, Faculty of Chemistry, Nicolaus Copernicus University in Torun, Gagarina 7, 87-100 Torun, Poland*
[c]*Institute of Advanced Studies, Nicolaus Copernicus University in Torun, Wilenska 4, 87-100 Torun, Poland*
[d]*Chair and Department of Inorganic and Analytical Chemistry, Poznan University of Medical Sciences, Rokietnicka 3, 60-806 Poznan, Poland*
k.kozerska@doktorant.umk.pl

This study aimed to design chitosan-based biomaterials modified with Hb/BSA and functionalized with BODIPY for potential PDT application. The films were characterized using spectroscopic techniques (ATR-FTIR, UV-Vis, fluorescence) and surface imaging (SEM and AFM). Additionally, their mechanical properties, thermal stability, swelling behavior, biodegradability, BODIPY release, and ability to interact with a model protein were evaluated. The films exhibited favorable physicochemical properties and enabled BODIPY release, indicating their potential for photosensitizer delivery in PDT.

BEYOND THE PLASTIC BOTTLE – THE OVERLOOKED FOOTPRINT OF SYNTHETIC POLYMER FLOCCULANTS

SIMON LEONHARTSBERGER*, RALUCA DOBRE, CHRISTIAN STANETTY, MARKO D. MIHOVILOVIC

TU Wien, Getreidemarkt 9, 1060 Vienna, Austria
simon.leonhartsberger@tuwien.ac.at

Polymers surround us in daily life, from plastic bottles to synthetic clothing. Their environmental impact is usually discussed in terms of plastic waste and microplastics, while dissolved polymers receive far less attention. Water-soluble synthetic flocculants such as cPAM are one such overlooked source: widely used, poorly biodegradable, and potentially persistent, yet outside conventional microplastic definitions. This talk considers flocculation performance alongside biodegradability, hydrolysis behavior, and aquatic toxicity, using polysaccharide-based alternatives.

FROM FOSSIL-BASED TO BIO-BASED: TOWARDS ENVIRONMENTALLY RESPONSIBLE POLYMER FLOCCULANTS

SIMON LEONHARTSBERGER*, RALUCA DOBRE, CHRISTIAN STANETTY, MARKO D. MIHOVILOVIC

TU Wien, Getreidemarkt 9, 1060 Vienna, Austria
simon.leonhartsberger@tuwien.ac.at

Synthetic polymer flocculants such as cPAM enable efficient solid–liquid separation, but their limited biodegradability may cause long-term environmental persistence. Polysaccharides offer renewable alternatives; however, chemical modification strongly affects their environmental fate. Higher degrees of substitution during

QUAB cationization can reduce biodegradation. We therefore prepared genuinely biodegradable polysaccharide-based flocculants and assessed their biodegradability, hydrolysis behavior, and aquatic toxicity while achieving performance comparable to conventional synthetic polymers.

CHITOSAN-BASED POROUS MEMBRANES WITH TUNABLE EDTA FUNCTIONALIZATION FOR Hg(II) REMOVAL FROM WATER

RICARDO MARÍN-SÁNCHEZ[a,b], LAURENT DAVID*[b], FRANÇOIS LUX[c], OLIVIER TILLEMENT[d], ROBERTO OLAYO-VALLES[e], MARÍA CRISTINA ACOSTA-GARCÍA[f], KEIKO SHIRAI*[a]

[a]Universidad Autónoma Metropolitana-Iztapalapa, Department of Biotechnology, Av. Ferrocarril San Rafael Atlixco 186, Colonia Leyes de Reforma 1a sección, Iztapalapa, Mexico City, Mexico, 09310
[b]Ingénierie des Matériaux Polymères, Université Claude Bernard Lyon 1, 15 bd A. Latarjet, Villeurbanne, France, 69622
[c]Laboratoire des Multimatériaux et Interfaces (LMI), Université Claude Bernard Lyon 1, CNRS, UMR 5615, Bâtiment Chevreul, 6 rue V. Grignard, 69622 Villeurbanne Cedex, France
[d]Institut Lumière Matière (ILM), Université Claude Bernard Lyon 1, CNRS, UMR 5306, Bâtiment Jules Raulin, 2 rue V. Grignard, 69622 Villeurbanne Cedex, France
[e]Universidad Autónoma Metropolitana-Iztapalapa, Department of Physics, Av. Ferrocarril San Rafael Atlixco 186, Colonia Leyes de Reforma 1a sección, Iztapalapa, Mexico City, Mexico, 09310
[f]Universidad Autónoma Metropolitana-Iztapalapa, Reproduction Biology Department, Av. Ferrocarril San Rafael Atlixco No. 186, Colonia Leyes de Reforma 1a sección, Alcaldía de Iztapalapa, Mexico City 09340, Mexico
smk@xanum.uam.mx, laurent.david@univ-lyon1.fr

Highly porous chitosan (CS) membranes with tunable porosity were fabricated by evaporation-induced phase separation and post-fabrication crosslinking with EDTA dianhydride. Varying the acetic acid content in CS-polyethylene oxide casting solutions enabled control over membrane porosity, while tunable EDTA incorporation modified mechanical properties and enhanced acid stability. The resulting membranes showed efficient Hg(II) removal over a broad pH range, with a maximum adsorption capacity of 247.7 mg g^{-1}. These results demonstrate the potential of EDTA functionalization in porous CS membranes for water treatment.
The authors acknowledge the support provided by the Universidad Autónoma Metropolitana and SECIHTI (Mexico) through scholarships awarded to RMS for the development of his doctoral research.

PLASTICISATION OF POLYLACTIDE USING CHITIN AND LECITHIN

PAUL MARTEN, OLIVER WEICHOLD*

Institute for Building Materials Research, RWTH Aachen University, Schinkelstraße 3, 52062 Aachen, Germany
marten@ibac.rwth-aachen.de

Chitin and soy lecithin were combined as a fully bio-based additive system for polylactide (PLA). Ternary formulations containing up to 24 wt.% additive were processed without macroscopic phase separation. SEM/EDX spot analysis revealed a heterogeneous lecithin distribution and local co-occurrence with chitin-rich regions. Increasing chitin-lecithin content reduced Shore hardness from 84.5 ± 0.5 for neat PLA to 77.0 ± 0.6 at 24 wt.% additive. The results suggest that chitin contributes to the incorporation and spatial distribution of lecithin, thereby supporting effective plasticisation of PLA.

ETHYLENE GLYCOL UTILIZATION AND DHA PRODUCTION BY THRAUSTOCHYTRIDS: POTENTIAL OF MICROBUBBLE-ASSISTED CULTIVATION

ADÉLA MOCOVÁ*[a], BERNADETA VACKOVÁ[a], ALOK KUMAR PATEL[b], LEONIDAS MATSAKAS[b], IRENA JAROŠOVÁ KOLOUCHOVÁ[a]

[a]University of Chemistry and Technology, Prague, Technická 5, 166 28 Prague 6, Czech Republic
[b]Luleå University of Technology, Sweden
mocovaa@vscht.cz

Three thraustochytrid strains (*Schizochytrium* sp. S8, *S. limacinum* SR21, and *Aurantiochytrium* sp. T66) were evaluated for ethylene glycol (EG) utilization, biomass formation, and lipid production at EG concentrations of 5 and 10 g/L. Although no detectable EG consumption was observed, all strains produced biomass with a high proportion of docosahexaenoic acid (DHA), reaching up to 52% of total fatty acids. The subsequent study focuses on microbubble-assisted cultivation to enhance oxygen transfer, potentially improve EG utilization, and support DHA-rich biomass production. Additionally, the research will investigate the valorization of residual biomass generated during DHA extraction, with particular emphasis on polysaccharide-rich cell wall fractions. These fractions will be subjected to isolation and structural characterization to explore their potential for further utilization, contributing to a more sustainable and integrated approach to thraustochytrid biomass processing.
This work was supported by the Internal Grant Agency of UCT Prague (grant no. A2_FPBT_2026_020).

CHITOSAN-BASED INTERPOLYELECTROLYTE COMPLEXES AS WOOD ADHESIVES

NILS MÜNSTERMANN, OLIVER WEICHOLD*

RWTH Aachen University, Institute for building materials research, Schinkelstr. 3, 52062 Aachen, Germany
weichold@ibac.rwth-aachen.de

Chitosan salts of itaconic and maleic acid were investigated as precursors for interpolyelectrolyte complexes in wood bonding. The acids protonate chitosan while simultaneously introducing polymerisable C=C groups, enabling in-situ formation of interpolyelectrolyte complexes. Upon curing, both systems formed mechanically stable adhesive joints and caused cohesive wood failure under dry conditions. Their behaviour in water, however, differed markedly: chitosan itaconate

showed substantially lower swelling and retained a shear strength of 2.7 $N \cdot mm^{-2}$ after boiling-water conditioning.

SUPRAMOLECULAR HYDROGELS BASED ON CARRAGEENAN AND AMINO ACIDS

LOREDANA ELENA NITA*[a], LORENA ELENA GRIGORIU[a], ALEXANDRA VIERU[a], ALINA GABRIELA RUSU[a], ALEXANDRU M. SERBAN[a], RALUCA NICOLETA DARIE-NITA[b]

[a]*Department of Natural Polymers, Bioactive and Biocompatible Materials, "Petru Poni" Institute of Macromolecular Chemistry, 41-A Grigore Ghica Voda Alley, 700487 Iasi, Romania*
[b]*Department of Physical Chemistry of Polymers, Petru Poni Institute of Macromolecular Chemistry, 41-A Grigore Ghica Voda Alley, 700487, Iasi, Romania*
lnazare@icmpp.ro

Materials based on carrageenan and essential amino acids (AAs) are of interest in obtaining gels with applicability in transdermal dressings. In this context, we obtained hydrogels based on carrageenan and AAs such as tryptophan and glutamic acid, which act as essential precursors in skin repair processes and play a determining role in protection against oxidative stress induced by UV radiation. The properties of hydrogels in relation to the variation of the carrageenan /AAs ratio were studied to demonstrate the capacity of this complex system to support the regeneration of damaged epithelial tissues.
This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CCCDI - UEFISCDI, project number PN-IV-P7-7.1-PED-2024-1788, within PNCDI IV

INVESTIGATING THE RHEOLOGY OF CHITOSAN AND ITS DERIVATIVE BLENDS IN SOLUTION

JOVANA OBRADOVIĆ, NILS MÜNSTERMANN, OLIVER WEICHOLD*

Institute of Building Materials Research, Schinkelstraße 3, 52062 Aachen, Germany
weichold@ibac.rwth-aachen.de

The rheological behaviour of chitosan is strongly influenced by its concentration, molecular weight and also the amount of acid added. In these studies, the behaviour of blends of chitosan and dimethylchitosan with similar molecular weights was investigated in order to demonstrate the influence of the composition of these blends on the rheological behaviour of the solutions. The results show that the rheological behaviour can be explained primarily by the chitosan content and that there is a non-linear relationship between the blends and viscosity. Thus, blend composition alone cannot predict rheological behaviour.

POLYSACCHARIDE-BASED FORMULATIONS AS POTENTIAL CARRIERS FOR PULMONARY DELIVERY

CLÁUDIA P. PASSOS

LAQV-REQUIMTE, Department of Chemistry, University of Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal
cpassos@ua.pt

Polysaccharides can be elite carriers for therapeutic molecules due to their versatility and low probability to trigger toxicity and immunogenic responses. Local and systemic therapies can be achieved through particle pulmonary delivery, a promising non invasive alternative. Successful pulmonary delivery requires particles with appropriate flowability to reach alveoli and avoid premature clearance mechanisms. Polysaccharides can form micro-, nano-in-micro-, and large porous particles, aerogels, and hydrogels. Herein, the characteristics of polysaccharides used in drug formulations for pulmonary delivery are reviewed, providing insights into structure-function relationships[1].
Thanks are due to the financial support from PT national funds (FCT/MCTES) of LAQV-REQUIMTE/University of Aveiro (UID/50006/2025 DOI 10.54499/UID/50006/2025).
[1] Valente S.A.; Silva L.M.; Lopes G.R.; Sarmento, B.; Coimbra, M.A.; Passos, C.P. (2022). "Polysaccharide-based formulations as potential carriers for pulmonary delivery – A review of their properties and fates" *Carbohydrate polymers*, 277, 118784.

UPCYCLING TOMATO POMACE INTO CARBON DOTS FOR ACTIVE THERMOPLASTIC STARCH/BENTONITE COMPOSITE FILMS

TOKTAM PEDRAMRAD*[a], PAULA FERREIRA[a], PEDRO DUARTE[b], IDALINA GONÇALVES[a]

[a]*CICECO – Aveiro Institute of Materials, Department of Materials and Ceramic Engineering, University of Aveiro, Portugal*
[b]*CTCP - Portuguese Footwear Technological Center*
Pedramrad@ua.pt

Tomato pomace was upcycled into carbon dots (CDs) and incorporated into thermoplastic starch (TPS)/bentonite composite films. CD incorporation improved mechanical performance, constant enhanced interactions within the starch-based matrix, and imparted antioxidant and UV-protective capacity. These findings demonstrate a circular-economy route to active, sustainable polysaccharide materials from agri-food waste.
This work was developed within CICECO–Aveiro Institute of Materials, UID/50011/2025 (DOI 10.54499/UID/50011/2025) and LA/P/0006/2020 (DOI 10.54499/LA/P/0006/2020), funded by national funds through FCT/MCTES (PIDDAC). TP acknowledges an FCT PhD scholarship; IG acknowledges FCT funding.

OPTIMIZATION OF NADES-ASSISTED PECTIN EXTRACTION FROM CELERIAC POMACE

IGNACIO POZZAN, SZYMON JARZĄBEK, IZABELA PAWLACZYK-GRAJA*

Laboratory of Bioproducts Technology, Faculty of Chemistry, Wrocław University of Science and Technology, Wybrzeże Wyspiańskiego 29, 50-370 Wrocław
izabela.pawlaczyk@pwr.edu.pl

Celeriac pomace (*Apium graveolens* var. rapaceum) was assessed as a source of pectic polysaccharides. A citric acid–choline chloride–glucose NADES was applied in hot-water extraction and optimized by response surface methodology. The predicted optimum gave 15.78% extraction yield and 98.10% uronic acid content. GC–MS indicated condition-dependent structures ranging from highly linear to highly branched, high-methoxyl pectins. These results support celeriac pomace valorization for producing structurally tunable pectic materials. The work was supported by the National Science Centre, Poland, under the research project „Processes of obtaining polyanionic saccharides from native agricultural waste, including Ohmic heating-assisted extraction in environmentally safe solvents.", no UMO-2023/51/B/ST8/02851

TRICOMPONENT NSAID-GLYCOPEPTIDE CHIMERAS AS POTENTIAL DUAL ANTIBACTERIAL AND ANTICANCER AGENTS

JUAN ESTEBAN REYES-CALDERÓN[a], KELIN CUERO-AMU[b], NATALIA LEÓN-SALAMANCA[a], ROSA SANTILLAN[d], NORBERTO FARFÁN[c], ZULY JENNY RIVERA-MONROY[a], JAVIER EDUARDO GARCÍA-CASTAÑEDA*[e]

[a]Universidad Nacional de Colombia – Sede Bogotá. Facultad de Ciencias. Departamento de Química
[b]Universidad Nacional de Colombia – Sede Bogotá. Facultad de Ciencias. Instituto de Biotecnología
[c]Departamento de Química. Centro de Investigación y de Estudios Avanzados del IPN. Ciudad de México. México
[d]Facultad de Química. Departamento de Química Orgánica. Universidad Nacional Autónoma de México
[e]Universidad Nacional de Colombia – Sede Bogotá. Facultad de Ciencias. Departamento de Farmacia
jaegarciaca@unal.edu.co

Antimicrobial resistance and poor selectivity of current anticancer agents demand new multifunctional strategies. In this work, bioactive peptides were conjugated to NSAIDs and glucose or galactose via CuAAC reactions to generate dual-activity hybrids. Peptides were characterized by RP-HPLC and LC-MS. Antibacterial activity was evaluated against *E. coli* ATCC 25922 and *S. aureus* ATCC 25923, and cytotoxicity against HeLa and MCF-7 cells. NSAID and carbohydrate incorporation significantly enhanced activity relative to the unconjugated peptide. These results support peptide conjugation with NSAIDs and carbohydrates as a promising route to dual antibacterial/anticancer agents.

GUM ARABIC FIBERS BY CENTRIFUGAL SPINNING FOR COSMETIC AND DERMATOLOGIC APPLICATION

MARTINA RIHOVA*[a,b], LUDEK HROMADKO[b], VERONIKA CICMANCOVA[b], JAN M. MACAK

[a]Central European Institute of Technology, Brno University of Technology, Purkynova 123, 612 00 Brno, Czech Republic
[b]Center of Materials and Nanotechnologies, Faculty of Chemical Technology, University of Pardubice, Nam. Cs. Legii, 565, 530 02 Pardubice, Czech Republic
martina.rihova@ceitec.vutbr.cz

Gum Arabic-based fibers for cosmetic and dermatological applications were prepared by centrifugal spinning. Two types of fibers were prepared: fibers loaded with vitamins E and C, and fibers loaded with antibacterial ZnO nanoparticles for the treatment of *Acne vulgaris*. The morphology and chemical composition of both types were characterized, the vitamin-loaded fibers were tested for the release of vitamin E, and the ZnO-loaded fibers for antibacterial activity. We show that the newly prepared fibers represent a very promising material for skin care applications.

EVALUATION OF THE EFFICIENCY OF NATIVE AND MODIFIED *DIOSCOREA HISPIDA* DENNST (*D. HISPIDA*) STARCHES IN STRUCTURING STABLE PICKERING EMULSION GELS

KOMATHY K. SANTHIL NATHAN[a], LIANG EE LOW[b], NADIAH WAN RASDI[c], NABILAH ABDUL HADI*[a]

[a]Faculty of Food Science and Agrotechnology, Universiti Malaysia Terengganu, 21030 Kuala Nerus, Terengganu, Malaysia
[b]Department of Chemical Engineering, School of Engineering, Monash University Malaysia, Jalan Lagoon Selatan, Bandar Sunway, Selangor Darul Ehsan, 47500, Malaysia
[c]Faculty of Fisheries Sciences and Aquaculture, Universiti Malaysia Terengganu, 21030 Kuala Terengganu, Terengganu, Malaysia
nabilah.abdhadi@umt.edu.my

Underutilized *D. hispida* starch for Pickering emulsion gels (PEGs) remains unexplored. This study, the comparative effects of single (pregelatinized & OSA) and dual modifications (pregelatinized + OSA) on *D. hispida* starch properties on PEGs performance have been reported. Results reveled that OSA modification yielding a superior three-phase contact angle of 87.1° ± 1.902, a degree of substitution 0.0183 ± 0.001 and elastic-dominated (G′>G″) 3D network that kept the creaming index below 3% throughout 112 days. Single OSA modification transitions *D. hispida* starch into a viable biopolymer stabilizer for functional food emulsion gel. This work was supported by the MyBrainSc scholarship program from Ministry of Higher Education Malaysia.

RHEOLOGY AND DIGESTIBILITY OF EXTRUDATES WITH ADDED QUERCETIN

EVŽEN ŠÁRKA[a], LUKÁŠ JELÍNEK[b], ALENA OSVALDOVÁ[b], PETRA SMRČKOVÁ*[a]

[a]UCT Prague, Department of Carbohydrates and Cereals, Technická 5, 166 28 Prague 6, Czech Republic
[b]UCT Prague, Department of Biotechnology, Technická 5, 166 28 Prague 6, Czech Republic
Petra.Smrckova@vscht.cz

A set of 17 model mixtures with varying quercetin content was prepared on a single-screw KE19 / 25 DN Brabender extruder. During the extrusion process the screw compression ratio of 2:1 and the temperatures in the first three zones (50/70/90) were kept constant. The temperature in the fourth zone was changed from 100 to 150°C and the screw speed was ranged from 110 to 150 rpm. The extrudates were characterised by total starch

(TS) and resistant starch (RS) and rheological properties tested on an RVA 4500 viscometer. The extrusion parameters and the quercetin content are assumed to be closely connected with the RS content a and RVA profiles. This work was financially supported by the Czech Science Foundation (Project No 25-16506S).

STRUCTURAL CHARACTERIZATION OF POLYSACCHARIDE FRACTIONS FROM BREWER'S SPENT GRAIN, WITH A FOCUS ON COLD-WATER EXTRACTS

MAREK SOGEL*, RASTISLAV KORMAN, DAMLA AVCI, PETRA SMRČKOVÁ, IVAN ŠVEC, PAVEL SKŘIVAN, MARCELA SLUKOVÁ, ROMAN BLEHA, ANDRIY SYNYTSYA

Department of Carbohydrate and Cereals at University of Chemistry and Technology Prague, Technická 5, 166 28 Praha 6 – Dejvice
sogelm@vscht.cz

Brewer's spent grain (BSG) was investigated as a source of valuable compounds for food-industry applications. Cold-water extracts were purified and fractionated by preparative chromatography and dialysis. The obtained fractions were characterized by FTIR spectroscopy, GC/FID, and GPC/SEC. The extracts consisted predominantly of arabinoxylans, glucans, and proteins. The results support the potential use of BSG flour and its extracts as functional ingredients in bakery products and demonstrate new opportunities for BSG valorisation. This work was supported from the grant of Specific university research – grant No A1_FPBT_2026_005.

BEYOND YEAST BIOMASS: EXPLORING BIOACTIVE EXTRACELLULAR POLYSACCHARIDES

DOMINIKA ŠPAČKOVÁ*[a], JIŘÍ HOLUB[a], NELA GERSPITZEROVÁ[a], ROMAN BLEHA[b], IVANA MÁROVÁ[a]

[a]Department of Food Science and Biotechnology, Faculty of Chemistry, Brno University of Technology, Brno, 612 00, Czech Republic
[b]Department of Saccharides and Cereals, University of Chemistry and Technology, Prague, 160 00, Czech Republic
Dominika.Spackova@vut.cz

Yeast-derived extracellular polysaccharides are promising biopolymers with diverse biological activities. This study investigated an extracellular polysaccharide fraction from an underexplored yeast strain. FTIR and gas chromatography (GC) analysis revealed a mannose- and galactose-rich polysaccharide profile. The fraction showed high cell viability in an MTT assay and pronounced immunostimulatory activity in RAW 264.7 macrophages, evidenced by NO production comparable to that induced by bacterial LPS. These findings highlight yeast-derived extracellular polysaccharides as bioactive biomaterials with immunomodulatory potential. This work is supported by Project of the Internal Grant Agency of BUT (FCH-S-26-9000)

ENGINEERING FUNCTIONAL POLYSACCHARIDES FOR SUSTAINABLE ADHESIVES AND WATER TREATMENT

CHRISTIAN STANETTY*[a], SIMON LEONHARTSBERGER[a], HUBERT KALAUS[a], PIERRE CARMONA[a], RALUCA DOBRE[a], BERNHARD SEIDL[b], KARL-JÜRGEN MANN[b], MARTIN KOZICH[b], MARKO D. MIHOVILOVIC[b]

[a]TU Wien, Institute of Applied synthetic chemistry, Getreidmarkt 9, 1060 Vienna, Austria
[b]AGRANA Research and Innovation Center (ARIC), Josef-Reither-Straße 21-23, 3430 Tulln, Austria
christian.stanetty@tuwien.ac.at

Tailored polysaccharides offer sustainable alternatives to fossil-based functional polymers. Controlling molecular weight, charge density and functionality yielded efficient bio-based flocculants approaching conventional cationic polyacrylamides, with successful transfer to pilot-scale sludge treatment. Complementarily, enzymatic laccase–mediator systems enabled efficient starch oxidation using oxygen as terminal oxidant, providing functionalized starches for bio-based adhesives. These studies demonstrate the potential of targeted polysaccharide engineering towards sustainable high-performance materials.
The federal state of Lower Austria (BioSet-project) and the Österreichische Forschungsförderungsgesellschaft mbH (FFG, BRIDGE No. 898905) are acknowledged for financial support.

INFLUENCE OF HARVEST YEAR AND SOIL PROTECTION TECHNOLOGY ON STARCH CONTENT IN CORN GRAIN

IVAN ŠVEC[a], MICHAELA HAVRLENTOVÁ*[b,c], DANIEL JÁNOŠKA[c], KATARÍNA HRČKOVÁ[b], MARCELA SLUKOVÁ[a]

[a]University of Chemistry and Technology Prague, Technická 5, 166 28 Prague 6, Czech Republic
[b]National Agricultural and Food Centre, Division of Plant Production, Hlohovecká 2, 951 41 Lužianky, Slovak Republic
[c]Faculty of Natural Sciences, University of SS. Cyril and Methodius in Trnava, 917 01 Trnava, Slovak Republic
michaela.havrlentova@nppc.sk,
michaela.havrlentova@ucm.sk

During field experiments 2023–2025 in the West Slovakia, corn hybrid 'DKc 4391' was bred under 1 standard and 3 soil tillage technologies (STT; soil protection regimes): CONventional vs. MINimalized, MULch, and NO-Tillage one. Statistically processed meteorology data revealed microclimatic anomalies as a precipitation surplus (2024) and an early-summer droughts (2025). The 3-year mean starch content was 76.60 ± 2.00%, correlated tightly to both year climate and single STT. Under CON, climate-induced stress lowered starch content to 72.80%; the MUL buffered it above 76.50% in all 3 years. This work was supported by the Slovak Ministry of Agriculture and Rural Development R&D Project "PRUPEP".

CARBOHYDRATE ENGINEERING IN SWEET OAT-BASED BISCUITS

NHAT MINH TA, THI THAO LE, XIN QI*, RICHARD TESTER

Glycologic Limited, Lamb's Farm Business Park, Swallowfield, Reading, RG7 1PQ, UK
e.qi@glycologic.co.uk

Oat flour-based biscuits (50 g) containing maize, tapioca, or waxy maize starch were evaluated for sustained glucose release in healthy volunteers (10 male and 10 female). Average blood glucose concentrations remained above baseline for 136, 167, and 173 min, respectively, and above 5.0 mmol/L for 270 min across all formulations. At 5.3 mmol/L, glucose remained elevated for up to 180 min with maize and waxy maize and 270 min with tapioca starches. These data indicate that carbohydrate digestion and glucose release may extend beyond the two-hour period typical for glycaemic index (GI) determinations.

TUNING STRUCTURE TO CONTROL FUNCTION: POLYSACCHARIDE HYDROGEL MICROCARRIERS FOR PHYTOCHEMICAL PROTECTION AND DELIVERY

MARTA TSIRIGOTIS-MANIECKA*

Laboratory of Bioproducts Technology, Department of Engineering and Technology of Chemical Processes, Wroclaw University of Science and Technology, Wybrzeze Wyspianskiego 29, 50-370 Wroclaw, Poland
marta.tsirigotis@pwr.edu.pl

For many years, polysaccharide-based matrices have been considered rather passive carriers. However, by tuning their composition, charge, gelation and interfacial interactions, these carriers can be engineered to respond to their environment. From pH-responsive polyelectrolyte coatings to multilayer and lipid-hydrogel systems, the studies presented here show how carbohydrate-based interfaces govern molecular transport, protect bioactives under stress and improve their bioaccessibility, positioning polysaccharides as active elements of functional material design.
This research was supported by a subsidy provided by the Ministry of Higher Education (Poland) to the Wrocław University of Science and Technology.

SACCHARIDE INTERACTIONS WITH FUNCTIONALIZED POLYURETHANE AND THEIR RELEVANCE TO BACTERIAL ADHESION

TEREZA TUTKOVÁ[a], DENYS BIRIUKOV*[a,b]

[a]*National Centre for Biomolecular Research, Faculty of Science, Masaryk University, Kamenice 753/5, 625 00 Brno, Czech Republic*
[b]*Central European Institute of Technology, Masaryk University, Kamenice 753/5, 625 00 Brno, Czech Republic*
biriukov@sci.muni.cz

All-atom molecular dynamics and free energy calculations were used to assess saccharide binding to polyurethane implant-coating models functionalized with oxygen-, nitrogen-, or fluorine-based groups. Representative monosaccharides served as proxies for surface-exposed glycans involved in early, nonspecific bacterial attachment. The results identify polyurethane modifications that strengthen or weaken binding, as well as saccharides with the greatest affinity, providing insight into early adhesion and guiding coating design to balance biocompatibility with resistance to bacterial adhesion.
This work was supported by the Czech Science Foundation (grant 26-20435S).

PHYTOCHEMICAL AND ANTIOXIDANT PROFILE OF ALKALINE FRACTIONS FROM WILD BLACKTHORN (*PRUNUS SPINOSA* L.)

IVETA UHLIARIKOVÁ*, ZUZANA KOŠŤAĽOVÁ, PETER CAPEK

Institute of Chemistry, Slovak Academy of Sciences, Dúbravská cesta 9, SK-845 38 Bratislava, Slovakia

Characterisation of the KOH-extractable fractions from wild blackthorn (*Prunus spinosa* L.) fruits revealed a diverse polysaccharide profile, including pectic domains (homogalacturonan and rhamnogalacturonan-I with arabinan/galactan side chains), glucuronoxylans, and glucomannans. Despite their high structural diversity, limited solubility restricted subfraction recovery and lowered antioxidant efficacy. Notably, the crude alkaline fraction exhibited the highest yield, the highest phenolic compound content, and the strongest antioxidant activity.
This work was supported by the Slovak Grant Agency VEGA (Grant No. 2/0108/26).

UTILIZATION OF MICROBUBBLES IN THE CULTIVATION OF *HAEMATOCOCCUS* AND *CHLORELLA* MICROALGAE FOR ASTAXANTHIN PRODUCTION

BERNADETA VACKOVÁ*[a], ALOK KUMAR PATEL[b], LEONIDAS MATSAKAS[b], IRENA JAROŠOVÁ KOLOUCHOVÁ[a]

[a]*University of Chemistry and Technology, Prague, Technická 5, 166 28 Prague 6, Czech Republic*
[b]*Luleå University of Technology, Sweden*
marikovb@vscht.cz

This study combines the optimization of *Haematococcus pluvialis* and *Chlorella zofingiensis* cultivation for astaxanthin production with innovative microbubble (MB) technology. In complex, polysaccharide-rich media where conventional aeration fails, MBs provide efficient, shear-free gas transfer. While baseline cultivations yielded peak astaxanthin concentrations of 207.79 mg/L and 97.67 mg/L, respectively, integrating MB technology opens new possibilities for enhancing gas saturation and facilitating subsequent biomass flotation.
This work was supported by the Internal Grant Agency of UCT Prague (grant no. A2_FPBT_2026_020).

DEVELOPMENT OF OXIDIZED CELLULOSE FROM NATIVE BRAZILIAN SPECIES FOR HEMOSTATIC FOAM APPLICATIONS

LARA VASCONCELLOS PONSONI*[a], MARCO BEAUMONT[b], FALK LIEBNER[b], MATHEUS VINICIUS GREGORY ZIMMERMANN[a]

[a]*UNESC - University of the Extreme Sul Catarinense (UNESC), Postgraduate Program in Science and*

Engineering Materials (PPGCEM), 88805-350, Criciúma, Brazil
[b]Christian Doppler Laboratory for Cellulose High-Tech Materials, BOKU University Vienna, Konrad-Lorenz-Strasse 24, A-3430 Tulln, Austria
ponsonilara@gmail.com

In this study, cellulose extracted from native Brazilian plant fibers is oxidized with periodate to produce dialdehyde cellulose (DAC). The resulting DAC is used to develop composite hemostatic foams with enhanced porosity and bioactivity for rapid hemorrhage control and wound healing. By combining cellulose with other biopolymers, this approach aims to overcome the limitations of current commercial hemostatic materials while promoting tissue regeneration. Furthermore, the study highlights the valorization of Brazil's native biodiversity for the development of high-value, sustainable biomaterials.

DELIGNIFICATION PRETREATMENT FOR ENHANCING EXTRACTABILITY OF HEMICELLULOSE FROM SPENT COFFEE GROUNDS AND COFFEE SILVERSKIN

ALEKSANDRA VOJVODIĆ CEBIN*, DANIJELA ŠEREMET, IVONA LONČAR, MARTA SVETINOVIĆ, DRAŽENKA KOMES

University of Zagreb Faculty of Food Technology and Biotechnology, Department of Food Technology and Engineering, Pierottijeva 6, 10000 Zagreb, Croatia
aleksandra.vojvodic@pbf.unizg.hr

Spent coffee grounds (SCG) and silverskin (CSS) are abundant coffee-processing by-products rich in cell-wall polysaccharides with valorization potential within a circular bioeconomy. This study evaluated enzymatic (laccase) and chemical (sodium chlorite/acetic acid) delignification as pretreatments for enhancing hemicellulose extractability. Chemical delignification increased total sugar extractability by 85% in SCG and 150% in CSS, whereas laccase showed negligible effects. Monomer profile revealed galactomannan-arabinogalactan as the dominant hemicellulose network in SCG and xylan/xyloglucan in CSS.
This study was financially supported through the Call for proposals of the Croatian Academy of Science and Arts Foundation for the year 2026, as well as the Croatian Science Foundation project ReUSECoffee4Food (IP-2025-02-6834).

DEVELOPING CELLULOSE-BASED SUSTAINABLE ALTERNATIVES FOR TITANIUM DIOXIDE IN PAINT COATING

LINH VU*, MUHAMMAD MUJTABA, KAISA MARJAMAA

VTT Technical Research Centre of Finland, P.O. Box 1000, Espoo, FI-02044 VTT, Finland
linh.vu@vtt.fi

White-coloured products across various industries including cosmetics, films, and plastics often employ titanium dioxide (TiO_2) as their primary opacifier. However, the increasing health and environmental concerns associated with TiO_2 have led to a growing interest in more sustainable alternatives, particularly cellulose. Specifically, cellulose morphology could be tailored to offer an enhanced scattering effect, making it a promising candidate as an opacifying agent. Hence, this study aims to develop cellulose-based materials to reduce or replace the use of TiO_2 in paint formulations through mechano-chemical and enzymatic treatments.

MICROBIAL LECTINS IN HOST–PATHOGEN INTERACTIONS: FROM GLYCAN RECOGNITION TO STRUCTURAL DIVERSITY

MICHAELA WIMMEROVÁ*

National Centre for biomolecular Research, Faculty of Science & CEITEC, Masaryk University, Kamenice 5, 625 00 Brno, Czech Republic
michaw@chemi.muni.cz

Microbial lectins recognize specific glycans on host cells and can play important roles in host–pathogen interactions. Our research focuses on the identification and structure-functional characterization of lectins from pathogenic bacteria and fungi. Selected examples will illustrate their remarkable diversity in glycan recognition. Particular attention will be given to a novel calcium-dependent lectin with unusual specificity for glycosaminoglycans, demonstrating how structural adaptations within a conserved lectin family can lead to fundamentally different binding properties.
Acknowledgment to the Czech Science Foundation (21-29622S) and CIISB, Instruct-CZ, funded by MEYS CR infrastructure project LM2023042 for access to the CEITEC Proteomics and Biomolecular Interactions and Crystallography Core Facilities.

CURRENT TRENDS AND IMPORTANT DIRECTIONS OF RESEARCH ON NATURAL POLYSACCHARIDES AND NUTRACEUTICAL FUNCTIONS

JIAN-YONG WU*[a,b]

[a]State Key Laboratory of Food Science and Resources and College of Food Science & Technology, Nanchang University (NCU), Jiangxi, China
[b]Department of Food Science and Nutrition, The Hong Kong Polytechnic University, Kowloon, Hong Kong (SAR of China)
jian-yong.wu@polyu.edu.hk

Natural polysaccharides have attracted steadily increasing research interest over the past several decades as renewable bioresources, functional food ingredients, and nutraceuticals with diverse health-promoting properties. Recent progress in this field is particularly evident in five interconnected areas. First, advanced analytical technologies, together with computational modeling, are enabling more precise elucidation of polysaccharide structures and structure–activity relationships. Second, accumulating evidence highlights the important roles of polysaccharides in immunomodulation, anti-inflammatory responses, metabolic regulation, and gut microbiota modulation, particularly through prebiotic effects and short-chain fatty acid production. Third, green and sustainable extraction technologies, including ultrasound-assisted, enzyme-assisted, microwave-assisted, and combined autoclave–ultrasound approaches, are

improving extraction yield, purity, functionality, and resource efficiency while facilitating the valorization of agricultural and food-processing by-products. Fourth, polysaccharide-based functional materials, such as hydrogels, edible films, active packaging materials, and drug delivery systems, are broadening their applications in food, nutrition, and biomedicine. Fifth, artificial intelligence, multi-omics, and high-throughput screening are emerging as powerful tools for predictive design, mechanistic understanding, and accelerated discovery of functional polysaccharides.
This work was supported financially by Nanchang University Research Start-up Fund (Project No. 28170288).

FROM SOLVATION TO RHEOLOGY: NON-MONOTONIC CONFORMATIONAL TRANSITIONS OF OKRA PECTIN IN WATER–GLYCEROL MIXTURES

GLEB E. YAKUBOV*[a], PALLAB KUMAR BORAH[b,c], JOSHUA E.S.J. REID[d], THOMAS MACCALMAN[d], VLAD DINU[d], JOHANNES HUNGER[e], MONA SARTER[f], DANIELA RUSSO[g], FRANCESCA NATALI[g], MICHAEL W. BOEHM[h], STEPHEN E. HARDING[d], MARTIN A.K. WILLIAMS[i], STEFAN K. BAIER[j]

[a]*Food Colloids and Bioprocessing Group, School of Food Science and Nutrition, University of Leeds, Leeds, LS2 9JT, United Kingdom*
[b]*Division of Physical Chemistry, Lund University, Naturvetarvägen 22, 22100, Lund, Sweden*
[c]*Heinz Maier-Leibnitz Zentrum, Technical University of Munich, Lichtenbergstraße 1, 85748, Germany*
[d]*School of Biosciences, University of Nottingham, Sutton Bonington Campus, LE12 5RD, United Kingdom*
[e]*Department of Molecular Spectroscopy, Max Planck Institute for Polymer Research, Mainz, 55128, Germany*
[f]*ISIS Neutron and Muon Source, STFC Rutherford Appleton Laboratory, Didcot, OX11 0QX, United Kingdom*
[g]*CNR-Istituto Officina dei Materiali and INSIDE@ILL, Institut Laue Langevin, Grenoble, 38042, France*
[h]*Motif FoodWorks Inc., 27 Drydock Avenue, Boston, MA, 02210, United States of America*
[i]*School of Fundamental Sciences, Massey University, Palmerston North, 4442, New Zealand*
[j]*School of Chemical Engineering, University of Queensland, Brisbane, QLD, 4072, Australia*
g.yakubov@leeds.ac.uk

Pectin is a structurally complex, highly hydrated polysaccharide. Here, high-molecular-weight okra pectin (*Abelmoschus esculentus*; $\geq 10^7$ g/mol) was used to examine how solvent environment influences conformation and viscoelasticity. Increasing glycerol concentration produced a non-monotonic response: chains initially swelled before collapsing at high glycerol fractions. Steady-shear, normal-stress and capillary-breakup extensional rheology revealed corresponding changes in bulk behaviour, demonstrating how preferential solvation propagates from molecular interactions to macroscopic material properties.
GEY thanks funding received from BBSRC (BBSRC Grant No. BB/T006404/1 and BB/W019639/1) and Motif FoodWorks. Abstract is part of published research: https://doi.org/10.1016/j.carbpol.2026.125726

PURIFICATION OF CELLOBIOSE UF-PERMEATE SOLUTION BY CONVENTIONAL ELECTRODIALYSIS AT ELEVATED TEMPERATURE

ONDŘEJ ZAPADLO, TOMÁŠ KOTALA*

MemBrain s.r.o., Pod Vinicí 87, Stráž pod Ralskem, 471 27
Ondrej.Zapadlo@membrain.cz

The effect of conventional electrodialysis at elevated temperature on demineralisation of the cellobiose UF-permeate solution was investigated. A series of pilot-scale electrodialysis trials using a two-compartment pilot-scale ED module with an effective membrane area of 4.8 m^2 were performed using RALEX® membranes. The performance parameters of the electrodialysis process operated at an elevated temperature were evaluated, as well as the losses of cellobiose caused by the ED process. The data were compared with results achieved by electrodialysis at standard, non-elevated temperature. The main benefit of the process at elevated temperature is a significant increase of specific capacity.
This work was carried out in the framework of the IP project supported by the Czech Ministry of Industry and Trade. Special thanks go to an industrial partner Savanna Ingredients GmbH & Co.KG for cooperation on the project and for providing a process solution.

BREAD CRUST BROWNING: A KINETIC STUDY UNDER CONTROLLED EXPERIMENTAL CONDITIONS

MARHARYTA ZHOVNARENKO[a], PHUONG HOANG[b], TOMÁŠ SVOBODA*[a], TOMÁŠ MOUCHA[b], MARCELA SLUKOVÁ[a], IVAN ŠVEC[a], TOMÁŠ HLAVATÝ[c]

[a]*University of Chemistry and Technology Prague, Department of Carbohydrates and Cereals, Technická 5, 166 28 Prague 6, Czech Republic*
[b]*University of Chemistry and Technology Prague, Department of Chemical Engineering, Technická 5, 166 28 Prague 6, Czech Republic*
tomas3.svoboda@vscht.cz

Bread crust colour is an important sensory parameter affecting the perceived quality of bread. Crust browning during baking is largely associated with Maillard reactions between reducing sugars and amino compounds, resulting in the formation of coloured products and aroma-active compounds. This study presents a controlled and repeatable laboratory baking methodology designed to investigate crust browning under standardized experimental conditions, together with original data describing heat exposure and browning kinetics during baking.
This work was supported by the Ministry of Agriculture of the Czech Republic within the Programme of the Ministry of Agriculture to Support Applied Research for the Period 2024–2032, ZEMĚ II (Project No. QL24010110: Reducing energy consumption in baking bread by optimizing the temperature regime using numerical models, correlations and artificial intelligence).

SELECTIVE DE-CROSSLINKING OF CELLULOSE FIBERS FOR IMPROVED TEXTILE RECYCLING

JOHANNA ZIEHER[a,b], BARBORA BENETKOVÁ[a,b], LUKAS FLIRI[a], ANTJE POTTHAST[a], THOMAS ROSENAU*[a,c], HUBERT HETTEGGER*[a,b]

[a]Institute of Chemistry of Renewable Resources, Department of Natural Sciences and Sustainable Resources, BOKU University, Muthgasse 18, A-1190 Vienna, Austria
[b]Christian Doppler Laboratory for Cellulose High-Tech Materials, BOKU University, Konrad-Lorenz-Strasse 24, A-3430 Tulln, Austria
[c]Laboratory of Natural Materials Technology, Faculty of Science and Engineering, Åbo Akademi University, Porthansgatan 3, 20500 Turku, Finland
hubert.hettegger@boku.ac.at,
thomas.rosenau@boku.ac.at

Chemical crosslinking is frequently used to reduce fibrillation and improve the durability of cellulose-based textiles. Unfortunately, covalent crosslinking restricts the dissolution and disintegration behavior, which often makes recycling more difficult. We investigated the reversibility of crosslinking of cellulosic material (including manmade lyocell fibers) with two common crosslinking agents, dimethyloldihydroxyethyleneurea (DMDHEU) and 1,3,5-triacryloylhexahydro-1,3,5-triazine (TAHT), and successfully preserved the cellulose structure. The overall dissolution behavior has been significantly improved.

MULTIDIMENSIONAL SOLID-STATE NMR OF INTACT FUNGAL POLYSACCHARIDES: FROM STRUCTURE TO FUNGAL CELL-WALL ARCHITECTURE

ALVIS ZVIRGZDINS[a,b], ANITRA ZILE[a,b], ALONS LENDS*[a]

[a]National Institute of Research and Innovation, Aizkraukles 21, Riga, Latvia
[b]Latvian University, Faculty of Medicine and Natural Sciences, Faculty of Medicine and Life Sciences, University of Latvia, Jelgavas Street 1, LV-1004, Riga, Latvia

In recent years, human infections and fatalities caused by pathogenic fungi have increased substantially. Fungal cell walls are essential for cellular function, environmental interactions, and antifungal treatment, and they are composed mainly of complex polysaccharides. The molecular architecture of fungal polysaccharides in the intact cell wall remains difficult to characterize at the atomic level. Here, we present state-of-the-art solid-state NMR with magic-angle spinning to investigate the structure, abundance, dynamics, and interactions of cell-wall polysaccharides in the human-pathogenic fungi *C. albicans* and *C. auris*.
This research is funded by the Latvian Council of Science, project No. lzp-2023/1-0312 "Characterisation of fungal cell wall architecture using solid-state nuclear magnetic resonance spectroscopy at fast spinning regime".

AUTHORS INDEX

SAMAA ABDULLAH 3, 15
ULADZISLAU E. AHARODNIKAU 12, 15
CHRISTOPHE ALBRECHTS 10, 15
MICHAL AMRANI 8, 15
IMEN AMRAOUI 9, 16
DAMLA AVCI 7, 10–11, 16, 25–26, 30
SEZİN BAŞ 10, 16
BISWAJIT BASU 8, 17
DENYS BIRIUKOV 9, 31
ROMAN BLEHA 7, 10–12, 16–17, 23, 25–26, 30
PALLAB KUMAR BORAH 5, 17, 33
ELSA BRANDÃO 5, 18
CARLA T. P. COELHO 7, 18
ALEXEI V. DEMCHENKO 7, 18
NIROSHA DILRUKSHI 4, 19
RALUCA DOBRE 8–10, 19, 26, 30
MARIE DOHNALOVÁ 10, 19
BARBORA DRIBŇÁKOVÁ 11, 19
ULRICA EDLUND 3, 20
JIHEN ELLEUCH 3, 20
LUISE ERNST 8, 20
PEDRO FARDIM 4, 20
BERNARDO A. C. FERREIRA 5, 21
MARTA FIEDOT 3, 21
NELA GERSPITZEROVÁ 10, 22, 30
DENIS GIGUÈRE 7, 22
SIMONA GILLAROVÁ 9, 22
DOROTA GUMUL 9, 23
RUNSHENG GUO 3, 23
YUMA HARADA 11, 16
JOVIN HASJIM 7, 23
MICHAELA HAVRLENTOVÁ 9, 30
HUBERT HETTEGGER 4, 34
BICH THUY HOANGOVÁ 11, 23
MIHAELA CHIOREAN 4, 18
MEHDI IBRAHIMOV 10, 23
CHRISTOPHER IGWE IDUMAH 8, 24
BRONWEN IVENS 4, 10, 24
PAUL JARA 9, 25
ADRIANNA KACZMARSKA-KRÓL 9, 25
HOUSSINE KHALILI 5, 12, 25
RAMLA KHIARI 4, 25
RASTISLAV KORMAN 7, 11–12, 16–17, 25–26, 30
KAROLINA KOZERSKA 10, 26
ALONS LENDS 7, 34
SIMON LEONHARTSBERGER 8–9, 26, 30
JACEK LEWANDOWICZ 8, 24
RICARDO MARÍN-SÁNCHEZ 10, 27
PAUL MARTEN 7, 27
ADÉLA MOCOVÁ 12, 27
SOFIA DE LEÃO RODRIGUES MOTA 11, 26
NILS MÜNSTERMANN 5, 7, 27–28
LOREDANA ELENA NITA 8, 22, 28
JOVANA OBRADOVIĆ 5, 28
CLÁUDIA P. PASSOS 7, 28
IZABELA PAWLACZYK-GRAJA 4, 28
TOKTAM PEDRAMRAD 9, 28
JUAN ESTEBAN REYES-CALDERÓN ... 9, 29
MARTINA RIHOVA 5, 29
ALINA GABRIELA RUSU 8, 22, 28
KOMATHY K. SANTHIL NATHAN 3, 29
PETRA SMRČKOVÁ 7, 10, 16, 29–30
MAREK SOGEL 7, 11, 16, 25–26, 30
CHRISTIAN STANETTY 8–10, 19, 26, 30
DOMINIKA ŠPAČKOVÁ 10, 22, 30
RICHARD TESTER 4, 31
MARTA TSIRIGOTIS-MANIECKA 4, 31
IVETA UHLIARIKOVÁ 9, 31
BERNADETA VACKOVÁ 12, 27, 31
LARA VASCONCELLOS PONSONI 12, 31
ALEKSANDRA VOJVODIĆ CEBIN 11, 32
LINH VU 9, 32
MICHAELA WIMMEROVÁ 4, 32
JIAN-YONG WU 3, 32
GLEB E. YAKUBOV 5, 17, 33
ONDŘEJ ZAPADLO 11, 33
MARHARYTA ZHOVNARENKO 11, 33