

Carbohydrate Polymers

Volume 91, Issue 1, Pages 1-476 (2 January 2013)

A comparative study of the anticoagulant activities of eleven fucoidans

Original Research Article

Pages 1-6

Weihua Jin, Quanbin Zhang, Jing Wang, Wenjing Zhang

Highlights

► Samples differed only with respect to the molecular weight were obtained. ► Samples differed with respect to the content of galactose were obtained. ► The effect of molecular weight on anticoagulant activity is elucidated. ► The effect of the content of galactose on anticoagulant activity is elucidated.

Fabrication and properties of chitin/hydroxyapatite hybrid hydrogels as scaffold nano-materials

Original Research Article

Pages 7-13

Chunyu Chang, Na Peng, Meng He, Yoshikuni Teramoto, Yoshiyuki Nishio, Lina Zhang

Highlights

► Nano-hydroxyapatite (nHAP)/chitin nanocomposite hydrogels were prepared by a simple method. ► The biocompatible and nontoxic hybrid hydrogels showed potential application as scaffolds in tissue engineering. ► Compressive strength of the chitin hydrogel was enhanced about 10 times by introducing nHAP.

Characterization of conducting cellulose acetate based polymer electrolytes doped with “green” ionic mixture

Original Research Article

Pages 14-21

S. Ramesh, R. Shanti, Ezra Morris

Highlights

► Deep eutectic solvent improves the ionic conductivity. ► Samples have the ability to retain conductivity over 30 days of storage time. ► The DES-plasticized sample is found to be more heat-stable compared to pure CA.

Bacterial exopolysaccharide based nanoparticles for sustained drug delivery, cancer chemotherapy and bioimaging

Original Research Article

Pages 22-32

Sreejith Raveendran, Aby C. Poullose, Yasuhiko Yoshida, Toru Maekawa, D. Sakthi Kumar

Highlights

► We made extremophilic bacterial polysaccharide based nanoparticles for first time. ► Developed for drug delivery, cancer therapy and bioimaging. ► Using mauran extracted from *Halomonas maura*. ► Introduced mauran as a novel, stable and versatile biomaterial to nanotechnology. ► Biocompatible bacterial polysaccharide nanoparticles for sustained drug delivery.

Free radical scavenging and immunomodulatory activities of *Ganoderma lucidum* polysaccharides derivatives

Original Research Article

Pages 33-38

Jianguo Wang, Yutang Wang, Xuebo Liu, Yahong Yuan, Tianli Yue

Highlights

► Free radical scavenging activities of *Ganoderma lucidum* polysaccharides were studied. ► *Ganoderma lucidum* polysaccharides can eliminate the immune inhibition effect of 5-Fu. ► Polysaccharides derivatives can increase the mouse thymus and spleen index of mice. ► Polysaccharides derivatives increased the content of SOD and GSH content of mouse.

Corn starch granules with enhanced load-carrying capacity via citric acid treatment

Original Research Article

Pages 39-47

Jong-Yea Kim, Kerry C. Huber

Highlights

► Starch load carrying capacity (LCC) was at least doubled by citric acid treatment. ► Recovery of granular starch after treatment was as high as 92% (low starch loss). ► Starch leaching from granules (enlargement of granule cavity spaces) enhanced LCC. ► Partial disruption of the native granule crystalline structure also enhanced LCC. ► Citric acid-treated starch is not equivalent to typical acid (HCl)-modified starch.

Development and evaluation of 5-fluorouracil loaded chitin nanogels for treatment of skin cancer

Original Research Article

Pages 48-57

M. Sabitha, N. Sanoj Rejinold, Amrita Nair, Vinoth-Kumar Lakshmanan, Shantikumar V. Nair, R. Jayakumar

Highlights

► Stable 5-fluorouracil-loaded chitin nanogel (120–140 nm) was developed. ► FCNGs have almost same steady state flux as control 5-FU by skin permeation study. ► FCNGs retained in deeper layers of skin as 4–5 times more than 5-FU. ► More uptake and higher toxicity on melanoma, sparing the normal fibroblast cells. ► Histopathology showed no inflammatory signs by cationically charged FCNGs.

Trimethyl and carboxymethyl chitosan carriers for bio-active polymer–inorganic nanocomposites

Original Research Article

Pages 58-67

Georg Geisberger, Emina Besic Gyenge, Caroline Maake, Greta R. Patzke

Highlights

► Synthesis and characterization of new POM–TMC nanocomposites. ► Biopolymer-dependent properties of POM–TMC vs. POM–CMC nanoparticles. ► Investigation of POM–TMC cellular uptake pathways. ► Anticancer properties of POM–TMC composite with productive TMC matrix effect.

***Atractylodis macrocephalae* Koidz. polysaccharides enhance both serum IgG response and gut mucosal immunity**

Original Research Article

Pages 68-73

Feng Xie, Kedsirin Sakwiwatkul, Cenrong Zhang, Yueming Wang, Lijuan Zhai, Songhua Hu

Highlights

► *Atractylodis macrocephalae* Koidz. polysaccharide (RAMPS) is an oral adjuvant. ► Oral administration of RAMPS enhances gut mucosal immunity in mice. ► Serum specific IgG response is high in mice with enhanced gut mucosal immunity by RAMPS. ► Serum specific IgG response is low in mice without enhanced gut mucosal immunity. ► RAMPS-enhanced serum IgG response is associated with enhanced gut mucosal immunity.

Removal of anionic dyes from aqueous solutions by an ion-exchanger based on pullulan microspheres

Original Research Article

Pages 74-84

Marieta Constantin, Ionela Asmarandei, Valeria Harabagiu, Luminita Ghimici, Paolo Ascenzi, Gheorghe Fundueanu

Highlights

► A new biodegradable adsorbent was obtained by grafting reaction onto pullulan. ► Grafted pullulan was transformed in microspheres by suspension crosslinking method. ► Small size and high porosity confer to microspheres excellent adsorption properties. ► Adsorbent had good adsorption properties independent of the pH of aqueous medium. ► This strong basic exchanger could be used to remove dyes from textile effluents.

Rice starch vs. rice flour: Differences in their properties when modified by heat–moisture treatment

Original Research Article

Pages 85-91

Santhanee Pucha-arnon, Dudsadee Uttapap

Highlights

► Heat–moisture treatment (HMT) of rice starch and rice flour was studied. ► HMT had a much greater effect on the paste viscosity of flour than that of starch. ► HMT had stronger effects on gel and thermal properties of rice flour. ► Removal of protein from HMT flours resulted in higher paste viscosity. ► Protein played an important role in affecting properties of HMT products.

Sulfated chitosan as tear substitute with no antimicrobial activity

Original Research Article

Pages 92-99

Natália R. Pires, Pablyana L.R. Cunha, Jeanny S. Maciel, Alysson L. Angelim, Vania M.M. Melo, Regina C.M. de Paula, Judith P.A. Feitosa

Highlights

► Chitosan, an important material in ophthalmological research, was sulfated (CS). ► The sulfation leads to a viscous material, water soluble in neutral medium. ► CS is adequate as tear substitute, which is needed by up to 30% of world population. ► The antimicrobial activity was not observed and differed from previous study. ► CS must have low molecular weight/low sulfation degree to give antimicrobial effect.

κ -Carrageenan hydrogel nanocomposites with release behavior mediated by morphological distinct Au nanofillers

Original Research Article

Pages 100-109

Ana M. Salgueiro, Ana L. Daniel-da-Silva, Sara Fateixa, Tito Trindade

Highlights

► κ -Carrageenan/Au hydrogel nanocomposites for drug delivery applications. ► Au NPs affect hydrogel strength, microstructure and mechanism of drug release. ► Release profile depend on the morphology of the Au NPs used as nanofillers.

Interactions with β -cyclodextrin as a way for encapsulation and separation of camphene and fenchene

Original Research Article

Pages 110-114

Magdalena Ceborska, Monika Asztemborska, Roman Luboradzki, Janusz Lipkowski

Highlights

► The complexes of 2 isomeric monoterpenes with β -cyclodextrin were obtained. ► The monocrystal of β -cyclodextrin/fenchene was studied by X-ray crystallography. ► New method of separation of isomeric monoterpenes is being proposed.

Facile and durable antimicrobial finishing of cotton textiles using a silver salt and UV light

Original Research Article

Pages 115-127

Marek Kozicki, Elżbieta Sasiadek, Marek Kołodziejczyk, Justyna Komasa, Agnieszka Adamus, Waldemar Maniukiewicz, Aleksandra Pawlaczyk, Małgorzata Szyrkowska, Jacek Rogowski, Edward Rybicki

Highlights

► Antimicrobial finishing of cotton textiles using silver salt and UV light is shown. ► Samples act against *E. coli*, *B. subtilis* and *S. aureus*. ► Inhibition of bacteria's proliferation increase after multiple washes of samples. ► Samples are resistant to 50 washes.

Structure characterization of an exopolysaccharide produced by *Bifidobacterium animalis* RH

Original Research Article

Pages 128-134

Nan Shang, Rihua Xu, Pinglan Li

Highlights

► EPSb was purified from *B. animalis* RH, which was isolated from centenarian feces. ► The predicted monomer structure of EPSb was ► EPSb has ring- or worm-like morphologies and the non-triple helical conformation.

Blends of cross-linked high amylose starch/pectin loaded with diclofenac

Original Research Article

Pages 135-142

Grazielle Arantes Soares, Ana Dóris de Castro, Beatriz S.F. Cury, Raul C. Evangelista

Highlights

► Diclofenac was incorporated in cross-linked high amylose starch–pectin mixtures by soaking. ► Microparticles properties were evaluated by particle size, rheological, thermal and X-ray diffraction analysis. ► Thermal stability, crystallinity and the strength of structures were influenced by both drug loading and polymer proportion.

N,O6-partially acetylated chitosan nanoparticles hydrophobically-modified for controlled release of steroids and vitamin E

Original Research Article

Pages 143-151

Javier Pérez Quiñones, Kurt Vesterager Gothelf, Jørgen Kjems, Ángeles María Heras Caballero, Claudia Schmidt, Carlos Peniche Covas

Highlights

► N,O-acetylchitosan was linked to steroids and vitamin E for controlled release. ► Resulting conjugate formed self-assembled nanoparticles in aqueous solution. ► Almost constant release rates were observed during the first 6–8 h. ► Brassinosteroids-modified nanoparticles showed good agrochemical activity. ► Tocopheryl-modified nanoparticles exhibited antioxidant activity in DPPH test.

Synthesis of chitosan-stabilized gold nanoparticles by atmospheric plasma

Original Research Article

Pages 152-156

Yong Jin, Zepeng Li, Lijuan Hu, Xiaowen Shi, Weimin Guan, Yumin Du

Highlights

► Chitosan stabilized gold nanoparticles are prepared by atmospheric plasma. ► Shape and size of gold nanoparticles vary with the ratio of chitosan to H₂AuCl₄. ► Treatment time by plasma also affects the shape and size of gold nanoparticles. ► Moisture in air produces active ingredients as reducing agents during discharge.

Direct saccharification and ethanol fermentation of cello-oligosaccharides with recombinant yeast

Original Research Article

Pages 157-161

Xianxiang Liang, Takashi Yoshida, Toshiyuki Uryu

Highlights

► Ethanol was produced directly from cello-oligosaccharides at good rates. ► A recombinant laboratory yeast expressing β -glucosidase, pYBGA1, was used. ► The direct saccharification and fermentation mechanism was revealed by HPLC.

Microwave synthesis of cellulose/CuO nanocomposites in ionic liquid and its thermal transformation to CuO

Original Research Article

Pages 162-168

Ming-Guo Ma, Shao-Jun Qing, Shu-Ming Li, Jie-Fang Zhu, Lian-Hua Fu, Run-Cang Sun

Highlights

► Cellulose/CuO nanocomposites were successfully prepared. ► A green strategy of microwave-assisted ILs method was developed. ► The heating time had an effect on the shape of products. ► The influence of the ratio of cellulose solution to ILs on the products was discussed. ► CuO materials were obtained by thermal treatment of the nanocomposites.

Novel bio-antifelting agent based on waterborne polyurethane and cellulose nanocrystals

Original Research Article

Pages 169-174

Qun Zhao, Gang Sun, Kelu Yan, Aojia Zhou, Yixiu Chen

Highlights

► A novel cellulose nanocomposites is proposed for antifelting finish. ► The nanocrystal films were applied onto surfaces of wools by a pad-dry-cure process. ► Adding 1% cellulose nanocrystals can decrease 44% use of antifelting agent. ► Cellulose nanocrystals can react with the groups of wool. ► The tensile strength of the fabric was increased by 14.95%.

Pectic-oligosaccharides prepared by dynamic high-pressure microfluidization and their *in vitro* fermentation properties

Original Research Article

Pages 175-182

Jun Chen, Rui-hong Liang, Wei Liu, Ti Li, Cheng-mei Liu, Shuang-shuang Wu, Zhao-jun Wang

Highlights

► Pectic-oligosaccharide (POS) was prepared by dynamic high-pressure microfluidization. ► POS is superior to pectin and comparable to oligofructose in prebiotic effects. ► POS prepared by dynamic high-pressure microfluidization can be a useful prebiotic.

Network formation of nanofibrillated cellulose in solution blended poly(methyl methacrylate) composites

Original Research Article

Pages 183-190

Kuisma Littunen, Ulla Hippi, Tapio Saarinen, Jukka Seppälä

Highlights

► Injection moldable composites were prepared by solution blending of NFC and PMMA. ► Unmodified and PMMA-grafted NFC were compared. ► Percolating nanofibril network formed

between 1 and 5 wt.% NFC content. ► Grafted NFC protected the matrix polymer from degradation during melt processing.

Biochemical activities of 6-carboxy β -chitin derived from squid pens

Original Research Article

Pages 191-197

Jun Huang, Wan-wen Chen, Sheng Hu, Jing-Yan Gong, Hong-Wu Lai, Peng Liu, Le-he Mei, Jian-wei Mao

Highlights

► After TEMPO/NaBr/NaClO oxidation, the yield of T-chitin with carboxylate content of 2.08 mmol/g reached 74.55%. ► The highest bile acid binding capacity among four T-chitins reached 41.18 mg/g. ► EC₅₀ values of T-chitins against hydroxyl radicals were below 1.2 mg/mL. ► At 8 mg/mL, the maximum ferrous chelating effects of T-chitins reached 80.15%.

Optimization of chitosan and β -cyclodextrin molecularly imprinted polymer synthesis for dye adsorption

Original Research Article

Pages 198-208

George Z. Kyzas, Nikolaos K. Lazaridis, Dimitrios N. Bikiaris

Highlights

► Chitosan and β -cyclodextrin MIPs for selective separation of dyes. ► Effect of “polymer cookery” in selectivity and adsorption capacity. ► Adsorption capacity up to 35 mg/g for MIPs. ► Equilibrium, kinetic and thermodynamic parameters were calculated.

Mutational analysis and characterization of dextran synthesizing enzyme from wild and mutant strain of *Leuconostoc mesenteroides*

Original Research Article

Pages 209-216

Nadir Naveed Siddiqui, Afsheen Aman, Shah Ali Ul Qader

Highlights

► New strain of *Leuconostoc mesenteroides* was isolated. ► Mutagenesis was performed using UV method. ► An increased yield of dextranase was obtained from mutant strain. ► V_{\max} and K_m values of wild strain changed after mutation. ► Wild and mutant strain had same molecular weight of 221 kDa and mutation did not change the molecular weight.

β -Cyclodextrin-based oil-absorbent microspheres: Preparation and high oil absorbency

Original Research Article

Pages 217-223

Ci Song, Lei Ding, Fei Yao, Jianping Deng, Wantai Yang

Highlights

► High oil-absorbent microspheres were constructed with β -cyclodextrin derivative. ► The microspheres integrated the advantages of our earlier two oil-absorbents. ► The microspheres show high oil absorbency; fast absorption speed; good reusability.

The preparation and characterization of liquefied wood based primary fibers

Original Research Article

Pages 224-228

Jian Lin, Jun-Bo Shang, Guang-Jie Zhao

Highlights

► The primary fibers were prepared with different length/diameter ratio spinnerettes. ► Thermal stability and pore structure of primary fibers were improved. ► The formation of hydrogen bond resulting in the improvements was measured. ► The spinnerette system can be used to control the performance of primary fibers.

Extraction and characterization of nanocellulose structures from raw cotton linter

Original Research Article

Pages 229-235

João Paulo Saraiva Morais, Morsyleide de Freitas Rosa, Men de sá Moreira de Souza Filho, Lidyane Dias Nascimento, Diego Magalhães do Nascimento, Ana Ribeiro Cassales

Highlights

► We present a procedure for extraction of nanocellulose structures from raw cotton linter. ► The raw linter and nanocellulose structures were characterized. ► Pulping the raw linter is not required before the nanocellulose extraction. ► The nanostructures have properties significantly different from the raw linter. ► Using linter for nanocellulose extraction is an option for value addition to this textile by-product.

Chitosan–caffeic acid–genipin films presenting enhanced antioxidant activity and stability in acidic media

Original Research Article

Pages 236-243

Cláudia Nunes, Élia Maricato, Ângela Cunha, Alexandra Nunes, José A. Lopes da Silva, Manuel A. Coimbra

Highlights

- ▶ Methodology optimization to link caffeic acid by a radical mechanism to chitosan. ▶ Films preparation of chitosan grafted with caffeic acid and cross-linked with genipin. ▶ Developed films had higher antioxidant activity and low solubility in acid pH than the pristine films. ▶ These films can be promising to be used as active materials in acidic media.

Development and *in vitro* evaluation of coated pellets containing chitosan to potential colonic drug delivery

Original Research Article

Pages 244-252

Priscileila Colerato Ferrari, Fagner Magalhães Souza, Leandro Giorgetti, Giselle Faria Oliveira, Humberto Gomes Ferraz, Marco Vinícius Chaud, Raul Cesar Evangelist

Highlights

- ▶ The coating and the presence of chitosan in pellets affected the drug release. ▶ The presence of chitosan in pellets interfered with the drug intestinal absorption. ▶ The drug release from the coated pellets follows a complex release mechanism. ▶ Extrusion–spheronization technique is used to preparation of pellets in larger scale.

Plasticized-starch/poly(ethylene oxide) blends prepared by extrusion

Original Research Article

Pages 253-261

Fang Yu, Kalappa Prashantha, Jeremie Soulestin, Marie-France Lacrampe, Patricia Krawczak

Highlights

- ▶ This paper report for the first time the elaboration of plasticized-starch/PEO using extrusion.
- ▶ The addition of PEO greatly improves the processability of plasticized-starch. ▶ Thanks to a synergy effect, the blend has higher stiffness than both plasticized-starch and PEO.

Antioxidant activity and potential hepatoprotective effect of polysaccharides from *Cyclina sinensis*

Original Research Article

Pages 262-268

Changxing Jiang, Qingping Xiong, Dan Gan, Yunpeng Jiao, Jing Liu, Liping Ma, Xiaoxiong Zeng

Highlights

► There were α -type glycosidic linkages in CSPS-1 and CSPS-2. ► Average molecular weights of CSPS-1, CSPS-2 and CSPS-3 were 69, 81 and 101 kDa, respectively. ► CSPS exhibited high antioxidant activities *in vitro*. ► CSPS exhibited a significant protective effect against CCl_4 -induced acute hepatotoxicity in mice.

Long-alkane-chain modified *N*-phthaloyl chitosan membranes with controlled permeability

Original Research Article

Pages 269-276

Chao Chen, Shuming Tao, Xiaoyun Qiu, Xueqin Ren, Shuwen Hu

Highlights

► Acylated chitosan was synthesized using *N*-phthaloyl chitosan as an intermediate. ► The solubility of acylated chitosan has been improved significantly. ► The hydrophobicity of acylated chitosan has been improved significantly. ► The permeability of acylated chitosan membranes could be tuned by adjusting DS.

Synthesis and urea sustained-release behavior of an eco-friendly superabsorbent based on flax yarn wastes

Original Research Article

Pages 277-283

Yong Zhang, Fang Wu, Lin Liu, Juming Yao

Highlights

► Superabsorbent composite is synthesized from biological waste of textile industry. ► Homogeneous graft copolymerization in a low-cost NaOH/urea solution. ► The product is amphoteric with excellent urea loading and release capability. ► The superabsorbent composite is biodegradable and environment-friendly.

Polycaprolactone and polycaprolactone/chitosan nanofibres functionalised with the pH-sensitive dye Nitrazine Yellow

Original Research Article

Pages 284-293

Lien Van der Schueren, Thierry De Meyer, Iline Steyaert, Özgür Ceylan, Karen Hemelsoet, Veronique Van Speybroeck, Karen De Clerck

Highlights

► pH-sensitive PCL and PCL/chitosan nanofibres are successfully electrospun. ► pH-sensitive PCL and PCL/chitosan nanofibres show a clear halochromic response. ► Chitosan addition results in a significantly increased water sorption. ► Chitosan addition is indispensable for a sensitive and rapid response. ► Theoretical modelling on the dye–polymer interactions underpins the experimental findings.

Amphoteric amylopectin: A novel polymeric flocculant

Original Research Article

Pages 294-299

Ram Prakash Singh, Sagar Pal, Vijay Kumar Rana, Soumitra Ghorai

Highlights

► A novel polymeric flocculant has been synthesized. ► The flocculant is controlled biodegradable and based on amphoteric amylopectin. ► Amphoteric amylopectin prepared by microwave processing is the best. ► This flocculant can remove both positively and negatively charged contaminants.

High production of cellulose degrading endo-1,4-β-D-glucanase using bagasse as a substrate from *Bacillus subtilis* KIBGE HAS

Original Research Article

Pages 300-304

Saeeda Bano, Shah Ali Ul Qader, Afsheen Aman, Mohammad Noman Syed, Kamran Durrani

Highlights

► Bagasse was used as a source for the production of cellulose degrading enzyme. ► Maximum production of endo-1,4-β-d-glucanase was obtained at pH 7.0. ► Maximum endo-1,4-β-d-glucanase production was obtained after 48 h incubation. ► Endo-1,4-β-d-glucanase showed its

activity in wide temperature range with optimum of 60 °C. ► Ammonium nitrate was used as a nitrogen source for maximum enzyme production.

Glutaraldehyde–chitosan and poly (vinyl alcohol) blends, and fluorescence of their nano-silica composite films

Original Research Article

Pages 305-313

Huawen Hu, John H. Xin, Hong Hu, Allan Chan, Liang He

Highlights

► Fluorescent poly (vinyl alcohol) based blends and nanocomposites were prepared. ► The GA–chitosan and nano-silica were found to decrease the PVA crystallinity. ► The fluorescent property had a relationship with the polymer crystallinity. ► The enhanced fluorescence was found when decreasing the polymer crystallinity. ► The improved water and heat resistances were achieved by doping of the nano-silica.

Structural investigation of water-soluble polysaccharides extracted from the fruit bodies of *Coprinus comatus*

Original Research Article

Pages 314-321

Bo Li, Justyna M. Dobruchowska, Gerrit J. Gerwig, Lubbert Dijkhuizen, Johannis P. Kamerling

Highlights

► We separated five fractions from water-soluble polysaccharide of *Coprinus comatus*. ► One fraction contained the disaccharide α,α -trehalose. ► Three fractions were two α -1,4-glucan with ~10% branching at C-6 and a β -1,6-glucan. ► One fraction was α -1-fuco- α -d-galactan with pentasaccharide repeating units. ► Structural information will help to explain hypoglycemic activity of the polysaccharide.

Fe₃O₄/cyclodextrin polymer nanocomposites for selective heavy metals removal from industrial wastewater

Original Research Article

Pages 322-332

Abu Zayed M. Badruddoza, Zayed Bin Zakir Shawon, Wei Jin Daniel Tay, Kus Hidajat, Mohammad Shahab Uddin

Highlights

► CD polymer grafted magnetic nanoparticles are used for selective heavy metals removal. ► CD polymer grafted on MNP enhances the metal uptake due to its complexation ability. ► The adsorption affinity is in the order of $\text{Pb}^{2+} > \text{Cd}^{2+} > \text{Ni}^{2+}$ in single-metal system. ► CDpoly-MNPs can preferentially adsorb Pb^{2+} ions in multi-metal system. ► Adsorption mechanism, desorption and reusability of CDpoly-MNPs has been explored.

Synthesis and photobiocidal properties of cationic porphyrin-grafted paper

Original Research Article

Pages 333-338

Jean-Pierre Mbakidi, Klara Herke, Sandra Alvès, Vincent Chaleix, Robert Granet, Pierre Krausz, Stéphanie Leroy-Lhez, Tan-Sothea Ouk, Vincent Sol

Highlights

► Develop a novel antimicrobial paper. ► Cellulosic paper grafted with photosensitizers by covalent bonding using triazine. ► Strategy avoids preliminary chemical modification of the cellulosic material. ► Strong photoantibacterial activity against *S. aureus* and *E. coli*.

The mechanism of thermal activated radical formation in potato starch studied by electron paramagnetic resonance and Raman spectroscopies

Original Research Article

Pages 339-347

Maria Łabanowska, Aleksandra Weselucha-Birczyńska, Magdalena Kurdziel, Katarzyna Sepioło

Highlights

► Structures of thermally generated radicals in potato starch and in its fractions. ► Stable carbon-centered radicals as intermediate steps in starch thermal degradation. ► Insight into bonds cleavage in polysaccharides molecules.

Green, microwave-assisted synthesis of silver nanoparticles using bamboo hemicelluloses and glucose in an aqueous medium

Original Research Article

Pages 348-355

Hong Peng, Anshu Yang, Jianghua Xiong

Highlights

▶ A green, microwave-assisted method of synthesizing silver particles was developed. ▶ Bamboo hemicelluloses and glucose were used as stabilizer and reducer, respectively. ▶ The spherical, nanometer-sized particles formed. ▶ The reaction parameters significantly affected the formation of silver nanoparticles. ▶ The whole procedure was rapid and eco-friendly.

Statistics-based optimization of the extraction process of kelp polysaccharide and its activities

Original Research Article
Pages 356-362
Ping Yu, Xiaoyin Chao

Highlights

▶ The extraction process of kelp polysaccharide was optimized using RSM. ▶ Effect of factors on the polysaccharide yield is depicted by a mathematical model. ▶ Kelp polysaccharide displays a strong antioxidative ability *in vitro*. ▶ Kelp polysaccharide of 0.25% increases the collagen biosynthetic activity by 86%. ▶ This study provides insight into further development of kelp polysaccharide.

Chemical modification of cotton fabrics for improving utilization of reactive dyes

Original Research Article
Pages 363-369
Long Fang, Xiaodong Zhang, Deshuai Sun

Highlights

▶ This work provides a novel method to modify cotton fabrics. ▶ The modified cotton could be dyed with reactive dyes in the absence of salt. ▶ The method is characterized by an easy and feasible operation. ▶ This work shows promising use in reactive dyeing.

Structural characterisation of a complex heteroglycan from the cyanobacterium *Nostoc commune*

Original Research Article
Pages 370-376
S. Jensen, B.O. Petersen, S. Omarsdottir, B.S. Paulsen, J.Ø. Duus, E.S. Olafsdottir

Highlights

- ▶ A complex high MW heteroglycan was isolated from the cyanobacterium *Nostoc commune*.
- ▶ Nc-5-s is composed of eleven different monosaccharides including both acidic and OMe-units.
- ▶ Detailed structural characterisation of Nc-5-s using NMR spectroscopy. ▶ The results provide crucial data for future studies of cyanobacterial polysaccharides.

Morphology and thermal properties of PLA–cellulose nanofibers composites

Original Research Article

Pages 377-384

Adriana N. Frone, Sophie Berlioz, Jean-François Chailan, Denis M. Panaitescu

Highlights

- ▶ We isolated nanofibers from microcrystalline cellulose by acid hydrolysis. ▶ We emphasized the dispersion of cellulose nanofibers by ScanAsyst AFM. ▶ Nanolevel characteristics were explored for the first time using AFM QNM technique. ▶ Silane treatment led to a difference of affinity between nanofibers and the matrix. ▶ It was demonstrated the role of cellulose nanofibers as nucleating agents.

Storage stability and antioxidant activity of complex of astaxanthin with hydroxypropyl- β -cyclodextrin

Original Research Article

Pages 385-389

Chao Yuan, Lei Du, Zhengyu Jin, Xueming Xu

Highlights

- ▶ Storage stability of the astaxanthin/hydroxypropyl- β -cyclodextrin inclusion complex was evaluated. ▶ Complexation improved the stability of astaxanthin under storage conditions. ▶ Antioxidant activity of the astaxanthin/hydroxypropyl- β -cyclodextrin inclusion complex was assayed. ▶ Complexation affected the antioxidant activity of astaxanthin.

Effect of glucosamine and chito oligomer on the toxicity of arsenite against *Escherichia coli*

Original Research Article

Pages 390-393

Meifang Fu, Caiqin Qin, Wei Li, Yongbin Yan, Lintao Zeng, Xinhe Yang

Highlights

The toxicity of arsenite on *E. coli* was studied by microcalorimetry. ► Glucosamine and the tested chitooligomer decreased the toxicity of arsenite. ► The effect of glucosamine was stronger than that of the chitooligomer. ► Glucosamine and the chitooligomer may be potential assistant antidote for arsenite.

Rheological and physical properties of spray-dried mucilage obtained from *Hylocereus undatus* cladodes

Original Research Article

Pages 394-402

E.E. García-Cruz, J. Rodríguez-Ramírez, L.L. Méndez Lagunas, L. Medina-Torres

Highlights

► The rheological behavior of reconstituted spray-dried mucilage was studied. ► The reconstituted mucilage exhibited non-Newtonian shear-thinning behavior. ► The steady-shear viscosity and dynamic response were correlated to the Cox–Merz rule. ► Mucilage recovers its elastic properties at concentrations of 7% and 8%. ► The viscous component G'' predominated over the elastic component G' .

Anti-metastatic and anti-angiogenic activities of sulfated polysaccharide of *Sepiella maindroni* ink

Original Research Article

Pages 403-409

Aizhen Zong, Ting Zhao, Yan Zhang, Xinlei Song, Yikang Shi, Hongzhi Cao, Chunhui Liu, Yanna Cheng, Xianjun Qu, Jichao Cao, Fengshan Wang

Highlights

► Previous study demonstrated that SIP-SII had antimetastatic activity *in vitro*. ► SIP-SII significantly inhibited melanoma metastasis *in vivo*. ► SIP-SII inhibited angiogenesis in chick chorioallantoic membrane assay. ► SIP-SII inhibited the expression of ICAM-1 and bFGF both *in vitro* and *in vivo*.

Modification and cross-linking parameters in hyaluronic acid hydrogels—Definitions and analytical methods

Original Research Article

Pages 410-418

Lennart Kenne, Suresh Gohil, Eva M. Nilsson, Anders Karlsson, David Ericsson, Anne Helander Kenne, Lars I. Nord Access Article

Highlights

► We define terms describing cross-linked HA hydrogels. ► A novel method for the analysis of cross-linker ratio of HA hydrogels is introduced. ► The method is applied on two different HA hydrogels.

Carbon nanotube-incorporated multilayered cellulose acetate nanofibers for tissue engineering applications

Original Research Article

Pages 419-427

Yu Luo, Shige Wang, Mingwu Shen, Ruiling Qi, Yi Fang, Rui Guo, Hongdong Cai, Xueyan Cao, Helena Tomás, Meifang Zhu, Xiangyang Shi

Highlights

► Multilayers of CS/MWCNTs and CS/ALG can be successfully assembled onto the surface of CA nanofibers. ► Multilayer assembly of CS/MWCNTs and CS/ALG leads to increased surface roughness of the CA nanofibers. ► Incorporation of MWCNTs enables improved mechanical property of the multilayered CA fibrous scaffolds. ► Multilayered CA fibrous scaffolds incorporated with MWCNTs tend to promote fibroblast attachment, spreading, and proliferation. ► Hemocompatibility of CA nanofibers does not have significant changes after the assembly of multilayers.

Controllable antioxidative xylan–chitosan Maillard reaction products used for lipid food storage

Original Research Article

Pages 428-433

Xiaoxia Li, Xiaowen Shi, Yong Jin, Fuyuan Ding, Yumin Du

Highlights

► The xylan–chitosan MRPs tended to protect the peroxidation of lecithin liposome induced by AAPH. ► Fresh pork treated by the early xylan–chitosan MRPs retarded lipid oxidation and microbial spoilage during refrigerated storage. ► The antioxidant behavior of MRPs depended not only on the antioxidant substances, but also on the interaction of the food systems.

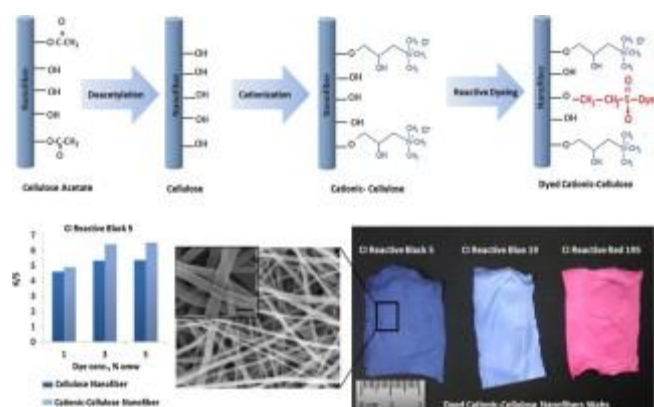
Cationic-cellulose nanofibers: Preparation and dyeability with anionic reactive dyes for apparel application

Original Research Article

Pages 434-443

Zeesan Khatri, Gopiraman Mayakrishnan, Yuichi Hirata, Kai Wei, Ick-Soo Kim

Graphical abstract



Highlights

► Cationic-cellulose nanofibers have been prepared via electrospinning and post-treatment. ► Cellulose nanofibers were cationized to form cationized-cellulose nanofibers and then dyed with anionic reactive dyes. ► Cationization of cellulose nanofibers enhanced dye color yield without electrolyte addition. ► Very good color yields, colorimetric and color fastness results were achieved. ► It has opened a new door for producing fascinating nanofibers for use as regular apparel and fashion.

Characterisation of large scale structures in starch granules via small-angle neutron and X-ray scattering

Original Research Article

Pages 444-451

James Douch, Elliot P. Gilbert

Highlights

► SAXS and SANS conducted on variety of starches in dry and hydrated state. ► Use of two radiation sources allowed selected structural regions to be highlighted. ► Structures detected in dry starches consistent with small blocklets or superhelices. ► Structures detected when hydrated consistent with growth rings, large blocklets.

Biomedical applications of carboxymethyl chitosans

Review Article

Pages 452-466

Laxmi Upadhyaya, Jay Singh, Vishnu Agarwal, Ravi Prakash Tewari

Highlights

► Carboxymethyl chitosan, a multi functional polymer derivative of chitosan. ► Synthesis characterization and physiochemical properties of carboxymethyl chitosan. ► Carboxymethyl chitosan-based systems for biomedical applications. ► Application in drug delivery, wound healing, tissue engineering, and gene therapy.

A sulfated polysaccharide, fucans, isolated from brown algae *Sargassum vulgare* with anticoagulant, antithrombotic, antioxidant and anti-inflammatory effects

Original Research Article

Pages 467-475

Celina Maria P. Guerra Dore, Monique Gabriela das C. Faustino Alves, Luiza Sheyla E. Pofirio Will, Thiago G. Costa, Diego A. Sabry, Leonardo Augusto R. de Souza Rêgo, Camila M. Accardo, Hugo Alexandre O. Rocha, Luciana Guimarães A. Filgueira, Edda Lisboa Leite

Highlights

► A polysaccharide from algae *Sargassum vulgare* (SV1) possess higher anticoagulant activity.
► It promoted direct inhibition of thrombin enzymatic activity and stimulated the enzymatic activity of FXa. ► SV1 displays the scavenging activity on DPPH.

Editorial Board

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