

Carbohydrate Polymers

Volume 94, Issue 2, Pages 713-946 (15 May 2013)

Chitosan(PEO)/silica hybrid nanofibers as a potential biomaterial for bone regeneration

Original Research Article

Pages 713-722

Georgios Toskas, Chokri Cherif, Rolf-Dieter Hund, Ezzeddine Laourine, Boris Mahltig, Amir Fahmi, Christiane Heinemann, Thomas Hanke

Highlights

► Chitosan(PEO)/silica hybrid nanofibers were prepared by a stable sol–gel solution. ► The nanofibers presented a self-assembled core–shell structure. ► As-spun fibers were proved cytocompatible in bone-forming 7F2-cells and bioactive. ► The combined nanofibrous materials offer potential application in bone repair.

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Effects of anionic structure on the dissolution of cellulose in ionic liquids revealed by molecular simulation

Original Research Article

Pages 723-730

Yuling Zhao, Xiaomin Liu, Jianji Wang, Suojiang Zhang

Highlights

► Hydrogen bonds (HBs) were formed between anions and hydroxyl protons of cellulose. ► Cl^- anion and O atom of both $[\text{CH}_3\text{COO}]^-$ and $[(\text{CH}_3\text{O})_2\text{PO}_2]^-$ are better HB acceptors. ► HB interactions increase with increasing electronegativity of the HB acceptors. ► HB interactions decrease with increasing chain length due to the steric effect. ► Addition of electron-withdrawing group in anions decreases the HB formation ability.

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Extraction and chemical characterization of *Angelica sinensis* polysaccharides and its antioxidant activity

Original Research Article

Pages 731-736

Songtao Ai, Xindong Fan, Linfeng Fan, Qi Sun, Yu Liu, Xiaofeng Tao, Kerong Dai

Highlights

▶ ASP extraction procedure was optimized by an $L_9 (3^4)$ orthogonal array experimental design. ▶ CT perfusion imaging (CTP) analysis were done in CIR rabbits. ▶ ASP was found to decrease oxidative injury in CIR animals. ▶ Potent role of ASP in protection of brain oxidative injury in CIR animals.

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Influence of sericin/TiO₂ nanocomposite on cotton fabric: Part 1. Enhanced antibacterial effect

Original Research Article

Pages 737-748

S. Doakhan, M. Montazer, A. Rashidi, R. Moniri, M.B. Moghadam

Highlights

▶ Preparation of novel sericin/TiO₂ nanocomposite for application on textile. ▶ Stabilization of nanocomposite on cotton fabric using polycarboxylic acid. ▶ Obtaining enhanced antibacterial cotton fabric using sericin/TiO/CA or BTCA. ▶ Introducing synergistic antibacterial effect of nanocomposite.

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Structure and properties of cellulose/poly(*N*-isopropylacrylamide) hydrogels prepared by SIPN strategy

Original Research Article

Pages 749-754

Jing Wang, Xuesong Zhou, Huining Xiao

Highlights

▶ The cellulose-based hydrogels with various structures were prepared in LiCl/DAMc. ▶ Semi-interpenetrating polymer network (SIPN) strategy was employed to fabricate the hydrogels. ▶ The thermo-sensitivity was observed for the hydrogels consisting of cellulose and polyNIPAM. ▶ The swelling behaviors of the hydrogels depended on the dosage of the cross-linker.

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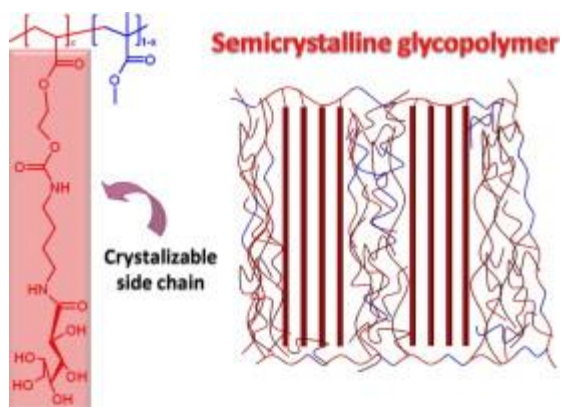
Amphiphilic polymers bearing gluconolactone moieties: Synthesis and long side-chain crystalline behavior

Original Research Article

Pages 755-764

María L. Cerrada, Vanesa Bordegé, Alexandra Muñoz-Bonilla, Orietta León, Rocío Cuervo-Rodríguez, Manuel Sánchez-Chaves, Marta Fernández-García

Graphical abstract



Highlights

► Amphiphilic carbohydrate polymers obtained from an unprotected glycomonomer and MMA. ► The kinetic behavior and copolymers structure fully characterized. ► Carbohydrate copolymers with high content of glycomonomer present crystalline order. ► Glycopolymers with high fraction of MMA display phase separation.

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Influence of citric acid and curing on moisture sorption, diffusion and permeability of starch films

Original Research Article

Pages 765-772

Erik Olsson, Mikael S. Hedenqvist, Caisa Johansson, Lars Järnström

Highlights

► Addition of citric acid to TPS reduces moisture content in films up to 70% RH. ► Addition of citric acid to TPS reduces the diffusion coefficient of water. ► Curing films with ≥ 20 pph citric acid reduce diffusion and moisture content at high RH. ► Possible to compare diffusion coefficient and moisture content with measured WVP.

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Characterization of cellulose II nanoparticles regenerated from 1-butyl-3-methylimidazolium chloride

Original Research Article

Pages 773-781

Jingquan Han, Chengjun Zhou, Alfred D. French, Guangping Han, Qinglin Wu

Highlights

► The crystalline structure of cellulose was converted from cellulose I–II with decreased crystallinity after a combined 1-butyl-3-methylimidazolium chloride [BMIM]⁺[Cl][−] and high pressure homogenation treatment. ► The regenerated cellulose II nanoelements had both elongated fiber and spherical structures. ► Measured length and width data of the elongated cellulose II nanoelements followed asymmetrical log-normal distributions. ► The cellulose II nanoelements had a two-step thermal pyrolysis process.

9□

Suspensions of vacuum-freeze dried starch nanoparticles: Influence of NaCl on their rheological properties

Original Research Article

Pages 782-790

Ai-min Shi, Li-jun Wang, Dong Li, Benu Adhikari

Highlights

► NaCl affected rheology of vacuum freeze dried starch nanoparticle (VFDSN) suspensions. ► The addition of NaCl was found to increase the viscosity of VFDSN suspensions. ► The presence of NaCl was found to restrain the gelling capacity of VFDSN suspensions. ► NaCl was found to significantly affect the storage and loss moduli of VFDSN suspensions. ► The 20% NaCl content in the VFDSN suspensions led to high (98.6%) creep-recovery.

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Profiling of soluble neutral oligosaccharides from treated biomass using solid phase extraction and LC-TOF MS

Original Research Article

Pages 791-799

Ramin Vismeh, James F. Humpula, Shishir P.S. Chundawat, Venkatesh Balan, Bruce E. Dale, A. Daniel Jones

Highlights

► Porous graphitized carbon enriches and stabilizes treated corn stover glucans to DP22. ► LC/TOF MS profiling of corn stover arabinoxylan and glucan oligomers is achieved. ► Linkage information from multiplexed collision-induced dissociation at multiple voltages. ► Ammonia fiber expansion treatment of corn stover removes arabinoxylan acetyl groups.

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Effect of lubricant on mechanical and rheological properties of compatibilized PP/sawdust composites

Original Research Article

Pages 800-806

Sílvia Helena Prado Bettini, Maria Paula Pereira de Miranda Josefovich, Pablo Andres Riveros Muñoz, Cybele Lotti, Luiz Henrique Capparelli Mattoso

Highlights

► The concomitant use of lubricant and compatibilizer reduces mechanical properties. ► Studies on the action of lubricant and compatibilizer allow evaluation of optimal concentrations in composites. ► Compatibilizers act as lubricant in composites reinforced with natural fibers. ► Composites with high concentrations of natural fibers should contain lubricants.

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Efficient enzymatic hydrolysis of the bagasse pulp prepared with active oxygen and MgO-based solid alkali

Original Research Article

Pages 807-813

Tujun Xie, Lu Lin, Chunsheng Pang, Junping Zhuang, Jianbin Shi, Qiulin Yang

Highlights

► We studied the enzymatic hydrolysis of bagasse pulp pretreated with active oxygen and MgO-based solid alkali. ► The optimized sugar yield of 82.38% was obtained after enzyme hydrolysis. ► The crystallinity of cellulose had a cyclical variation after enzyme hydrolysis.

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Locust bean gum: A versatile biopolymer

Review Article

Pages 814-821

Vipul D. Prajapati, Girish K. Jani, Naresh G. Moradiya, Narayan P. Randeria, Bhanu J. Nagar

Highlights

► Physicochemical properties, composition, processing and manufacturing aspect of locust bean gum are described briefly. ► Locust bean gum's versatile utility is described briefly through reported articles. ► Its use in combination with other biopolymers in description is focused. ► Its modified form's application in different drug delivery systems is also covered. ► Few biotechnological application of locust bean gum is also noted.

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Structure and properties of poly (lactic acid)/*Sterculia urens* uniaxial fabric biocomposites

Original Research Article

Pages 822-828

J. Jayaramudu, G. Siva Mohan Reddy, K. Varaprasad, E.R. Sadiku, S. Sinha Ray, A. Varada Rajulu

Highlights

► Newly identified *Sterculia urens* uniaxial fabrics used as a reinforcement. ► *Sterculia urens* uniaxial fabric reinforced poly (lactic acid) (PLA) biocomposites were prepared by a two-roll mill. ► Treatment on *Sterculia urens* uniaxial fabrics improved the mechanical and thermal properties of biocomposites. ► SEM of fractured surfaces treated with silane-coupling agent biocomposites showed flower-like structure. ► PLA/*Sterculia urens* uniaxial fabric reinforced biocomposites with excellent engineering properties useful for food packaging.

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Polysaccharide of *Hohenbuehelia serotina* as a defense against damage by whole-body gamma irradiation of mice

Original Research Article

Pages 829-835

Xiaoyu Li, Zhenyu Wang, Lu Wang

Highlights

► HSP effectively increase the SOD and CAT activities, and reduce the MDA level in vivo. ► HSP significantly improve the immunomodulatory activity in vivo. ► HSP significantly promote the cells in S phase away from apoptosis induced by radiation.

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Biodegradable chitosan nanogels crosslinked with genipin

Original Research Article

Pages 836-842

Maite Arteché Pujana, Leyre Pérez-Álvarez, Luis Carlos Cesteros Iturbe, Issa Katime

Highlights

► Chitosan was crosslinked with genipin in reverse microemulsion medium. ► Chitosan–genipin crosslinking reaction was quantitatively evaluated by UV–vis and ¹H NMR. ► Chitosan–genipin nanogels showed improved water solubility at neutral pHs. ► Swelling behaviour of the nanogels was studied as function of crosslinking degree and pH.

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Polymorphic transformation of cellulose I to cellulose II by alkali pretreatment and urea as an additive

Original Research Article

Pages 843-849

P.K. Gupta, Vanshi Uniyal, Sanjay Naithani

Highlights

► Cotton linter was treated with NaOH with and without urea as an additive. ► At 15 wt% NaOH sudden transformation from cellulose I to II polymorph. ► On addition 5 wt% urea this transformation decreased largely. ► The crystallinity index showed a gradual decrease with increasing concentration.

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Doxorubicin loading fucoidan acetate nanoparticles for immune and chemotherapy in cancer treatment

Original Research Article

Pages 850-856

Kun Woo Lee, Dooyong Jeong, Kun Na

Highlights

► Doxorubicin loaded acetylated fucoidan (AcFu) nanoparticles were investigated for immunochemotherapy in cancer treatment. ► The nanoparticles exhibited first-order drug release behavior for 5 days. ► AcFu treated Raw264.7 macrophages overexpressed various anti-tumor cytokines. ► The nanoparticles resist to multidrug resistance characteristics of cancer cells. ► The nanoparticles have a promising potential for one-step immunochemotherapy.

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Characterization and lectin microarray of an immunomodulatory heteroglucan from *Pleurotus ostreatus* mycelia

Original Research Article

Pages 857-865

K. Sanjana P. Devi, Bibhas Roy, Pradip Patra, Banalata Sahoo, Syed S. Islam, Tapas K.

Highlights

► Glucans isolated from *P. ostreatus* mycelia have a high mol. wt. of $\sim 2.7 \times 10^6$ Da. ► Glucose, mannose and fucose moieties with β and α linkage form its basic framework. ► Lectin array signify glucose, mannose and fucose residues in terminals and interior. ► The heteroglucan folded into a triple helical conformation. ► Antitumor activity was associated with immune cell activation on glucan treatment.

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Properties of the modified cellulosic fabrics using polyurethane acrylate copolymers

Original Research Article

Pages 866-873

Shazia Tabasum, Mohammad Zuber, Abdul Jabbar, Khalid Mahmood Zia

Highlights

► The cellulosic fabric was modified with polyurethane acrylates copolymers (PACs). ► The PACs were synthesized varying molecular weight of polycaprolactone (PCL). ► The structure of the PAC samples was confirmed with FTIR and physical characterization were studied and discussed. ► The PAC emulsion was applied onto the polyester/cellulosic fabrics and effect of molecular weight of PCL was investigated.

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Plasticization effect of triacetin on structure and properties of starch ester film

Original Research Article

Pages 874-881

Jie Zhu, Xiaoxi Li, Chen Huang, Ling Chen, Lin Li

Highlights

► New interaction between triacetin and starch ester enhanced C O in alcoxyl group. ► Increased mobility of macromolecules facilitated crystallite formation. ► Increased triacetin enlarged amorphous region with less effect on crystalline part. ► The thermal stability of triacetin and film matrix was influenced discriminately. ► Crystallite restricted the mobility of macromolecules in different scale and regions.

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Extracellular polymeric substances from two biofilm forming *Vibrio* species: Characterization and applications

Original Research Article

Pages 882-888

Kumari Kavita, Avinash Mishra, Bhavanath Jha

Highlights

► EPSs of *Vibrio campbellii* and *V. fortis* have distinctive composition. ► Spectral analysis revealed characteristic functional groups of polysaccharides. ► EPSs: amorphous in nature with high emulsifying activity and pseudoplastic rheology. ► Composition of EPS is independent of habitat but species-specific.

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Phosphorylated curdlan microgels. Preparation, characterization, and in vitro drug release studies

Original Research Article

Pages 889-898

Irina Popescu, Irina M. Pelin, Maria Butnaru, Gheorghe Fundueanu, Dana M. Suflet

Highlights

► New anionic microgel based on monobasic curdlan phosphate. ► Studies regarding the morphology, swelling degree, exchange capacity, and thermal resistance. ► The drug transport processes and the drug diffusion coefficients in various media. ► An excellent biocompatibility of microgels.

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Sulfation and biological activities of konjac glucomannan

Original Research Article

Pages 899-903

Surina Bo, Tegshi Muschin, Taisei Kanamoto, Hideki Nakashima, Takashi Yoshida

Highlights

► Natural konjac glucomannan was sulfated to give sulfated konjac glucomannans. ► Sulfated konjac glucomannans had anti-HIV and blood anticoagulant activities. ► The biological mechanism was elucidated by SPR.

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X-ray scattering studies of lignocellulosic biomass: A review

Review Article

Pages 904-917

Feng Xu, Yong-Cheng Shi, Donghai Wang

Highlights

► Previous studies of biomass structure using X-ray scattering are reviewed. ► The structural information of biomass is summarized and discussed. ► Methods for crystallinity calculation are summarized and compared. ► The use of cellulose crystallinity is suggested for future study.

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Structural elucidation of an immunoenhancing heteroglycan isolated from *Russula albonigra* (Krombh.) Fr.

Original Research Article

Pages 918-926

Ashis K. Nandi, Surajit Samanta, Ipsita K. Sen, K. Sanjana P. Devi, Tapas K. Maiti, Krishnendu Acharya, Syed S. Islam

Highlights

► A heteroglycan (PS-II) was isolated from the mushroom *Russula albonigra* (Krombh.) Fr. ► The PS-II consisted of glucose, galactose, manose, 2-OMe-fucose, and fucose. ► Its structure was established by chemical and 2D NMR studies. ► This molecule showed immunostimulatory property.

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Effect of particle size on the surface properties and morphology of ground flax

Original Research Article

Pages 927-933

E. Csiszár, E. Fekete, A. Tóth, É. Bandi, B. Koczka, I. Sajó

Highlights

► We examine the effect of grinding on the surface properties of flax fibers. ► Water sorption, copper number, OH number and surface O/C ratio increase. ► DP, crystallite size and dispersive component of surface energy decrease. ► O/C ratio and OH number vs. particle size curves have local maxima. ► Effects include destruction of waxy layer and increase of crystalline imperfections.

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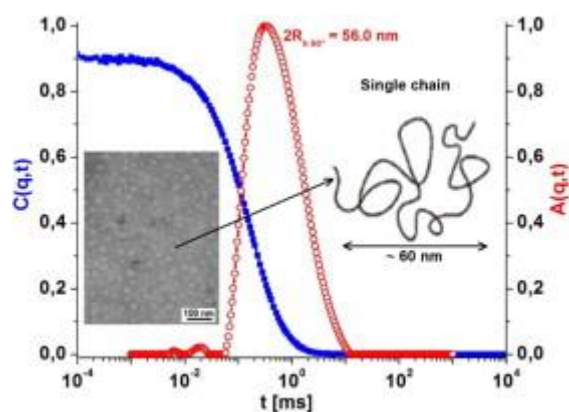
Preparation and enzymatic hydrolysis of nanoparticles made from single xyloglucan polysaccharide chain

Original Research Article

Pages 934-939

Ilham Mkedder, Christophe Travelet, Amandine Durand-Terrasson, Sami Halila, Frédéric Dubreuil, Redouane Borsali

Graphical abstract



Highlights

► We present a novel way to synthesize polysaccharide based nanoparticles. ► Single chain particles have been characterized by AFM and TEM. ► The mechanism of the enzymatic degradation was also investigated.

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Scalable ionic gelation synthesis of chitosan nanoparticles for drug delivery in static mixers

Original Research Article

Pages 940-945

Yuancai Dong, Wai Kiong Ng, Shoucang Shen, Sanggu Kim, Reginald B.H. Tan

Highlights

► Scalable ionic gelation synthesis of chitosan (CS) nanoparticles (NPs) was carried out in static mixers.
► 152–376 nm CS NPs were achieved by the proposed technique. ► Particle size and productivity can be tuned by adjusting flow rate, CS/TPP concentration, etc. ► Salicylic acid has been successfully loaded into CS NPs.

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Editorial Board

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