

Carbohydrate Polymers

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Utilisation of model pectins reveals the effect of demethylated block size frequency on calcium gel formation

Original Research Article

Pages 1-10

Beda M. Yapo, Kouassi L. Koffi

Highlights

► We examine the calcium-mediated gelation of pectins. ► Pectins with specific block sizes in the 3–100 range are modeled. ► Increasing the proportion of functional block increases the gel strength. ► The gel strength is correlated with the absolute degree of blockiness. ► Minimum block size and frequency are determinant for gelation.

Surface acetylation of bamboo cellulose: Preparation and rheological properties

Original Research Article

Pages 11-18

Jie Cai, Peng Fei, Zhouyi Xiong, Yongjun Shi, Kai Yan, Hanguo Xiong

Highlights

► Purified bamboo cellulose was used to synthesize cellulose diacetate (B-CDA). ► B-CDA was dissolved in acetone/DMAc and the rheological properties were studied. ► The dependence of η_a , n , and $\Delta\eta$ on concentration and temperature was analyzed. ► E_η was used to measure the dependence of solution viscosity on temperature. ► The results are favorable for predicting the B-CDA solution spinnability.

Development of biodegradable flexible films of starch and poly(lactic acid) plasticized with adipate or citrate esters

Pages 19-22

M.A. Shirai, M.V.E. Grossmann, S. Mali, F. Yamashita, P.S. Garcia, C.M.O. Müller

Highlights

► We tested adipate and citrate esters as plasticizer in starch/PLA films production. ► The films were characterized by FTIR, SEM and mechanical properties. ► Films of PLA with high TPS content using blow extrusion were obtained. ► Production of films was possible due to PLA plasticization. ► Adipate esters were the best plasticizer for PLA.

Multiresponsive macroporous semi-IPN composite hydrogels based on native or anionically modified potato starch

Original Research Article

Pages 23-32

Ecaterina Stela Dragan, Diana Felicia Apopei

Highlights

► Semi-IPN cryogels with native or anionically modified potato starch as entrapped polysaccharide. ► The nature of the entrapped polymer strongly influenced the gel morphology. ► The equilibrium swelling tailored by the post hydrolysis of cryogels. ► Deswelling/reswelling kinetics in response to external stimuli controlled by monomer concentration.

Mucoadhesive nanoparticles made of thiolated quaternary chitosan crosslinked with hyaluronan

Original Research Article

Pages 33-39

Ylenia Zambito, Francesca Felice, Angela Fabiano, Rossella Di Stefano, Giacomo Di Colo

Highlights

► Thiolated quaternary chitosans were obtained from a chitosan of 32 kDa MW. ► Nanoparticles were obtained by interaction of these polymers with hyaluronan. ► The nanoparticles were modispersed and showed mucoadhesivity. ► The nanoparticles were internalized by endothelial progenitor cells. ► The nanoparticles improved cell resistance to oxidation.

Evaluation of the effect of hydroxypropyl- β -cyclodextrin on topical administration of milk thistle extract

Original Research Article

Pages 40-47

Gianpiera Spada, Elisabetta Gavini, Massimo Cossu, Giovanna Rassu, Antonio Carta, Paolo Giunchedi

Highlights

► Cyclodextrins activity as penetration enhancers was demonstrated by in vivo tests. ► Complexation between cyclodextrin and milk thistle extract was proved. ► Comparison between formulations with or without cyclodextrins was done. ► Cyclodextrins effect on antioxidant activity and stability of extract was showed.

Chitosan/polyethylene glycol fumarate blend film: Physical and antibacterial properties

Original Research Article

Pages 48-56

Azadehsadat Hashemi Doulabi, Hamid Mirzadeh, Mohammad Imani, Nasrin Samadi

Highlights

► The biocompatible blend films based on chitosan and PEGF are prepared. ► The physical properties of these films are evaluated in detail. ► We explore the relationship between blend ratio and surface properties of the film. ► Effect of blend ratios on mechanical characteristics of the films will be assessed. ► The films pose excellent characteristics regarding their antibacterial activity.

Preparation and characterization of nonaarginine-modified chitosan nanoparticles for siRNA delivery

Original Research Article

Pages 57-62

Soyeon Park, Eun Ju Jeong, Jangwook Lee, Taiyoun Rhim, Sang Kyung Lee, Kuen Yong Lee

Highlights

► Nonaarginine can be chemically conjugated to the chitosan backbone. ► Nonaarginine–chitosan/siRNA forms stable nanoparticles. ► Nonaarginine–chitosan/siRNA nanoparticles enhance gene transfection *in vitro*.

Structural characterization and antioxidant activities of polysaccharides extracted from *Epimedium acuminatum*

Original Research Article

Pages 63-68

Haoran Cheng, Shiling Feng, Xuejing Jia, Qianqian Li, Yonghong Zhou, Chunbang Ding

Highlights

► We extract four polysaccharides from *Epimedium acuminatum* Franch. ► We conduct preliminary structural characterization of the four polysaccharides. ► We evaluate the antioxidant activities of the four polysaccharides.

Preparation and properties of carboxylated styrene-butadiene rubber/cellulose nanocrystals composites

Original Research Article

Pages 69-76

Xiaodong Cao, Chuanhui Xu, Yuhong Liu, Yukun Chen

Highlights

► We explore using CNs to reinforce XSBR matrix for preparation of a nanocomposite. ► CNs could form a strong filler network in the XSBR matrix. ► Good compatibility and interfacial adhesion between XSBR and CNs. ► Significant increase in tensile strength and tear strength with increasing CNs.

Preparation of cellulose-graft-poly(ϵ -caprolactone) nanomicelles by homogeneous ROP in ionic liquid

Original Research Article

Pages 77-83

Yanzhu Guo, Xiaohui Wang, Zuguang Shen, Xuancai Shu, Runcang Sun

Highlights

► Novel biodegradable cellulose-g-PCL micelles were developed from dissolved pulp. ► Controlled molecular architecture was achieved by homogeneous ROP in ionic liquid. ► Cellulose-g-PCL copolymers can self-assemble into 20–100 nm nanomicelles in water. ► The self-assembly behaviors are correlated with the copolymer architecture.

Anti-inflammatory effect of fucoidan extracted from *Ecklonia cava* in zebrafish model

Original Research Article

Pages 84-89

Seung-Hong Lee, Chang-Ik Ko, Youngheun Jee, Yoonhwa Jeong, Misook Kim, Jin-Soo Kim, You-Jin Jeon

Highlights

► This study was designed to assess *in vivo* anti-inflammatory effect of fucoidan. ► Fucoidan of *Ecklonia cava* alleviated inflammation in tail-cutting-induced zebrafish model. ► Fucoidan exhibited anti-inflammatory activities in LPS-stimulated zebrafish model. ► Fucoidan has a protective effect against LPS-induced toxicity in zebrafish model.

Crystalline structure and thermal property characterization of chitin from Antarctic krill (*Euphausia superba*)

Original Research Article

Pages 90-97

Yanchao Wang, Yaoguang Chang, Long Yu, Cuiyu Zhang, Xiaoqi Xu, Yong Xue, Zhaojie Li, Changhu Xue

Highlights

► Antarctic corresponds to the α -polymorph. ► It is composed of small, stable, and uniform micro-crystals. ► It possesses a better thermal stability than crab and shrimp chitins.

Viscoelastic properties and fractal analysis of acid-induced SPI gels at different ionic strength

Original Research Article

Pages 98-105

Chong-hao Bi, Dong Li, Li-jun Wang, Benu Adhikari

Highlights

► Two rheological models were used to estimate the fractal dimension of SPI gels. ► The CLSM based image analysis method was used in calculating fractal dimension. ► The gel formation process of acid-induced SPI gels was predicted well. ► The viscoelastic properties and fractal structure were sensitive to ionic strength.

Characterizations and microsphere formulation of polysaccharide from the marine clam (*Macra veneriformis*)

Original Research Article

Pages 106-113

Ling Chong Wang, Liu Qing Di, Rui Liu, Hao Wu

Highlights

► Polysaccharide in *Macra veneriformis* (MVPS) is lacking suitable applications. ► MVPS are noncrystalline but thermostable polymers. ► MVPS can easily dissolve in water media and solution belongs to non-Newtonian fluids. ► Well morphological microspheres were prepared

by MVPS and chitosan blend. ► The blend microspheres can encapsulate drug and achieve the sustained release.

Layer by Layer coatings assembled through dipping, vertical or horizontal spray for cotton flame retardancy

Original Research Article

Pages 114-119

Jenny Alongi, Federico Carosio, Alberto Frache, Giulio Malucelli

Highlights

► Layer by Layer silica-based architectures have been deposited for the fire protection of cotton. ► Dipping, vertical and horizontal spray methods have been compared. ► The coating morphologies have shown to depend on the deposition technique. ► The best fire performances have been achieved by applying the horizontal spray to cotton.

Effects of lipids on enzymatic hydrolysis and physical properties of starch

Original Research Article

Pages 120-127

Yongfeng Ai, Jovin Hasjim, Jay-lin Jane

Highlights

► Corn oil, soy lecithin, and free fatty acids reduced starch enzymatic hydrolysis. ► Corn oil as well as other lipids was proven to form helical-complexes with amylose. ► Starch pasting properties and gel formation were affected by the added lipids.

The relation of apple texture with cell wall nanostructure studied using an atomic force microscope

Original Research Article

Pages 128-137

Justyna Cybulska, Artur Zdunek, Katarzyna M. Psonka-Antonczyk, Bjørn T. Stokke

Highlights

► The structure of cellulose network influences on the properties of fruit tissue. ► AFM images shown differences in the nanostructure of apple cell walls. ► Diameter of cellulose microfibrils is correlated with texture of apples.

High performance polyethylene/thermoplastic starch blends through

controlled emulsification phenomena

Original Research Article

Pages 138-148

Claire Cerclé, Pierre Sarazin, Basil D. Favis

Highlights

► Compatibilized thermoplastic starch/polyethylene blends were studied. ► The morphology of these blends was correlated to their mechanical properties. ► Copolymers containing an elastomeric part provided the best mechanical properties.

Drug diffusion from disperse systems with a hydrophobically modified polysaccharide: Enhancer[®] vs Franz cells

Original Research Article

Pages 149-156

María Jesús Lucero, Carmen Claro, Marta Casas, María Rosa Jiménez-Castellanos

Highlights

► We study a new HPC modified with methyl methacrylate suitable for topic formulations. ► Systems need a determined surfactant and drug concentration to obtain cross-linking. ► Systems with relaxed structure have high drug release and diffusion values. ► Results with Enhancer Cell[®] are more reliable and reproducible than with Franz cell. ► Studies confirm that the new polymer makes gel structure and controls drug release.

Preparation and characterization of hydrogels based on homopolymeric fractions of sodium alginate and PNIPAAm

Original Research Article

Pages 157-166

David Leal, Wim De Borggraeve, Maria V. Encinas, Betty Matsuhira, Robert Müller

Highlights

► Copolymerization of poly-l-galuronic acid with semi-telechelic PNIPAAm was achieved. ► Association of poly-d-mannuronic acid and PNIPAAm afforded porous semi-IPN hydrogels. ► Surface morphology of hydrogels was studied by SEM. ► Graft copolymers hydrogels showed better water retention than semi-IPN hydrogels.

ZrO₂ surface chemically coated with hyaluronic acid hydrogel loading

GDF-5 for osteogenesis in dentistry

Original Research Article

Pages 167-175

Min Soo Bae, Ji Eun Kim, Jung Bok Lee, Dong Nyoung Heo, Dae Hyeok Yang, Jin-Ho Kim, Kung-Rock Kwon, Jae Beum Bang, Hojae Bae, Il Keun Kwon

Highlights

► We prepared ZrO₂ disks surface-modified with **pcHA**gel containing GDF-5 and BMP-2, respectively. ► We found that **ZrO₂-4-7** are good candidates that can effectively release as well as contain GDF-5 and BMP-2. ► It was found that GDF-5 is an effective alternative to aid new bone formation *in vitro* as compared to BMP-2.

Controlled antiseptic release by alginate polymer films and beads

Original Research Article

Pages 176-183

Ioannis Liakos, Loris Rizzello, Ilker S. Bayer, Pier Paolo Pompa, Roberto Cingolani, Athanassia Athanassiou

Highlights

► Alginate encapsulates the antiseptic povidone iodine (PVPI). ► Free standing films and beads of alginate and PVPI are formed. ► The release of the PVPI from the sodium alginate films and calcium alginate beads is within minutes and hours respectively. ► Films and beads with PVPI have antimicrobial properties.

***Agaricus bisporus* fucogalactan: Structural characterization and pharmacological approaches**

Original Research Article

Pages 184-191

Andrea C. Ruthes, Yanna D. Rattmann, Simone M. Malquevicz-Paiva, Elaine R. Carbonero, Marina M. Córdova, Cristiane H. Baggio, Adair R.S. Santos, Philip A.J. Gorin, Marcello Iacomini

Highlights

► A fucogalactan (EFP-Ab) from *A. bisporus* was characterized structurally. ► EFP-Ab inhibited significantly inflammatory pain caused by formalin injection. ► Lethality induced by CLP was decreased by 40%. ► iNOS and COX-2 protein expression were markedly decreased. ► EFP-Ab has significant anti-sepsis, antinociceptive and anti-inflammatory actions.

Diverse patterns of cell wall mannan/galactomannan occurrence in seeds of the Leguminosae

Original Research Article

Pages 192-199

João Francisco Bento, Irineu Mazzaro, Lia Magalhães de Almeida Silva, Renato de Azevedo Moreira, Marília Locatelli Correa Ferreira, Fany Reicher, Carmen Lúcia de Oliveira Petkowicz

Highlights

- ▶ Endosperms from seeds of Leguminosae were submitted to sequential extractions. ▶ Soluble and insoluble polysaccharides were analyzed. ▶ Galactomannans and mannans were found in Caesalpinioideae and Faboideae. ▶ Galactomannans and cellulose were found in Mimosoideae.
- ▶ Mannan was isolated for the first time from unripe endosperm of a Caesalpinioideae.

Structure and protective effect on UVB-induced keratinocyte damage of fructan from white garlic

Original Research Article

Pages 200-205

Jinling Chen, Kit leong Cheong, Ziliang Song, Yujie Shi, Xuesong Huang

Highlights

- ▶ The structure of GF was elucidated by chemical and instrumented analysis. ▶ The GF from white garlic was confirmed as 1-kestose type. ▶ The effective of GF on UVB exposed human keratinocyte cells was estimated.

Preparation and properties of aligned poly(3-hydroxybutyrate-co-3-hydroxyvalerate)/cellulose nanowhiskers composites

Original Research Article

Pages 206-213

Elena Ten, Long Jiang, Michael P. Wolcott

Highlights

- ▶ Unidirectionally aligned CNW composite was developed by applying electrical field. ▶ CNW concentration governs the degree of CNW alignment under the field. ▶ The electric field was effective in aligning CNWs up to 4 wt% CNW concentration. ▶ Above CNW content of 4 wt%, CNW/PHBV and CNW/CNW interactions restrain CNW mobility. ▶ The aligned composite showed strong anisotropy.

Preparation of microfibers from wood/ionic liquid solutions

Pages 214-217

Martina Polaskova, Roman Cermak, Vincent Verney, Petr Ponizil, Sophie Commereuc, Margarida F. Costa Gomes, Agilio A.H. Padua, Pavel Mokrejs, Michal Machovsky

Highlights

► Direct preparation of cellulose fibers from wood is introduced. ► Dissolution of wood in 1-ethyl-3-methylimidazolium lactate is firstly documented. ► Structure of cellulose fibers depends on ionic liquid used.

SO₃H-functionalized acidic ionic liquids as catalysts for the hydrolysis of cellulose

Original Research Article

Pages 218-222

Yuanyuan Liu, Wenwen Xiao, Shuqian Xia, Peisheng Ma

Highlights

► Six kinds of acidic ionic liquids were used to promote the hydrolysis of cellulose. ► The main factors influencing the hydrolysis of cellulose were investigated. ► Acidic ionic liquids with analogous structures showed similar catalytic activities. ► The water in solvent [BMIM]Cl had negative effect on the TRS yield.

Amphipathicity and self-assembly behavior of amphiphilic alginate esters

Original Research Article

Pages 223-227

Ji Sheng Yang, Qi Quan Zhou, Wen He

Highlights

► Alg-C_n can be synthesized by the reaction between SA and aliphatic alcohols. ► The CMC value of Alg-C_n is obtained by SFT, conductivity and fluorescence. ► The morphology and size of micelle are observed by TEM and Zetasizer Nano.

Separation and recovery of cellulose from *Zoysia japonica* by 1-allyl-3-methylimidazolium chloride

Original Research Article

Pages 228-235

Wei-Zun Li, Mei-Ting Ju, Yan-Nan Wang, Le Liu, Yang Jiang

Highlights

► Water pretreatment is used at 121 °C to make structure more porous. ► Cellulose extraction rate is 71% and the purity can be as high as 99%. ► The mechanism of water pretreatment and ionic liquid dissolution is studied. ► AMIMCl can only recover cellulose meanwhile the crystallinity decreased.

Structural elucidation of a novel mannogalactan isolated from the fruiting bodies of *Pleurotus geesteranus*

Original Research Article

Pages 236-240

An-qiang Zhang, Mei Xu, Li Fu, Pei-long Sun

Highlights

► It was isolated and purified by columns of DEAE-Sepharose F. F. and Sephacryl S H.R. ► It is composed of d-glucose, d-galactose, d-mannose, and 3-*O*-methylgalactose. ► Its structure is determined by MS, ¹H, ¹³C and 2D NMR spectroscopic as follows: .

Soluble β -1,3/1,6-glucan in seaweed from the southern hemisphere and its immunomodulatory effect

Original Research Article

Pages 241-248

Francisca Bobadilla, Carolina Rodriguez-Tirado, Mónica Imarai, María José Galotto, Roger Andersson

Highlights

► Soluble β -1,3/1,6-glucan was detected in seaweed from the southern hemisphere. ► YBGL-enzymatic kit was used for the confirmation of β -1,3/1,6-glucan polymers. ► A process was presented for production thereof with good recovery percentages. ► Composition and structure provided comprising a β -1,3-glucan with β -1,6 side links. ► Immunomodulatory activity of the soluble β -1,3/1,6-glucan extract was established.

A critical reinvestigation of the TAED-activated peroxide system for low-temperature bleaching of cotton

Pages 249-253

Changhai Xu, Xiaoxia Long, Jinmei Du, Shaohai Fu

Highlights

► The TAED-activated peroxide system conducted effective cotton bleaching at near-neutral pH. ► PAA underwent two types of decomposition under alkaline conditions. ► H₂O₂ in excess of the stoichiometric amount produced no addition effect on cotton bleaching. ► NaHCO₃ was the most desired alkaline agent for use in cotton bleaching.

Chitosan-based nanofibrous membranes for antibacterial filter applications

Original Research Article

Pages 254-259

Ashleigh Cooper, Rachael Oldinski, Hongyan Ma, James D. Bryers, Miqin Zhang

Highlights

► Chitosan–PCL nanofibers exhibit antibacterial activity based on chitosan content. ► Chitosan–PCL nanofibrous membranes facilitated high fluid flux. ► The membranes successfully removed 300-nm diameter particles from solution. ► The chitosan–PCL nanofibers can potentially serve as antibacterial pre-filter for microfiltration.

Preparation of starch-stabilized silver nanoparticles from amylose–sodium palmitate inclusion complexes

Original Research Article

Pages 260-268

George F. Fanta, James A. Kenar, Frederick C. Felker, Jeffrey A. Byars

Highlights

► Silver nanoparticles were prepared from amylose–sodium palmitate complexes. ► Aqueous solutions were obtained that could be dried and re-dispersed in water. ► Addition of acid increased viscosity, and precipitation was observed at low pH. ► Smaller-sized nanoparticles were obtained than with soluble starch. ► Conversion of AgNO₃ to water-soluble nanoparticles was also higher.

Removal of fluoride from drinking water by cellulose@hydroxyapatite

nanocomposites

Original Research Article

Pages 269-275

Xiaolin Yu, Shengrui Tong, Maofa Ge, Junchao Zuo

Highlights

► The nano-size HA was uniformly dispersed in the cellulose template matrix. ► The fluoride concentration could meet the drinking water standard after adsorption. ► The coexisting anions had no significant effect on fluoride adsorption.

Obtaining biobleached eucalyptus cellulose fibres by using various enzyme combinations

Original Research Article

Pages 276-282

Cristina Valls, Edith M. Cadena, M. Blanca Roncero

Highlights

► Different enzyme combinations were applied to biobleach eucalypt cellulose fibres. ► A diverse mode of action on lignin and hexenuronic acids was found between enzymes. ► Biobleached eucalypt cellulose fibres with added value were obtained.

Optimum conditions for *Radix Rehmanniae* polysaccharides by RSM and its antioxidant and immunity activity in UVB mice

Original Research Article

Pages 283-288

Zhifu Sui, Li Li, Biao Liu, Tingmin Gu, Zhili Zhao, Chang Liu, Chengfang Shi, Rongya Yang

Highlights

► Optimization of *Radix Rehmanniae* polysaccharides was done using response surface methodology (RSM). ► Optimum extraction conditions were: extraction temperature 100 °C, extraction time 2 h and ratio of liquid to solid 6. ► The model had a satisfactory coefficient of R^2 (=0.9815) and was verified experimentally. ► *Radix Rehmanniae* polysaccharides protect against skin oxidative stress in experimental mice.

Soluble dietary fiber from *Canna edulis* Ker by-product and its

physicochemical properties

Original Research Article

Pages 289-296

Juan Zhang, Zheng-Wu Wang

Highlights

► Physical–enzymatic method can be well used for the production of SDF from *Canna edulis* by-product. ► *C. edulis* SDF has high yield, good homogeneity and thermal stability. ► *C. edulis* SDF can be used as dietary supplement and additive in the food industry.

Separation, purification, and α -glucosidase inhibition of polysaccharides from *Coriolus versicolor* LH1 mycelia

Original Research Article

Pages 297-306

Wen-kuang Hsu, Tai-hao Hsu, Fang-yi Lin, Yuan-kai Cheng, John Po-wen Yang

Highlights

► LH1 is a new strain of *Coriolus versicolor*. ► We have separated and purified three polysaccharides from *C. versicolor* LH1. ► These polysaccharides could be explored as a novel potential antidiabetic. ► These polysaccharides included triterpenoids and polyphenols compounds. ► The amount of glucose and α -(1,4) glycosidic linkages are related to α -glucosidase inhibition.

Highly efficient propionylation and butyralation of cellulose in an ionic liquid catalyzed by 4-dimethylminopyridine

Pages 307-311

Yihao Luan, Jinming Zhang, Maosheng Zhan, Jin Wu, Jun Zhang, Jiasong He

Highlights

► Finding an effective catalyst for propionylation and butyralation of cellulose in ionic liquid.
► Synthesizing CP and CB under mild reaction conditions. ► Resultant CP and CB with DS from 0.89 to 2.89. ► Controlling DS of products by molar ratio of acid anhydride/AGU. ► Conversions of acid anhydrides in both reactions as high as 90%, even above 96%.

Structural characterization and emulsifying properties of

polysaccharides of *Acacia mearnsii* de Wild gum

Original Research Article

Pages 312-320

Aline Grein, Bruno C. da Silva, Cinthia F. Wendel, Cesar A. Tischer, Maria Rita Sierakowski, Angela B. Dewes Moura, Marcello Iacomini, Philip A.J. Gorin, Fernanda F. Simas-Tosin, Izabel C. Riegel-Vidotti

Highlights

► Polysaccharides from *Acacia mearnsii* gum from Brazilian trees are first investigated. ► The polysaccharides were characterized as non homogenous, acidic arabinogalactans. ► The polysaccharides behave distinctly in tensiometry tests and as emulsifiers. ► A commercial gum was analyzed similarly and compared with the studied polysaccharides.

A comparison of spacer on water-soluble cyclodextrin grafted chitosan inclusion complex as carrier of eugenol to mucosae

Original Research Article

Pages 321-327

Warayuth Sajomsang, Onanong Nuchuchua, Somsak Saesoo, Pattarapond Gonil, Saowaluk Chaleawlerumpon, Nuttaporn Pimpha, Issara Sramala, Apinan Soottitantawat, Satit Puttipipatkachorn, Uracha Rungsardthong Ruktanonchai

Highlights

► Inclusion complex of water-soluble β -cyclodextrin grafted chitosan was studied. ► The spacer on both derivatives plays a role on physical properties of the complex. ► Self-aggregates of the derivative led to high encapsulation and slow EG release. ► Stronger mucoadhesive response was found with the derivative with citrate spacer.

Acetylation of banana fibre to improve oil absorbency

Original Research Article

Pages 328-333

M.D. Teli, Sanket P. Valia

Highlights

► Banana fibre was acetylated using N-Bromosuccinimide (NBS) as catalyst. ► The acetylated Banana fibre was used for oil spill recovery. ► Its oil sorption capacities were much greater than those of synthetic sorbents such as polypropylene fibre. ► It is also possible to reuse the acetylated banana fibre for oil sorption.

Sugar yields from dilute oxalic acid pretreatment of maple wood compared to those with other dilute acids and hot water

Original Research Article

Pages 334-344

Taiying Zhang, Rajeev Kumar, Charles E. Wyma

Highlights

► Dilute oxalic acid pretreatment was developed for better downstream compatibility. ► Comparable xylose yields (~84%) to other leading pretreatment technologies was obtained. ► Monomer, oligomer, and degradation products were determined and compared for all pretreatments. ► Dilute oxalic acid led to less formation of degradation products than other acids during pretreatment. ► Total sugar yields for pretreatment & enzymatic hydrolysis were ~85% for all pretreatments tested.

Pectic polysaccharide from immature onion stick (*Allium cepa*): Structural and immunological investigation

Original Research Article

Pages 345-352

Pradip Patra, Ipsita K. Sen, Sunil K. Bhanja, Ashis K. Nandi, Surajit Samanta, Debsankar Das, K. Sanjana P. Devi, Tapas K. Maiti, Syed S. Islam

Highlights

► Pectic polysaccharide was isolated from immature onion stick. ► Its structure was established by chemical and 2D NMR studies. ► This molecule showed immunological activity.

Surface functionalization of viscose and polyester fabrics toward antibacterial and coloration properties

Original Research Article

Pages 353-359

L.K. El-Gabry, O.G. Allam, O.A. Hakeim

Highlights

► Viscose and polyester are treated with SiO₂ nanoparticle in presence of binder. ► This approach imparted high level of surface functionalization to the fabrics. ► A durable antibacterial activity was achieved on viscose. ► The binder accelerates the dyeing properties of polyester with disperse dye. ► This approach decreases the steaming temperature of polyester prints from 180 °C to 110 °C.

Effects of glucuronic acid oligomers on the production, structure and properties of bacterial cellulose

Original Research Article

Pages 360-366

Mazhar Ul-Islam, Jung Hwan Ha, Taous Khan, Joong Kon Park

Highlights

► Effect of an additive (by-product, SSGO) on the production, structure, and properties of BC was investigated. ► BC production was increased significantly until 2% SSGO addition. ► SSGO was utilized as secondary carbon sources, with considerable decrease in its initially added amount. ► BC produced in SSGO added media illustrated significantly higher mechanical properties. ► Fibrils became thicker, denser and more crystalline with SSGO addition.

Prilling for the development of multi-particulate colon drug delivery systems: Pectin vs. pectin–alginate beads

Original Research Article

Pages 367-373

Giulia Auriemma, Teresa Mencherini, Paola Russo, Mariateresa Stigliani, Rita P. Aquino, Pasquale Del Gaudio

Highlights

► Colon targeted dextran beads are prepared by prilling and an enteric coating. ► Optimization of process parameters may control beads properties. ► Strength of the Zn–pectinate matrix allows to reduce the thickness of the coating. ► Piroxicam loaded multi-particulate systems show a prolonged drug release in IF. ► Such platforms may be proposed for the treatment of inflammatory bowel diseases.

Hybrid immobilization of galactosyl lactose and cellobiose on a gold substrate to modulate biological responses

Original Research Article

Pages 374-379

Takuya Kitaoka, Chiharu Yoshiyama, Fumi Uemura

Highlights

► Galactosyl lactose and cellobiose can be successfully immobilized on gold substrates. ► Carbohydrate-binding lectins show specific affinities for the glyco-nanolayers. ► Human liver carcinoma cells adhere well to the hydrophilic glyco-scaffolds. ► Cytochrome P450 activity

depends on the hybrid ratios of two oligosaccharides. ► Architectural design of the hybrid glyco-nanolayers can affect biological responses.

Synthesis and characterization of multi-amino-functionalized cellulose for arsenic adsorption

Original Research Article

Pages 380-387

Xiaolin Yu, Shengrui Tong, Maofa Ge, Lingyan Wu, Junchao Zuo, Changyan Cao, Weiguo Song

Highlights

- A multi-amino-functionalized cellulose was synthesized for the removal of arsenic. ► The aminated cellulose has relative high nitrogen content. ► The adsorbent has a high adsorption capacity for As(V). ► The adsorption capacities of arsenic were less affected by coexisting ions.
- The adsorbent can be efficiently regenerated with NaOH solution.

Gamma radiation-induced grafting of acrylamide and dimethyl diallyl ammonium chloride onto starch

Original Research Article

Pages 388-393

Xiaohua Lv, Weiqiang Song, Yongzhou Ti, Lingbo Qu, Zhiwei Zhao, Hongjuan Zheng

Highlights

- Cationic starch was prepared from AM and DMDAAC by Gamma irradiation. ► Cationic starch was characterized by FTIR, weight method and titration method. ► Grafting ratio and cationic degree depend on absorbed dose and composition. ► The changing trends of grafting ratio and cationic degree are very different.

Determination sulfamethoxazole based chemiluminescence and chitosan/graphene oxide-molecularly imprinted polymers

Original Research Article

Pages 394-399

Qiu Huamin, Fan Lulu, Xiangjun Li, Leilei Li, Sun Min, Luo Chuannan

Highlights

► A novel chemiluminescence sensor was described. ► Chitosan/graphene oxide-molecularly imprinted polymer was used. ► The adsorption capacity was improved using chitosan/graphene oxide.

Flame retardancy and UV protection of cotton based fabrics using nano ZnO and polycarboxylic acids

Original Research Article

Pages 400-406

M.M. Abd El-Hady, A. Farouk, S. Sharaf

Highlights

► ZnO nanoparticles were applied on cellulosic fabrics. ► Application was through different polycarboxylic acids with SHP as catalyst. ► Effect of concentration of SHP on flammability and UV-protection are investigated. ► 6% SHP increase the flame-retardant of the treated cellulosic fabrics.

Development of CMC hydrogels loaded with silver nano-particles for medical applications

Original Research Article

Pages 407-413

Ali Hebeish, M. Hashem, M.M. Abd El-Hady, S. Sharaf

Highlights

► Innovative CMC hydrogels for medical applications were synthesized by two methods. ► The first involved silver nano-particles (AgNPs)-loaded preformed CMC hydrogel. ► The second entailed the *in situ* preparation of AgNPs during CMC hydrogel preparation.

Proinflammatory activity of an alginate isolated from *Sargassum vulgare*

Original Research Article

Pages 414-420

Kézia O.A.L. Lins, Mariana L. Vale, Ronaldo A. Ribeiro, Leticia V. Costa-Lotufo

Highlights

► The alginate from *Sargassum vulgare* is a promising antitumor compound with immunomodulatory activity. ► The isolated alginate from *S. vulgare* induced paw edema, mast cells degranulation and neutrophil migration *in vivo*. ► This activity depends on the activation of resident cells, being the macrophages the main cells involved.

A new cellulose-producing bacterium, *Rhodococcus* sp. MI 2: Screening and optimization of culture conditions

Original Research Article

Pages 421-428

Somporn Tanskul, Korntip Amornthatree, Nathakan Jaturonlak

Highlights

► A new strain capable of producing extracellular cellulose. ► A new strain capable of producing cellulose higher than the reference strain did. ► Different forms of cellulose produced under agitated and stirred conditions. ► The cellulose yield of the new strain increased by adding CaCO₃.

A new supramolecular gel via host–guest complexation with cucurbit[8]uril and *N*-(4-diethylaminobenzyl)chitosan

Original Research Article

Pages 429-434

Youwen Lin, Lifan Li, Guangwen Li

Highlights

► A novel supramolecular gel based on cucurbit[8]uril and *N*-(4-diethylaminobenzyl)chitosan was prepared. ► Cucurbit[8]uril acted as crosslinker and the host–guest interaction was the main driving force for the formation of the gel. ► This supramolecular gel system showed thermosensitive and pH-sensitive properties.

Flame retardancy of polyaniline-deposited paper composites prepared via in situ polymerization

Original Research Article

Pages 435-440

Xianna Wu, Xueren Qian, Xianhui An

Highlights

► The flame retardancy of polyaniline-deposited paper composite was investigated. ► The key role of doping acid in the flame retardancy was verified. ► The effectiveness of codoping with mixed inorganic acid was demonstrated. ► The decay of the flame retardancy was due to the dedoping effect.

Compatibility studies on tea polysaccharide/amylose/water and tea

polysaccharide/amylopectin/water

Original Research Article

Pages 441-447

Li Guo, Yu Zhu, Xian feng Du

Highlights

► The compatibilities of Am/TPS and Ap/TPS blends were studied by using DSV and DSC. ► TPS can compatibly combined with Am and Ap at moderate concentration. ► TPS can change the conformational ordering and intermolecular association of starch.

In vitro cytocompatibility evaluation of alginate dialdehyde for biological tissue fixation

Original Research Article

Pages 448-454

Yuanting Xu, Li Li, Hao Wang, Xixun Yu, Zhipeng Gu, Chengcheng Huang, Hong Peng

Highlights

► We used alginate dialdehyde for biological tissue fixation. ► Its cytocompatibility for biological tissue fixation was evaluated thoroughly. ► It is a study which has not been reported elsewhere. ► Both glutaraldehyde and genipin were used as experimental controls. ► The alginate dialdehyde is an excellently cytocompatible crosslinking reagent.

Developing gelatin–starch blends for use as capsule materials

Original Research Article

Pages 455-461

Nuozi Zhang, Hongsheng Liu, Long Yu, Xingxun Liu, Liang Zhang, Ling Chen, Robert Shanks

Highlights

► PEG acted as both plasticizer and compatibilizer for gelatin/starch blends. ► PEG increased transparency and toughness of gelatin/starch blends. ► The “onset” of gelation temperature became less pronounced with increasing starch content. ► Linear microstructure of amylose, and hydrophilic hydroxylpropylene improved compatibility.

High operational stability of invertase from *Saccharomyces cerevisiae*

immobilized on chitosan nanoparticles

Original Research Article

Pages 462-468

Sheila G. Valerio, Joana S. Alves, Manuela P. Klein, Rafael C. Rodrigues, Plinho F. Hertz

Highlights

- ▶ Chitosan nanoparticles were prepared for enzyme immobilization. ▶ Invertase from *S. cerevisiae* was covalently immobilized on chitosan nanoparticles. ▶ The support provided high superficial area. ▶ The immobilization yield was 74.3% and immobilization efficiency 61.6%.
- ▶ High operational stability was reached: 59 reuses with maximal enzyme activity.

In situ observation of crystallinity disruption patterns during starch gelatinization

Original Research Article

Pages 469-478

Canhui Cai, Cunxu Wei

Highlights

- ▶ Four patterns of crystallinity disruption during starch heating were proposed. ▶ The gelatinization began on the proximal or distal surface of the eccentric hilum. ▶ The gelatinization began from the hilum or surface of the central hilum granule. ▶ The uneven distribution of amylose in starches resulted in the different patterns.

Studies on immunoregulatory and anti-tumor activities of a polysaccharide from *Salvia miltiorrhiza* Bunge

Original Research Article

Pages 479-483

Lei Liu, Jun Jia, Guang Zeng, Yan Zhao, Xingshun Qi, Chuangye He, Wengang Guo, Daiming Fan, Guohong Han, Zhanting Li

Highlights

- ▶ The root of *Salvia miltiorrhiza* is a popular traditional Chinese herbal medicines. ▶ The polysaccharide (SMP-W1) was purified from *S. miltiorrhiza*. ▶ SMP-W1 displayed efficient tumor growth inhibitory effect in vitro and in vivo. ▶ Antioxidase activities and immune response were improved by SMP-W1. ▶ SMP-W1 could be developed as a safe antitumor agent.

Optimization of adding konjac glucomannan to improve gel properties of low-quality surimi

Original Research Article

Pages 484-489

Jianhua Liu, Xinping Wang, Yuting Ding

Highlights

► Effect of processing conditions on gel properties of low-quality surimi was studied. ► RSM was applied to optimize the processing conditions. ► Processing conditions had significant effects on the gel properties. ► Optimal conditions to improve gel properties of low-quality surimi were obtained.

Compatible compositions based on aqueous polyurethane dispersions and sodium alginate

Original Research Article

Pages 490-496

Hamed Daemi, Mehdi Barikani, Mohammad Barmar

Highlights

► The alginate content was studied on properties of aqueous polyurethane dispersions. ► Excellent miscibility was shown on the compositions of polyurethane and alginate. ► The morphology of alginate in polyurethane matrix was shown as particulate with different sizes. ► The presence of alginate in microstructure was determined by sodium peak in EDX.

Functionalization of natural gum: An effective method to prepare iodine complex

Original Research Article

Pages 497-502

Syed Ishraque Ahmad, Nasreen Mazumdar, Sunil Kumar

Highlights

► Natural gum was functionalized to introduce new reactive groups. ► Iodine complex was found reddish-brown in colour. ► Interaction of free iodine was established by UV-vis spectrophotometer. ► Antimicrobial activity of complex was found to be effective against bacteria.

Structure characterization of a fucose-containing exopolysaccharide

produced by *Enterobacter cloacae* Z0206

Original Research Article

Pages 503-509

Fengqin Wang, Hangxian Yang, Yizhen Wang

Highlights

► A novel polysaccharide was extracted and purified by column chromatography from *Enterobacter cloacae* Z0206. ► The EPS was partially hydrolyzed. ► Oligosaccharides were purified by GPC to obtain hexasaccharide. ► The structure of the hexasaccharide was investigated. ► The EPS comprised a heptasaccharide repeating unit.

Influence of operating conditions on extracellular polymeric substances and surface properties of sludge flocs

Original Research Article

Pages 510-515

Hongwu Wang, Huanhuan Deng, Luming Ma, Liyun Ge

Highlights

► Effect of operating conditions on exopolymers and sludge properties was performed. ► Two modes of reactor operation, S-mode and B-mode, were investigated. ► Polysaccharides (PS) and proteins (PN) were the main components of exopolymers. ► LB-EPS content was related to operation modes and sludge-retention time (SRT). ► PS and PN in LB-EPS and TB-EPS were both dependent of operation modes and SRT.

The comparison of rheological properties of aqueous welan gum and xanthan gum solutions

Original Research Article

Pages 516-522

Long Xu, Guiying Xu, Teng Liu, Yijian Chen, Houjian Gong

Highlights

► Rheological properties of welan gum and xanthan gum solutions have been compared. ► Welan gum shows a higher viscoelasticity than that of xanthan gum. ► The dynamic modulus has exponential relationship with the concentration. ► Adjacent double helices of welan gum arrange in parallel as the zipper model. ► The network structure formed by zipper model is more stable.

Synthesis of biocompatible hybrid magnetic hollow spheres based on encapsulation strategy

Original Research Article

Pages 523-528

Wei Ha, Hao Wu, Yuan Ma, Min-Min Fan, Shu-Lin Peng, Li-Sheng Ding, Sheng Zhang, Bang-Jing Li

Highlights

► We construct a kind of novel magnetic hollow spheres by encapsulation strategy. ► The self-assembly hollow spheres were formed by supramolecular inclusion. ► The self-aggregated hollow spheres showed pH-dependent properties. ► The encapsulation process has no effect on the superparamagnetism of magnetofluid.

Galectin 3– β -galactobiose interactions

Original Research Article

Pages 529-533

A.P. Gunning, C. Pin, V.J. Morris

Highlights

► Gal3 binds specifically to β -d-galactobiose. ► The lifetime of the interaction is 3.0 s. ► Binding is consistent with a molecular model for the anti-cancer role of modified pectin.

Antimicrobial N-halamine modified chitosan films

Original Research Article

Pages 534-539

Rong Li, Pei Hu, Xuehong Ren, S.D. Worley, T.S. Huang

Highlights

► Cyclic N-halamine-based chitosan was synthesized. ► The synthesized N-halamine-based chitosan was characterized. ► N-halamine-based chitosan showed excellent efficacies against bacteria. ► N-halamine-based chitosan films have potential for food packaging.

Cellulose dissolution at ambient temperature: Role of preferential solvation of cations of ionic liquids by a cosolvent

Original Research Article

Pages 540-544

Airong Xu, Yajuan Zhang, Yang Zhao, Jianji Wang

Highlights

- ▶ Developed effective solvents by adding an aprotic polar solvent to ionic liquid (IL).
- ▶ The solvents can rapidly dissolve cellulose with high solubility without heating.
- ▶ Enhanced cellulose dissolution results from preferential solvation of cations of IL.

In vitro evaluation on novel modified chitosan for targeted antitumor drug delivery

Original Research Article

Pages 545-554

Ding Qu, Haijiao Lin, Nan Zhang, Jingwei Xue, Can Zhang

Highlights

- ▶ Synthesis and characterization of novel amphiphilic chitosan derivatives as drug delivery system.
- ▶ Introduction of phthalyl groups could lower CMC and improve solubility in aqueous and organic system.
- ▶ Drug-loaded micelles with small particle size, narrow distribution and high drug loading efficiency.
- ▶ Enhancement on cellular uptake by active tumor targeting.
- ▶ Mechanism of cellular uptake varied from different surface properties.

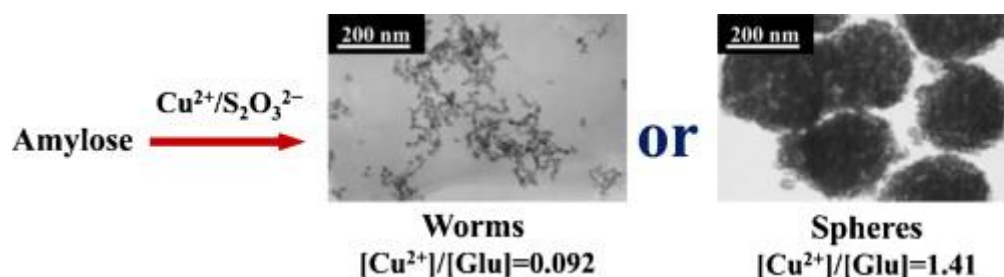
Amylose-directed synthesis of CuS composite nanowires and microspheres

Original Research Article

Pages 555-563

Yinhui Li, Jiwen Hu, Guojun Liu, Ganwei Zhang, Hailiang Zou, Jinheng Shi

Graphical abstract



Highlights

► Synthesis of CuS/amylose nanowires and microspheres in the presence of amylose. ► Preparation of CuS/amylose microspheres with hierarchical structure. ► Shape/size-controlled synthesis of CuS/amylose composite particles. ► Detailed characterization of CuS/amylose composite particle particles.

The interaction of chitosan and olive oil: Effects of degree of deacetylation and degree of polymerization

Original Research Article

Pages 564-570

Ian Ken D. Dimzon, Jürgen Ebert, Thomas P. Knepper

Highlights

► Interaction of chitosans with oil using the fat-binding test was successfully studied. ► Gathered data were fitted into a chemometric model using partial least squares. ► Fat-binding capacity increases linearly as the degree of deacetylation is decreased. ► Fat-binding capacity is minimally affected by the degree of polymerization.

In situ growth of silver nanoparticles on TEMPO-oxidized jute fibers by microwave heating

Original Research Article

Pages 571-576

Xinwang Cao, Bin Ding, Jianyong Yu, Salem S. Al-Deyab

Highlights

► For the first time, Ag nanoparticles were in situ deposited on TEMPO treated jute fibers. ► Ag nanoparticles were synthesized on jute without any reducing reagents. ► The size distributions of Ag nanoparticles on the jute fibers were narrow. ► Jute/nanosilver nanocomposites exhibited superior thermal stability and high crystallinity. ► Microwave heating provides a promising method for preparation of metallic nanoparticles.

A polysaccharide from the fungi of Huaier exhibits anti-tumor potential and immunomodulatory effects

Original Research Article

Pages 577-582

Yi Sun, Tiewei Sun, Feng Wang, Jing Zhang, Cong Li, Xiaoning Chen, Qiang Li, Shibo Sun

Highlights

▶ Cholangiocarcinoma is an aggressive and lethal cancer. ▶ A polysaccharide (W-NTRP) was isolated from *Trametes robiniophila* (Huaier). ▶ W-NTRP inhibits the growth of three human cholangiocarcinoma cell lines. ▶ W-NTRP prompts the splenocytes proliferation. ▶ W-NTRP stimulates macrophages to produce NO through the up-regulation of iNOS activity.

Multi-fingerprint and quality control analysis of tea polysaccharides

Original Research Article

Pages 583-590

Yuanfeng Wang, Jianghui Xian, Xionggang Xi, Xinlin Wei

Highlights

▶ Primary study on the methods of quality assessment for polysaccharide. ▶ Using Chinese herbal medicine fingerprint to quality valuation for polysaccharide. ▶ Many analytical tools are utilized in this paper; multi-fingerprint is proposed. ▶ Quality valuation of multi-fingerprint is verified by other polysaccharide samples. ▶ Different analysis should match along with an appropriate mathematical analysis.

Cardiac repair using chitosan-hyaluronan/silk fibroin patches in a rat heart model with myocardial infarction

Original Research Article

Pages 591-597

Nai-Hsin Chi, Ming-Chia Yang, Tze-Wen Chung, Nai-Kuan Chou, Shoei-Shen Wang

Structural characterization of polysaccharide obtained from red seaweed *Gracilaria caudata* (J Agardh)

Pages 598-603

Francisco C.N. Barros, Draulio C. da Silva, Venicios G. Sombra, Jeanny S. Maciel, Judith P.A. Feitosa, Ana L.P. Freitas, Regina C.M. de Paula

Highlights

▶ Polysaccharide from marine alga *Gracilaria caudata* (PGC) was recovery with 32.8% of yield. ▶ Characterization was performed by microanalysis, FT-IR and NMR spectroscopy. ▶ The structure is constituted by β -d-galactopyranose and 6- α -l-anhydrogalactose. ▶ Methyl and pyruvic acid groups were also detected.

Box–Behnken design based statistical modeling for ultrasound-assisted

extraction of corn silk polysaccharide

Original Research Article

Pages 604-611

J. Prakash Maran, S. Manikandan, K. Thirugnanasambandham, C. Vigna Nivetha, R. Dinesh

Highlights

► UAE of polysaccharide from corn silk. ► Box–Behnken design was applied to find out the optimum conditions. ► Second order polynomial regression models were developed. ► Optimal conditions were determined by Derringer's desired function methodology. ► Experimental values showed good agreement with the values predicted by the model.

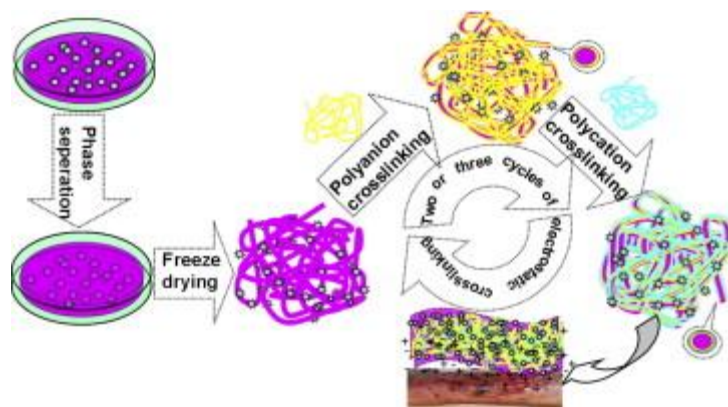
Bioactive glasses-incorporated, core–shell-structured polypeptide/polysaccharide nanofibrous hydrogels

Original Research Article

Pages 612-620

Jian Chen, Xiaoyi Chen, Xianyan Yang, Chunmao Han, Changyou Gao, Zhongru Gou

Graphical abstract



Highlights

► Bioglass particles are incorporated in gelatin nanofibers via phase separation. ► The nanofibers are coated by chitosan–hyaluronic acid by electrostatic crosslinking. ► The composite nanofibers exhibit excellent structural stability in aqueous solution. ► The bioactive inorganic ions could readily release from the composite hydrogel. ► The bioactive hydrogel affords a close biomimicry to the natural soft tissues.

A convenient way to synthesize comb-shaped chitosan-graft-poly (N-isopropylacrylamide) copolymer

Original Research Article

Pages 621-628

Chen Chen, Mingzhu Liu, Chunmei Gao, Shaoyu Lü, Jiucun Chen, Xiyong Yu, Enyong Ding, Chuanming Yu, Jing Guo, Guijia Cui

Highlights

► Comb-shaped CS-g-PNIPAAm copolymer was synthesized via ATRP. ► The grafting reaction occurred on the primary hydroxyl group. ► This multi-responsive copolymer is self-assemble in aqueous solution.

Influence of controlled pH on the activity of UDPG-pyrophosphorylase in *Aureobasidium pullulans*

Pages 629-632

Saikun Pan, Dongrui Yao, Jing Chen, Shengjun Wu

Highlights

► Time course of fermentation was investigated. ► Effect of controlled pH on fermentation was studied. ► The exopolysaccharide prepared in this study was characterized.

Lipase-catalyzed synthesis and characterization of polymers by cyclodextrin as support architecture

Original Research Article

Pages 633-640

Wenhui Liu, Fang Wang, Tianwei Tan, Biqiang Chen

Highlights

► Aliphatic polyesters are synthesized by enzymatic lipase catalysis, without using solvents. ► Lipase from *Candida* sp. initiates the polymerization. ► β -Cyclodextrin safeguards the polymer chain from coagulation. ► High molecular weight polyesters (62,100 Da) are obtained in a three-stage reaction. ► Polymers are stable till 350 °C, with a 72% crystallinity, thus improving the storage modulus.

Hydroquinone modified chitosan/carbon film electrode for the selective

detection of ascorbic acid

Pages 641-644

Harishchandra Digambar Jirimali, Rajaram Krishna Nagarale, Durai Saravanakumar, Jong Myung Lee, Woonsup Shin

Highlights

- ▶ Synthesis and characterization of hydroquinone linked chitosan (Cs-Q) polymer. ▶ Preparation of electroactive porous composite made of Cs-Q polymer with carbon nanoparticles.
- ▶ Facile and selective electrooxidation of ascorbic acid in the presences of the interferences, dopamine and uric acid.

Optimization of selenylation conditions for Chinese angelica polysaccharide based on immune-enhancing activity

Original Research Article

Pages 645-650

Tao Qin, Jin Chen, Deyun Wang, Yuanliang Hu, Mi Wang, Jing Zhang, The Luong Nguyen, Cui Liu, Xu Liu

Highlights

- ▶ Nine selenizing Chinese angelica polysaccharide, sCAP₁–sCAP₉, were prepared. ▶ sCAPs' immune-enhancing activities were compared taking non-modified CAP as control. ▶ Selenylation modification could significantly raise CAP's immune-enhancing activity. ▶ sCAP₂ presented best effect and the optimal modification conditions were defined.

Dissolution and recovery of cellulose from 1-butyl-3-methylimidazolium chloride in presence of water

Original Research Article

Pages 651-658

Masayuki Iguchi, Taku Michael Aida, Masaru Watanabe, Richard L. Smith Jr

Highlights

- ▶ Temperature affects cellulose structure after dissolution in [bmIm][Cl]. ▶ At 90 °C, [bmIm][Cl] and its mixtures with water are non-derivatizing solvents. ▶ At 120 °C, [bmIm][Cl] and its mixtures with water are derivatizing solvents. ▶ Regenerated cellulose has cellulose II

structure at $T = 120$ °C and $t = 10$ h. ► Regenerated cellulose has high amorphous content at $T < 120$ °C or $t < 10$ h.

Polyaniline/cellulose fiber composite prepared using persulfate as oxidant for Cr(VI)-detoxification

Pages 659-661

Xiangyao Liu, Wanpeng Zhou, Xueren Qian, Jing Shen, Xianhui An

Highlights

► Polyaniline/cellulose fiber composite was used for Cr(VI)-detoxification. ► Ammonium persulfate was used as oxidant to prepare the composite. ► The composite was very effective in Cr(VI)-detoxification. ► Cellulose fibers and polyaniline showed synergic effect.

Dual stimuli-responsive *N*-phthaloylchitosan-*graft*-(poly(*N*-isopropylacrylamide)-*block*-poly(acrylic acid)) copolymer prepared via RAFT polymerization

Original Research Article

Pages 662-667

Ke Zhang, Zhengke Wang, Youliang Li, Zhiqiang Jiang, Qiaoling Hu, Minying Liu, Qingxiang Zhao

Highlights

► *N*-Phthaloylchitosan-*g*-(NIPAAm-*b*-PAA) graft copolymer was synthesized via RAFT. ► The chain transfer agent was obtained by modification of chitosan with BPATT. ► The graft copolymer could assemble to micelles in aqueous solution. ► Thermo-responsive behaviors can be tuned by the formation of branch chain and pH.

Chemical, morphology and thermal evaluation of cellulose microfibrils obtained from *Hibiscus sabdariffa*

Original Research Article

Pages 668-674

A. Sonia, K. Priya Dasan

Highlights

► Microfibrils. ► Chemical composition. ► Thermal properties. ► Energy of activation.

Study of algal biomass harvesting using cationic guar gum from the

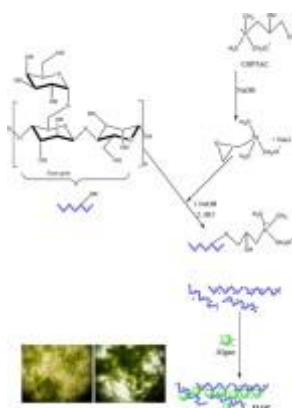
natural plant source as flocculant

Original Research Article

Pages 675-681

Chiranjib Banerjee, Sandipta Ghosh, Gautam Sen, Sumit Mishra, Pratyooosh Shukla, Rajib Bandopadhyay

Graphical abstract



Highlights

► Cationic guar gum (CGG) was synthesized from natural plant source guar gum (GG). ► CGG has higher intrinsic viscosity than GG. ► CGG is proved to be better flocculant than GG towards algal biomass harvesting. ► The optimized dosage was 40 ppm for *Chlorella* sp. CB4 and 100 ppm for *Chlamydomonas* sp. CRP7.

Milling of rice grains: Effects of starch/flour structures on gelatinization and pasting properties

Original Research Article

Pages 682-690

Jovin Hasjim, Enpeng Li, Sushil Dhital

Highlights

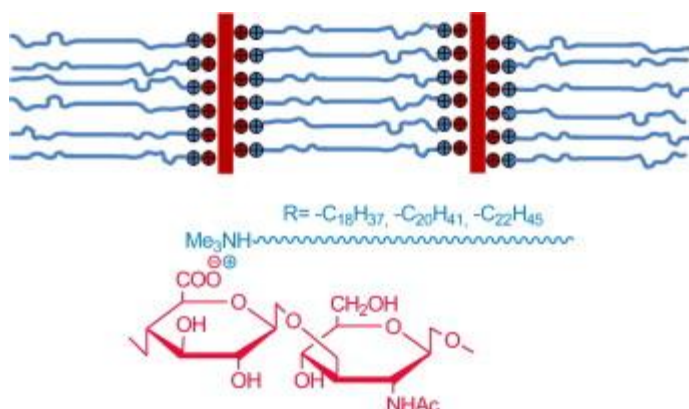
► Flour/starch properties were correlated with 4 levels of structures. ► Flour particle size is the dominant factor for starch gelatinization temperature. ► Starch granular and molecular structures have less effect on starch gelatinization of rice flour. ► Flour particle size strongly affects the RVA pasting temperature. ► Degree of damaged starch strongly affects the RVA final viscosity of rice flour.

Comb-like ionic complexes of hyaluronic acid with alkyltrimethylammonium surfactants

Pages 691-696

Ainhoa Tolentino, Abdelilah Alla, Antxon Martínez de Ilarduya, Sebastián Muñoz-Guerra

Graphical abstract



Highlights

- ▶ Hyaluronic acid with alkyltrimethylammonium surfactants form stable ionic complexes with a comb-like architecture.
- ▶ Comb-like alkyltrimethylammonium–polyhyaluronate complexes melt at temperatures between 50 and 70 °C
- ▶ Comb-like alkyltrimethylammonium–polyhyaluronate complexes are arranged in a biphasic amphiphilic structure.

Production of pullulan by *Aureobasidium pullulans* from Asian palm kernel: A novel substrate

Original Research Article

Pages 697-703

K.R. Sugumaran, E. Gowthami, B. Swathi, S. Elakkiya, S.N. Srivastava, R. Ravikumar, D. Gowdhaman, V. Ponnusami

Highlights

- ▶ Asian palm kernel novel substrate for pullulan production.
- ▶ FTIR, ¹H NMR confirm pullulan production from Asian palm kernel.
- ▶ Under optimum conditions 18.43 g/L pullulan was produced.
- ▶ Use of Asian palm kernel as sole carbon source reduce cost of production.

Structural studies of an immunostimulating gluco-arabinan from seeds of *Caesalpinia bonduc*

Original Research Article

Pages 704-711

Eshita Kar Mandal, Soumitra Mandal, Saikat Maity, Birendra Behera, Tapas K. Maiti, Syed S. Islam

Highlights

► A water-soluble gluco-arabinan (PS-II) was isolated from alkaline extract of seeds of *Caesalpinia bonduc*. ► The structure of this polysaccharide (PS-II) was established by chemical and 2D NMR studies. ► Comparison studies of immunostimulating properties between gluco-arabinan (PS-II) and arabinan (PS-I) were carried out.

Chitin-based renewable materials from marine sponges for uranium adsorption

Original Research Article

Pages 712-718

Dorothea Schleuter, Alix Günther, Silvia Paasch, Hermann Ehrlich, Zoran Kljajić, Thomas Hanke, Gert Bernhard, Eike Brunner

Highlights

► Porous, flexible chitin networks can easily be extracted from marine sponges. ► Uranium from solution can be adsorbed on these networks with higher sorption capacities than other comparable materials. ► The uranium can easily be desorbed using diluted acid. ► The uranium seems to be bound by weak interactions only, such as hydrogen bonds. ► This renewable material may provide an alternative to more elaborate and expensive chitin-based sorbents.

pH-sensitive interpenetrating network hydrogels based on chitosan derivatives and alginate for oral drug delivery

Original Research Article

Pages 719-725

Ji Yang, Jie Chen, Dan Pan, Ying Wan, Zheng Wang

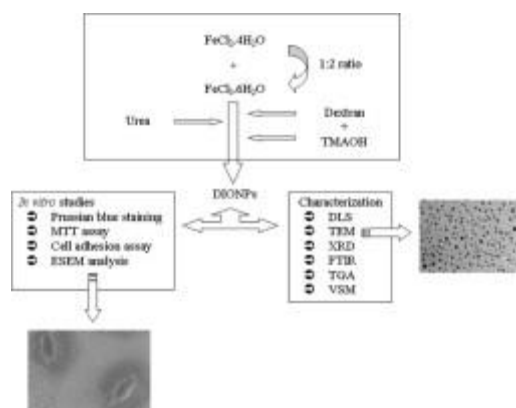
Highlights

► The mPEG-g-CMC and alginate were used to form the hydrogel. ► The mPEG physically mixed with CMC hydrogel was comparative studied. ► BSA was chosen as a model of protein drug. ► The mPEG-g-CMC/alginate was a promising pH-sensitive hydrogel for oral drug delivery.

Dextran stabilized iron oxide nanoparticles: Synthesis, characterization and *in vitro* studies

Original Research Article

Graphical abstract



Highlights

- ▶ DIONPs had an average core size 9.12 ± 1.46 nm.
- ▶ The phase composition of DIONPs corresponds to spinel ferrite.
- ▶ The particles were found to be superparamagnetic.
- ▶ The particles were biocompatible with percentage viability greater than 80%.
- ▶ No significant effect on cell adhesion and cell morphology was observed.

Specific enzymatic tailoring of wheat arabinoxylan reveals the role of substitution on xylan film properties

Original Research Article

Pages 733-740

Susanna L. Heikkinen, Kirsi S. Mikkonen, Kari Pirkkalainen, Ritva Serimaa, Catherine Joly, Maija Tenkanen

Highlights

- ▶ Structure–function relationship of wheat arabinoxylan was studied systematically.
- ▶ Fine structure of wheat arabinoxylan was modified by specific enzymes.
- ▶ Amount and distribution of Araf substituents in WAX clearly affected film properties.

Effects of extraction condition on structural features and anticoagulant activity of *F. vesca* L. conjugates

Original Research Article

Pages 741-750

Izabela Pawlaczyk, Marta Lewik-Tsirigotis, Peter Capek, Mária Matulová, Vlasta Sasinková, Paweł Dąbrowski, Wojciech Witkiewicz, Roman Gancarz

Highlights

► From the Wild strawberry leaves five water-soluble glycoconjugates have been isolated. ► Glycoconjugates were composed of carbohydrate, phenolic and protein components. ► Galacturonans and/or rhamnogalacturonans with arabinogalactans were the main components of carbohydrate parts of conjugates. ► Conjugates **Fv I** and **Fv III**, containing the highest amounts of phenolics, were shown to be the most active in anticoagulant tests.

Cellulose nanocrystals/polyurethane nanocomposites. Study from the viewpoint of microphase separated structure Original Research Article

Pages 751-757

L. Rueda, A. Saralegui, B. Fernández d'Arilas, Q. Zhou, L.A. Berglund, M.A. Corcuera, I. Mondragon, A. Eceiza

Highlights

► Well dispersed nanocrystals in polyurethane due to hydrogen bonding interactions. ► Low nanocrystals content in polyurethane nanocomposites leads to tough material. ► An increase in nanocrystals content induced soft and hard segment crystallization. ► Cellulose network formation can be affected with polyurethane microstructure.

Structural characteristics and antioxidant activities of polysaccharides from longan seed Original Research Article

Pages 758-764

Guoxiang Jiang, Lingrong Wen, Feng Chen, Fuwang Wu, Sen Lin, Bao Yang, Yueming Jiang

Highlights

► The polysaccharide extraction for longan seed was optimized. ► The structural features and antioxidant activities of longan polysaccharides were characterized. ► The structure–antioxidant activity relationships of longan polysaccharides were elucidated.

Measurements of water content in hydroxypropyl-methyl-cellulose based hydrogels via texture analysis

Pages 765-768

Gaetano Lamberti, Sara Cascone, Maria Margherita Cafaro, Giuseppe Titomanlio, Matteo d'Amore, Anna Angela Barba

Highlights

► A fast method to estimate the water content in HPMC matrices was proposed. ► The method is based on work of penetration measurements by texture analysis. ► The method was tuned by comparison with a traditional gravimetric technique. ► The novel tool is of interest for pharmaceutical and food applications.

pH-indicators doped polysaccharide LbL coatings for hazardous gases optical sensing Original Research Article

Pages 769-774

A. Yu. Mironenko, A.A. Sergeev, S.S. Voznesenskiy, D.V. Marinin, S. Yu. Bratskaya

Highlights

► Exponentially growing LbL films of marine polysaccharides have been built up. ► Congo red and bromothymol blue entrapped in LbL form optical sensitive layers. ► Optical waveguide sensors for NH₃ and HCl detection have been fabricated. ► Lowest detection limit of the LbL-based optical sensor for NH₃ is below 1 ppm. ► Congo red-doped LbL film can be applied as optical switch sensitive to acid vapor.

Preparation of dry ultra-porous cellulosic fibres: Characterization and possible initial uses Original Research Article

Pages 775-783

Anna Svensson, Per Tomas Larsson, German Salazar-Alvarez, Lars Wågberg

Highlights

► The open structure of water swollen cellulose fibres was preserved in dry state. ► The open structure was preserved by liquid exchange and careful drying. ► The open structure was used as scaffold for in situ polymerization. ► Properties of fibrils were utilized in a composite without taking the fibre apart. ► A new way of preparing biocomposite material from cellulose fibres is described.

Biochemical properties of a novel glycoside hydrolase family 1 β -glucosidase (PtBglu1) from *Paecilomyces thermophila* expressed in *Pichia pastoris* Original Research Article

Pages 784-791

Shaoqing Yang, Chengwei Hua, Qiaojuan Yan, Yinan Li, Zhengqiang Jiang

Highlights

► A β -glucosidase gene (*PtBglu1*) from *Paecilomyces thermophila* was cloned for the first time. ► The gene was expressed extracellularly in *Pichia pastoris* at high level. ► The enzyme was purified and characterized. ► The enzyme exhibited a broad range of substrate specificity.

Structural diversity of fungal glucans Review Article

Pages 792-809

Andriy Synytsya, Miroslav Novák

Highlights

► Fungal glucans represent a number of structurally variable polysaccharides. ► There are various linear or branched α -, β - and mixed α , β -d-glucans. ► Structure of fungal glucans depends on the source and the way of isolation. ► Molecular masses and glycoside bond positions are also highly variable. ► Chemical modifications of fungal glucans improve their properties for medicinal use.

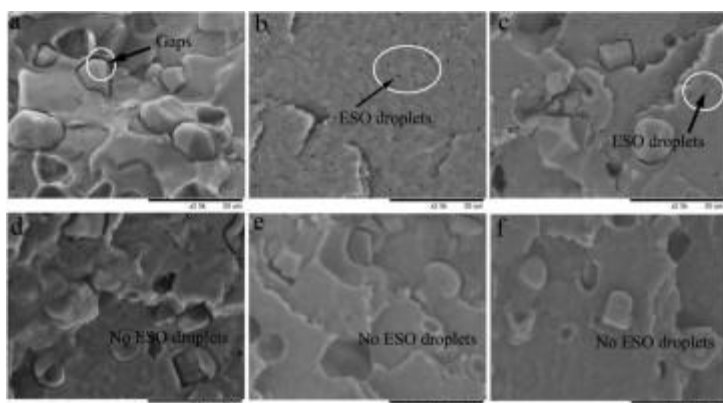
Preparation and characterization of poly(lactic acid)/starch composites toughened with epoxidized soybean oil

Original Research Article

Pages 810-816

Zhu Xiong, Yong Yang, Jianxiang Feng, Xiaomin Zhang, Chuanzhi Zhang, Zhaobin Tang, Jin Zhu

Graphical abstract



Highlights

► It has no report about PLA/starch blends toughened and compatibilized by ESO. ► The elongation at break increased very significantly because of the addition of ESO. ► The miscibility and mechanical properties of PLA/starch/ESO ternary blends could be further improved via the MA grafting native starch. ► ESO droplets were not observed in PLA matrix after MA grafting starch in .

Optimization of chitosan treatments for managing microflora in lettuce seeds without affecting germination

Original Research Article

Pages 817-823

M.G. Goñi, M.R. Moreira, G.E. Viacava, S.I. Roura

Highlights

► Chitosan reduced *in vitro* growth of targeted microorganisms. ► Chitosan imbibition (60 min) reduced superficial seed microflora but inhibited germination. ► 10 min contact between seeds and chitosan (10 g/L) did not affect germination.

Modulation of pro-inflammatory mediators in LPS-stimulated human periodontal ligament cells by chitosan and quaternized chitosan Original Research Article

Pages 824-829

Qiuxia Ji, Jing Deng, Xinbo Yu, Quanchen Xu, Hong Wu, Jianfeng Pan

Highlights

► Chitosan stimulated the proliferation of HPDLCs at 1 d, 3 d and 5 d. ► Quaternized chitosan improved the proliferation at 1 µg/mL concentrations after 5 d culture. ► Chitosan inhibited the production of IL-1β and TNF-α at 24, 48 and 72 h. ► Quaternized chitosan significantly increased IL-1β and TNF-α production at 24, 48 and 72 h. ► The production of IL-1β and TNF-α was inhibited by bFGF.

Chemical and functional properties of cell wall polymers from two cherry varieties at two developmental stages Original Research Article

Pages 830-841

María F. Basanta, Marina F. de Escalada Plá, Carlos A. Stortz, Ana M. Rojas

Highlights

► Cell wall polysaccharides of two cherry (unripe and ripe) varieties were studied. ► Cell wall matrix was mainly diferulated pectins with arabinan side chains at RG-I. ► RG-I with long arabinan chains were anchored into XG-cellulose network. ► HG and diferulated pectin rheology helped to justify the higher Regina firmness. ► Pectin loss in residues of the sequential extractions decreased hydration ability.

Thermal effects on the structure of cereal starches. EPR and Raman spectroscopy studies Original Research Article

Pages 842-848

Maria Łabanowska, Aleksandra Wesołucha-Birczyńska, Magdalena Kurdziel, Paulina Puch

Highlights

► Thermal generation of radicals in cereal starches investigated by EPR and Raman spectroscopies. ► Differences in the radical generation processes occurring in corn and potato starch. ► The influence of starch fractions ratio and phosphorus content on the radicals formation upon thermal treatment.

Study of “*napier grass*” delignification for production of cellulosic derivatives

Original Research Article

Pages 849-855

Andreia de Araújo Morandim-Giannetti, Tiago Santos Albuquerque, Renata Kobal Campos de Carvalho, Ramires Menezes Silva Araújo, Rodrigo Magnabosco

Highlights

► Pulping process with calcium oxide. ► Bleaching technology using hydrogen peroxide. ► A lignocellulosic material alternative: “*napier grass*”.

Self-assembled nanoparticles of modified-chitosan conjugates for the sustained release of DL- α -tocopherol

Original Research Article

Pages 856-864

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

Highlights

► Vitamin E was linked to O6-succinylated chitosan and glycol chitosan. ► Resulting conjugates formed self-assembled nanoparticles in aqueous solution. ► Almost constant release rates were observed during the first 7 h. ► Self-assembled nanoparticles exhibited antioxidant activity. ► Resulting nanoparticles enhanced Human Microvascular Endothelial Cells viability.

Preparation and characterization of bagasse/HDPE composites using multi-walled carbon nanotubes

Original Research Article

Pages 865-871

Alireza Ashori, Shabnam Sheshmani, Foad Farhani

Highlights

► 0.5–1.5 wt% of MWCNTs can improve tensile and flexural properties to a considerable level. ► Addition of MWCNTs and MAPE reduced water absorption and thickness swelling properties. ► Composites containing 4 wt% MAPE and 1.5 wt% MWCNTs had the maximum improvements. ► With increasing MWCNTs loading up to 1.5 wt%, agglomeration of nanoparticles were occurred.

Sulfated modification of the polysaccharide from *Cordyceps gunnii* mycelia and its biological activities

Original Research Article

Pages 872-876

Zhen-Yuan Zhu, Yang Liu, Chuan-Ling Si, Jing Yuan, Qiang Lv, Yuan-Yuan Li, Guo-Ling Dong, An-Jun Liu, Yong-Min Zhang

Highlights

► *Cordyceps gunnii* is also well known as the Chinese rare caterpillar fungus. ► A chemically new sulfated polysaccharide was prepared from *Cordyceps_gunnii*. ► The structural characteristics of sulfated polysaccharide were determined. ► The anti-oxidant and anti-tumor activities were investigated.

A novel green gelatin–agar microencapsulation system with *P. urinaria* as an improved anti-*A. niger* model

Pages 877-880

Pik-Ling Lam, Stanton Hon-Lung Kok, Yiu-Wah Ho, Raymond Siu-Ming Wong, Gregory Yin-Ming Cheng, Chor-Hing Cheng, Kim-Hung Lam, Roberto Gambari, Kenneth Ka-Ho Lee, Chung-Hin Chui

Highlights

► We report *Phyllanthus urinaria* microcapsules prepared by a green agar/gelatin-based system.
► Microencapsulated *P. urinaria* showed a stronger growth inhibition toward *Aspergillus niger* than the free drug. ► Microencapsulated *P. urinaria* is suggested to enhance the anti-*A. niger* activity of the original drug.

CP/MAS ¹³C NMR study of pulp hornification using nanocrystalline cellulose as a model system

Pages 881-884

Alexander Idström, Harald Brelid, Magnus Nydén, Lars Nordstierna

Highlights

► Hornification of paper pulp is studied using solid-state NMR. ► Nanocrystalline cellulose (NCC) is used as model for the crystalline parts of pulp. ► Signs of hornification can be seen for both paper pulp and NCC after drying. ► Conclusion is that the crystalline parts of paper pulp contribute to hornification. ► Elements of higher hydrophobicity in NCC experiences increased aggregation.

Conferring flame retardancy on cotton using novel halogen-free flame retardant bifunctional monomers: synthesis, characterizations and applications Original

Research Article

Pages 885-893

Hammad A. Cheema, Ahmed El-Shafei, Peter J. Hauser

Highlights

▶ Two novel halogen-free P–N flame retardant bifunctional monomers were synthesized. ▶ Synthesized monomers greatly improved the charring as shown by TGA. ▶ Self extinguishing cotton was achieved by monomer 2. ▶ Bifunctionality in monomers significantly improved washing durability. ▶ Effective halogen-free flame retardant bifunctional monomers were developed.

Relationship of the channels of normal maize starch to the properties of its modified products Original Research Article

Pages 894-904

Zhongquan Sui, James N. BeMiller

Highlights

▶ The degree of channelization of maize starch is not the main factor in determining DS. ▶ Different reagents react differently with different maize starches. ▶ Differences in the starch determined by genetics carry through chemical derivatization.

Structure and physicochemical properties of octenyl succinic anhydride modified starches: A review Review Article

Pages 905-920

Michael C. Sweedman, Morgan J. Tizzotti, Christian Schäfer, Robert G. Gilbert

Highlights

▶ Starches modified by octenyl succinic acid are used extensively in industry. ▶ Applications include nutritional products and stabilizers. ▶ Their synthesis, characterization and structure are reviewed.

Effect of sonochemical treatments on the integrity and oxidation state of cellulose Original Research Article

Pages 921-927

Bojan Stefanovic, Thomas Rosenau, Antje Potthast

Highlights

▶ Sonication of cellulose in suspension causes not very pronounced degradation. ▶ Sonication in solution causes cellulose oxidation, i.e. carbonyl group introduction. ▶ Carbonyl groups are located at or very close to the terminal glucopyranose units. ▶ Cellulose degradation increases with increasing temperature.

Plasma-induced polymerization for enhancing paper hydrophobicity Original Research Article

Pages 928-933

Zhaoping Song, Jiebin Tang, Junrong Li, Huining Xiao

Highlights

► Plasma-induced grafting of hydrophobic monomers on paper is presented. ► Modified paper sheets show excellent hydrophobic properties. ► The modified paper with high contact angle above 120° could be easily achieved. ► The plasma power and plasma treatment time should be controlled. ► The resulting paper sheets are of great potential as packaging materials.

Study of *Astragalus mongholicus* polysaccharides on endothelial cells

permeability induced by HMGB1 Original Research Article

Pages 934-941

Yun-Jiang Zheng, Bin Zhou, Zhi-Fang Song, Lei Li, Jun Wu, Ru-Yuan Zhang, Yao-Qing Tang

Highlights

► APS suppressed HMGB1-induced a progressive increase in permeability in ECs. ► APS suppressed HMGB1-induced morphological changes in ECs. ► APS inhibited the activation of Rho and its downstream effector Rho kinase. ► APS reduced the levels of myosin light chain phosphorylation in ECs.

Editorial Board

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