Carbohydrate Polymers

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4 **Characterization and controlled release aloe extract of collagen protein modified cotton fiber**

Original Research Article
Pages 982-988
Yunhui Xu, Chen Huang, Xiaoming Wang
(747 K) |

Highlights

► The CPMCF is prepared by the reaction of oxidized cotton fiber with collagen protein. ►

Collagen protein combined with oxidized cotton fiber by the C N of imine bond. ► Controlled release of aloe anthraquinone extract using the CPMCF as a drug carrier. ► Crystallinity of the CPMCF is determined by peaks separation and curves imitation of the diffractograms.

5 **Laccase-assisted formation of bioactive chitosan/gelatin hydrogel stabilized with plant polyphenols**

Original Research Article
Pages 989-996
Guillem Rocasalbas, Antonio Francesko, Sonia Touriño, Xavier Fernández-Francos, Georg M. Guebitz, Tzanko Tzanov
(621 K) |

Highlights

► Laccase-assisted formation of chitosan/gelatin hydrogel with plant phenolics. ► Mechanical properties of the hydrogel are function of the reaction time. ► Stable under physiological conditions and resistant to lysozyme degradation. ► Capacity to inhibit myeloperoxidase and collagenase activities. ► Hydrogel antibacterial activity against *P. aeruginosa* and *S. aureus*.

6 **Kinetics and mechanism of imidazole-catalyzed acylation of cellulose in LiCl/*N*,*N*-dimethylacetamide**

Original Research Article
Pages 997-1005
Haq Nawaz, Paulo Augusto R. Pires, Omar A. El Seoud
(914 K) |

Supplementary content

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Highlights

► Kinetics of cellulose acylation is conveniently studied by conductivity. ► Acylation of cellulose is not catalyzed by tosyl chloride. ► Imidazole catalysis occurs via intermediate formation of N-acylimidazole. ► Dependence on structure of *N*-acylimidazole is due to enthalpy/entropy compensation. ► Reason for catalysis is lower enthalpy and higher entropy of activation.

Highlights

► We investigated the rheological and thermal properties of MCC/lignin/PLA composites. ► The composites were fabricated through direct melt compounding. ► The well-dispersed MCC increased cold crystallization temperature.

Highlights

► Silver nanoparticles (AgNPs) are prepared using carboxymethyl chitosan (CMCTS). ► CMCTS–AgNPs are mixed with polyethylene oxide (PEO). ► CMCTS–AgNPs/PEO mixture is subjected to electrospinning. ► The electrospun nanofiber is evaluated against pathogenic/non-pathogenic bacteria.

Highlights

► Xanthan–konjac mannan interaction has been studied by DSC and rheometry. ► Xanthan–konjac mannan association and gelation only occurs at or below the xanthan coil–helix transition. ► The thermal and rheological properties of the gels are influenced by the presence of salt. ► The gel temperature and gel strength can be controlled by manipulating the xanthan fine structure.

10 **Higher order structures of a bioactive, water-soluble (1→3)-β-D-glucan derived from *Saccharomyces cerevisiae***

Original Research Article
Pages 1026-1032
Fen Qin, Marit Sletmoen, Bjørn Torger Stokke, Bjørn E. Christensen
(867 K) |

Highlights

► Soluble (1→3)-β-d-glucans (SBG) were studied by DLS, AFM and SEC-MALLS. ► Dilute solutions contain mixtures of single chains, triple-stranded chains and higher aggregates and particulate material. ► Particulate fractions are enriched in long chains which are most prone to chain association. ► The size distribution shifts to lower values upon heating, but hysteresis is observed when cooling.

11 **Novel injectable and *in situ* cross-linkable hydrogels of dextran methacrylate and scleroglucan derivatives: Preparation and characterization**

Original Research Article
Pages 1033-1039
Federica Corrente, Hend M. Abu Amara, Settimio Pacelli, Patrizia Paolicelli, Maria Antonietta Casadei
(621 K) |

Supplementary content

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Highlights

► Novel injectable and *in situ* cross-linkable hydrogels were prepared. ► Dextran methacrylate and native or carboxymethylated scleroglucan were employed. ► Both Scl and Scl-CM improved the mechanical properties of DEX-MA hydrogels. ► The new hydrogels were harder,

more elastic and easy to work with than DEX-MA ones. ► These systems were able to modulate the release of biomolecules with different M_w.

12 **Antiproliferative potential of *Artemisia capillaris* polysaccharide against human nasopharyngeal carcinoma cells**

Original Research Article
Pages 1040-1045
Guofang Feng, Xiaoqing Wang, Changxuan You, Xiaohua Cheng, Zeli Han, Liang Zong, Chengyong Zhou, Meikui Zhang
(770 K) |

Highlights

► One polysaccharide (WACP) is purified from the *Artemisia capillaris*. ► WACP exhibits anti-proliferation activity on CNE-2 cells by inducing apoptosis. ► Mitochondrial membrane depolarization and cytochrome c release result in caspase-3/9 activation. ► Mitochondria-mediated pathway involves in apoptosis induced by WACP.

13 **Interactions of a cationic cellulose derivative with an ultrathin cellulose support**

Original Research Article
Pages 1046-1053
Tamilselvan Mohan, Cíntia Salomão Pinto Zarth, Aleš Doliška, Rupert Kargl, Thomas Grießer, Stefan Spirk, Thomas Heinze, Karin Stana-Kleinschek
(1175 K) |

Highlights

► Adsorption of a cationic cellulose derivative is studied on hydrophilic substrates. ► On SiO_2 substrates no adsorption is detected. ► On nanometric cellulose films, at pH 7 and 8 irreversible adsorption takes place. ► Adsorption is probably due to structural similarity rather than electrostatics.

14 **New hyaluronic acid based brush copolymers synthesized by atom transfer radical polymerization**

Original Research Article
Pages 1054-1063
Giovanna Pitarresi, Calogero Fiorica, Mariano Licciardi, Fabio Salvatore Palumbo, Gaetano Giammona
(1220 K) |

Highlights

► Synthesis of two hyaluronic acid based macroinitiators. ► Atom transfer radical polymerization (ATRP). ► Synthesis and characterization of hyaluronic acid based brush copolymers. ► New hyaluronic acid derivatives with potential in biomedical and pharmaceutical field.

15 **Modulating the behaviors of C3A cells via surface charges of polyelectrolyte multilayers**

Original Research Article
Pages 1064-1070
Xiaobo Huang, Naiming Lin, Ruiqiang Hang, Xiaoguang Wang, Xiangyu Zhang, Bin Tang
(793 K) |

Highlights

► On PEMs with a PLL layer, C3A cells attach, proliferate and form monolayer. ► Cells aggregate and exhibit improved function on PEMs with a ALG layer. ► Cell fate is correlated with the protein adsorption on the surface.

16 **Polysaccharides from *Bupleurum chinense* impact the recruitment and migration of neutrophils by blocking fMLP chemoattractant receptor-mediated functions**

Original Research Article
Pages 1071-1077
Haibin Tong, Dan Tian, Zhongmei He, Yang Liu, Xiaodan Chu, Xin Sun
(789 K) |

Highlights

► BCPs, the polysaccharides from *Bupleurum chinense*, impact the recruitment and migration of neutrophils. ► BCPs significantly blocks the fMLP chemoattractant receptor-mediated functions, including regulation of affinity and avidity of β2 integrin, actin polymerization, and Vav1 and Rac1 activation. ► We provide novel mechanistic insights into the poorly understood signaling network that polysaccharides interfere with the migration of leukocytes to inflammatory sites.

17 **Preparation and antimicrobial property of chitosan oligosaccharide derivative/rectorite nanocomposite**

Original Research Article
Pages 1078-1085

Bo Liu, Xiaoying Wang, Chunsheng Pang, Jiwen Luo, Yuqiong Luo, Runcang Sun
(1356 K) |

Highlights

► QCMCO/REC (QCOR) nanocomposite was achieved under microwave irradiation in 70 min. ► It was much faster than conventional heating method of 48 h. ► There were hydrogen bonding and electrostatic interaction between QCMC and REC. ► Compared to QCMC, QCOR nanocomposites had higher thermal stability. ► Compared to QCMC, QCOR nanocomposites showed stronger antimicrobial activity.

18 **Purification, characterization and anticoagulant activity of the polysaccharides from green tea**

Original Research Article
Pages 1086-1090
Weirong Cai, Liangliang Xie, Yong Chen, Hong Zhang
(458 K) |

Highlights

► Four major polysaccharide fractions were purified with DEAE sepharose CL-6B. ► The average molecular weight was analyzed by HPGPC. ► Monosaccharide composition of polysaccharide fractions were analyzed HPAEC–PAD. ► TPS-4 showed significant anticoagulant activity in APTT and TT assay.

19 **Synthesis and swelling behavior of xanthan-based hydrogels**

Original Research Article
Pages 1091-1099
Vania Blasques Bueno, Ricardo Bentini, Luiz Henrique Catalani, Denise Freitas Siqueira Petri
(1487 K) |

Supplementary content

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Highlights

► Xanthan was crosslinked by heating esterification, forming hydrogels. ► Tensiometry allowed understanding the swelling mechanism of xanthan hydrogels. ► Quasi-Fickian, Fickian and Anomalous Diffusion were observed for hydrogels. ► Swelling degree increased at high pH

values due to ester linkages rupture. ► Swelling degree was affected by salts, depending on gel composition and salt.

20 **Diameter-tuning of electrospun cellulose acetate fibers: A Box–Behnken design (BBD) study**

Original Research Article
Pages 1100-1106
Rocktotpal Konwarh, Manjusri Misra, Amar K. Mohanty, Niranjan Karak
(1042 K) |

Highlights

► Box–Behnken design is used to predict electrospun cellulose acetate fiber diameter. ► Voltage, tip-to-collector distance and feed rate exert linear and quadratic effect. ► Fiber morphology and size-spectrum are dependent on the chosen variables. ► Reasonable agreement exists between observed and predicted fiber diameter. ► The model may aid in studying process-parametric modulations on fiber-diameter.

21 **Scleroglucan compatibility with thickeners, alcohols and polyalcohols and downstream processing implications**

Original Research Article
Pages 1107-1115
Silvana C. Viñarta, Mariana M. Yossen, Jorge R. Vega, Lucía I.C. Figueroa, Julia I. Fariña
(1015 K) |

Supplementary content

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Highlights

► *Sclerotium rolfsii* ATCC 201126 EPSs were compatible and synergistic with commercial hydrocolloids. ► Mixtures with polyethylene glycol (PEG) or lower alcohols induced EPSs precipitation. ► PEG-based scleroglucan downstream processing would be unsuitable. ► Purity, solubility, rheological properties and appearance were optimal for isopropanol-purified EPSs. ► Isopropanol-downstream processing was appropriate for obtaining refined-grade scleroglucan.

22 **Bionanowhiskers from jute: Preparation and characterization**

Original Research Article
Pages 1116-1123
Nibedita Kasyapi, Vidhi Chaudhary, Anil K. Bhowmick
(1375 K) |

Highlights

► Bionanowhiskers were extracted from jute by acid hydrolysis for the first time. ► These were characterized by different sophisticated analytical techniques. ► In FTIR, absence of peak at 1738 cm^{-1} indicated removal of hemicellulose. ► Rod like morphology (length – 550 ± 100 nm, width – 77 ± 30 nm) was observed.

23 **Core–shell nanocarriers with ZnO quantum dots-conjugated Au nanoparticle for tumor-targeted drug delivery**

Original Research Article
Pages 1124-1132
Tong Chen, Tong Zhao, Dongfeng Wei, Yanxia Wei, Yuanyuan Li, Haixia Zhang
(1403 K) |

Supplementary content

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Highlights

► We synthesized core–shell structured multifunctional nanocarriers. ► Nanocarriers had great potential as tumor-targeted drug delivery nanocarrier. ► Nanocarriers had certain antitumor activities. ► Tumor cells could be killed by the cooperation of nanocarriers and drugs.

24 **Characterisation of commercial LM-pectin in aqueous solution**

Original Research Article
Pages 1133-1142
Xiangyang Li, Saphwan Al-Assaf, Yapeng Fang, Glyn O. Phillips
(1529 K) |

Highlights

► Characterisation of 14 commercial LM-pectin recently supplied by major producers. ► Molecular aggregation in various concentrations of pectin solutions detected by various techniques. ► Role of extrinsic factors in LM pectin gelation and thickening properties.

25 **Artificial simulated saliva, gastric and intestinal digestion of polysaccharide from the seeds of *Plantago asiatica* L.**

Original Research Article
Pages 1143-1150
Jie-Lun Hu, Shao-Ping Nie, Fang-Fang Min, Ming-Yong Xie
(935 K) |

Supplementary content

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Highlights

► Saliva, gastric and intestinal digestion of polysaccharide was studied *in vitro*. ► Salivary amylase had no effect on the polysaccharide. ► Polysaccharide molecular weight decrease was found in gastrointestinal digestion. ► Reducing ends increased but no monosaccharide released during the digestion. ► Polysaccharide molecular weight decrease may due to breakdown of glycosidic bonds.

26 **Characterization of non-linear rheological behavior of SPI–FG dispersions using LAOS tests and FT rheology**

Original Research Article
Pages 1151-1158
Chong-hao Bi, Dong Li, Li-jun Wang, Yong Wang, Benu Adhikari
(954 K) |

Highlights

► LAOS test was used to generate the nonlinear stress response. ► The Fourier transform rheology was used in analyzing the nonlinear behavior. ► Flaxseed gum strongly affected the deformation of nonlinear stress response curve. ► Flaxseed gum significantly altered magnitude of higher harmonic curve.

27 **Effects of oat *β*-glucan on endurance exercise and its anti-fatigue properties in trained rats**

Original Research Article
Pages 1159-1165
Chao Xu, Junli Lv, Y. Martin Lo, Steve W. Cui, Xinzhong Hu, Mingtao Fan
(705 K) |

Highlights

► The anti-fatigue effect of β-glucan was investigated. ► β-Glucan can significantly reduce the weight gain of rats and prolong their maximum running time. ► β-Glucan decreased BUN, LA levels and increased the NEFA and liver glycogen contents. ► β-Glucan decreased CK activity, and increased lactic dehydrogenase activity in serum.

28 **Antioxidant activity of xanthan oligosaccharides prepared by different degradation methods**

Original Research Article
Pages 1166-1171
Xiaoying Xiong, Ming Li, Jing Xie, Qi Jin, Bin Xue, Tao Sun
(445 K) |

Highlights

► Two kinds of xanthan oligosaccharides with similar molecular weights were prepared by different degradation methods. ► XGOS-B (prepared under alkaline condition) showed better antioxidant activity than XGOS-A (prepared under acidic condition). ► The antioxidant activity of xanthan oligosaccharides was influenced by the pyruvate acid content and reducing sugar content. ► The relationship of antioxidant activity and degradation method was revealed.

29 **A novel method for promoting antioxidant exopolysaccharidess production of *Bacillus licheniformis***

Original Research Article
Pages 1172-1176
Yaowei Fang, Shu Liu, Mingsheng Lu, Yuliang Jiao, Shujun Wang
(494 K) |

Highlights

► We described a novel method for improving the production of antioxidant extracellular polysaccharides from *Bacillus licheniformis*. ► The tolerances of the strains to the organic solvent were examined. ► We investigated the effects of concentrations of n-hexane and xylene stress treatment on the extracellular polysaccharides excretion from *Bacillus licheniformis*. ► The hereditary stability of *Bacillus licheniformis* OSTK95 and strain UD061 were tested.

30 **Antibacterial activity and cell viability of hyaluronan fiber with silver nanoparticles**

Original Research Article
Pages 1177-1187
A.M. Abdel-Mohsen, Radim Hrdina, Ladislav Burgert, Rasha M. Abdel-Rahman,

Martina Hašová, Daniela Šmejkalová, Michal Kolář, M. Pekar, A.S. Aly
(2253 K) |

Highlights

► Green synthesis of hyaluronan fiber by wet-spinning technique. ► Hyaluronan fiber was used as stabilizing agent for preparation of silver nanoparticles. ► The so-prepared was confirmed by FTIR, NMR, TEM, DLS, XPS, UV–vis, DSC, and TGA. ► Hyaluronan fiber with silver nanoparticles was evaluated for cell viability and antibacterial activity.

31 **Influence of rutin, $FeSO_4$, Tween 80, aspartate and complex vitamins on synthesis of fungal exopolysaccharide**

Original Research Article
Pages 1188-1196
Xiao-Kui Ma, Hong Zhang, Hala Fam
(1079 K) |

Highlights

► The antioxidative activity (TEAC) of exopolysaccharide (EPS) by fungi may be affected by components. ► Rutin, aspartate, $FeSO_4$, vitamins and Tween 80 affected EPS production and TEAC by *Phellinus* sp. P0988. ► The relative effect of these components on EPS production was shown to be $FeSO_4$ > Tween 80 > rutin > aspartate. ► The relative effect on EPS TEAC was aspartate > rutin > $FeSO_4$ > Tween 80. ► These results yielded EPS and TEAC with 6.2 ± 0.2 g/L and 5.5 ± 0.1 mM, respectively.

32 **Optimization of extraction process of crude polysaccharides from Pomegranate peel by response surface methodology**

Original Research Article
Pages 1197-1202
Caiping Zhu, Xiaolin Liu
(706 K) |

Highlights

► Extraction of crude polysaccharides from Pomegranate peel. ► Response surface methodology was used. ► Extraction time, temperature and ratio of water to the raw material were discussed. ► Model was set up to optimization extraction of Pomegranate peels polysaccharides. ► The best extraction methods were 98 °C, 1.9 h and 37 ml/g of ratio of water to material.

33 **Immobilization of ethylene sulfide in aminated cellulose for removal of the divalent cations**

Original Research Article
Pages 1203-1210
Edson C. Silva Filho, Luciano C.B. Lima, Fabrícia C. Silva, Kaline S. Sousa, Maria G. Fonseca, Sirlane A.A. Santana
(620 K) |

Highlights

► Aminated cellulose was modified with ethylene sulfide in free solvent conditions. ► Modified cellulose can be used as an adsorbent for cations removal. ► The order of divalent metal sorption was $Pb^{2+} > Cd^{2+} > Ni^{2+} > Co^{2+} > Cu^{2+} > Zn^{2+}$. ► The maximum sorption occur for Pb^{2+}.

34 **The protective effect of MT-α-glucan against streptozotocin (STZ)-induced NIT-1 pancreatic β-cell damage**

Original Research Article
Pages 1211-1217
Lei Hong, Wang Qin, Guo Shuzhen, Han Juncheng, Sun Hanju, Zhang Xiaoxiang, Wu Wutong
(724 K) |

Highlights

► MT-α-glucan is a new kind of α-glucan purified from fruit body of maitake. ► MT-α-glucan has protective effect on damaged NIT-1 pancreatic β-cells induced by streptozotocin in vitro. ► MT-α-glucan could decrease levels of β-cell-destroying factors such as oxidative stress and NO synthesis.

35 **Study on preparation and separation of Konjac oligosaccharides**

Original Research Article
Pages 1218-1224
Wenjie Jian, Yuanming Sun, Huan Huang, Youhui Yang, Shuhui Peng, Bo Xiong, Tingtiao Pan, Zhenlin Xu, Mingxiang He, Jie Pang
(1043 K) |

Highlights

► Konjac oligosaccharides were prepared by γ-irradiation and β-mannanase. ► It was analyzed by gel permeation chromatography and ion exchange column in HPLC. ► The oligosaccharides could be effectively separated by ultrafiltration.

36 **Biocompatible nanofibers based on extremophilic bacterial polysaccharide, Mauran from *Halomonas maura***

Original Research Article
Pages 1225-1233
Sreejith Raveendran, Brahatheeswaran Dhandayuthapani, Yutaka Nagaoka, Yasuhiko Yoshida, Toru Maekawa, D. Sakthi Kumar
(2474 K) |

Highlights

► Extremophilic bacterial polysaccharide based nanofibers were made for first time. ► Developed for tissue engineering applications. ► Using mauran extracted from *Halomonas maura* and PVA. ► Introduced mauran as a novel, stable and versatile biomaterial to nanotechnology. ► Mauran showed biocompatibility against mesenchymal stem cells and connective tissue.

37 **Structural analysis of fructans produced by acetic acid bacteria reveals a relation to hydrocolloid function**

Original Research Article
Pages 1234-1242
Frank Jakob, Andre Pfaff, Ramon Novoa-Carballal, Heinrich Rübsam, Thomas Becker, Rudi F. Vogel
(778 K) |

Highlights

► Fructans of acetic acid bacteria (AAB) were identified as levans. ► Some of these levans exhibit extraordinarily high molecular weight. ► Levans adopted a more compact structure with increasing molecular weight. ► Molecular weight and compactness contribute to their hydrocolloid character.

38 **A new arabinoxylan from green leaves of *Litsea glutinosa* (Lauraeae): Structural and biological studies**

Original Research Article
Pages 1243-1248
Debsankar Das, Swatilekha Maiti, Tapas K. Maiti, Syed S. Islam
(670 K) |

Highlights

► Arabinoxylan was isolated from hot water extract of green leaves of *Litsea glutinosa*. ► Its structure was established by chemical and 2D NMR studies. ► This molecule showed immunomodulating properties.

39 **Structural variation of rice starch in response to temperature during microwave heating before gelatinisation**

Original Research Article
Pages 1249-1255
Daming Fan, Liyun Wang, Shenyan Ma, Wenrui Ma, Xiaoming Liu, Jianlian Huang, Jianxin Zhao, Hao Zhang, Wei Chen
(832 K) |

Highlights

► We study starch structural variation during microwave heating at subgelatinisation. ► We also use oil bath to imitate the high heating rate of microwave heating. ► Effect of different heating rates on starch structure is also analysed. ► Thermal physics methods are used to analyse strength variation of hydrogen bonds. ► Starch lamellar organisation is obtained through small angle X-ray scattering.

40 **Acetylation of banana (*Musa paradisiaca* L.) and corn (*Zea mays* L.) starches using a microwave heating procedure and iodine as catalyst: II. Rheological and structural studies**

Original Research Article
Pages 1256-1261
Mirna M. Sánchez-Rivera, Sirlen Almanza-Benitez, Luis A. Bello-Perez, Guadalupe Mendez-Montealvo, María C. Núñez-Santiago, Sandra L. Rodriguez-Ambriz, Felipe Gutierrez-Meráz
(365 K) |

Highlights

► Banana starch was more resistant to acetylation in relation to normal corn starch. ► Restricted swelling was present in acetylated banana starch. ► Degree substitution of acetylated starches influenced the rheological parameters. ► Native banana starch contains high amount of long chains of amylopectin in relation to normal corn starch.

41 **Hyaluronic acid based scaffolds for tissue engineering—A review**

Review Article
Pages 1262-1279
Maurice N. Collins, Colin Birkinshaw
(1656 K) |

Highlights

► Review on hyaluronic acid (HA) for tissue engineering applications. ► Latest HA modifications and crosslinking reactions used in tissue engineering. ► Optimisation of these reactions through hydrodynamics is highlighted. ► Latest processing and applications of HA based scaffolds are reviewed.

42 **A review of polysaccharide cytotoxic drug conjugates for cancer therapy**

Review Article
Pages 1280-1293
N. Goodarzi, R. Varshochian, G. Kamalinia, F. Atyabi, R. Dinarvand
(804 K) |

Highlights

► Biocompatibility, molecular weight and type of linkers are the core factors in rational drug-conjugate design. ► Conjugates generally show lower in vitro cytotoxicity in comparison with free drug. ► Superiority of the conjugates is the performance in vivo where distribution determines efficacy and safety. ► Better simulation and using more reliable in vitro cell culture models accelerate finding the best in vivo candidates.

43 **Detection of Lewis antigen structural change by FTIR spectroscopy**

Original Research Article
Pages 1294-1301
A.T. Lewis, K. Jones, K.E. Lewis, S. Jones, P.D. Lewis
(629 K) |

Highlights

► We evaluate FTIR as a tool to identify structural changes to Lewis x antigens. ► FTIR provides distinct infrared patterns for oligosaccharides. ► FTIR can detect characteristic infrared patterns for unmodified, sialylated and sulphated Lewis x. ► Lewis x specific infrared patterns are identifiable in disease tissue.

44 **Antibacterial activity of konjac glucomannan/chitosan blend films and**

their irradiation-modified counterparts

Pages 1302-1307
Xuezhu Du, Lingxiao Yang, Xiao Ye, Bin Li
(924 K) |

Supplementary content

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Highlights

► Antibacterial activity of KGM/CHI blend films and their irradiated counterparts were tested. ► Antibacterial activity against *Escherichia coli* and *Pseudomonas aeruginosa* also increased after the irradiation. ► KC2-25 is a promising biomedical material for its good mechanical properties, biocompatibility.

45 **Scutellarin-cyclodextrin conjugates: Synthesis, characterization and anticancer activity**

Original Research Article
Pages 1308-1314
Bo Yang, Yu-Lin Zhao, Xia Yang, Xia-Li Liao, Jian Yang, Ji-Hong Zhang, Chuan-Zhu Gao
(593 K) |

Supplementary content

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Highlights

► Three scutellarin-β-cyclodextrin conjugates were prepared and confirmed. ► XRD and TG spectrometry characterized these conjugates. ► The aqueous solubility of the conjugates was much higher than that of scutellarin. ► The conjugates could hardly be hydrolyzed to scutellarin in aqueous solutions. ► The anti-colon cancer activities of the conjugates were better than that of scutellarin.

46 **Stability of inclusion complex formed by cellulose in NaOH/urea aqueous solution at low temperature**

Original Research Article
Pages 1315-1320

Xingzhen Qin, Ang Lu, Jie Cai, Lina Zhang
(948 K) |

Highlights

► The effect of the proportion of solvent on aggregation behavior of cellulose was investigated by light scattering. ► The mechanism of NaOH, urea and temperature on the cellulose solution stability was established. ► Stable cellulose solution was obtained.

47 **Effects of NH_4Cl and $MgCl_2$ on pretreatment and xylan hydrolysis of miscanthus straw**

Original Research Article
Pages 1321-1326
Kyeong Eop Kang, Don-Hee Park, Gwi-Taek Jeong
(424 K) |

Highlights

► This is focused on the xylan hydrolysis of miscanthus straw using NH_4Cl and $MgCl_2$. ► Increasing pretreatment temperature increased enzymatic digestibility and xylan removal. ► With pretreatment time, the enzymatic digestibility was increased. ► Pretreatment by 2% NH_4Cl or $MgCl_2$ at 185 for 15 min completely hydrolyzes xylan. ► Surface area was damaged and exposed the internal structure by pretreatment.

48 **Heating rate effect on char yield from cotton, poly(ethylene terephthalate) and blend fabrics**

Original Research Article
Pages 1327-1334
Jenny Alongi, Giovanni Camino, Giulio Malucelli
(1008 K) |

Highlights

► The heating rate effect on char yield for cotton, PET and blend fabrics was studied. ► The overall degradation process of cotton and PET is the result of several competing reactions. ► The yield and thermal stability of char depend on the kinetic control of the degradation reactions.

49 **Development of model for barrier and optical properties of tapioca starch based edible films**

Original Research Article

Pages 1335-1347
J. Prakash Maran, V. Sivakumar, R. Sridhar, K. Thirugnanasambandham
(1657 K) |

Highlights

► Edible films were prepared from tapioca starch by casting method. ► Experiments were performed according to Box-Behnken experimental design. ► Second order polynomial models were developed for barrier and optical properties. ► Adequacies of the developed models were checked.

50 **Complexation of copper(II) with chitosan nanogels: Toward control of microbial growth**

Original Research Article
Pages 1348-1356
Fabrice Brunel, Nour Eddine El Gueddari, Bruno M. Moerschbacher
(1038 K) |

Highlights

► Elaboration of stable chitosan nanogels loaded with large amounts of copper(II) ions. ► Chitosan–copper(II) complex controlled the release of copper(II) as a function of the pH. ► Biodegradation of chitosan nanogels, using chitosanolytic enzymes. ► Synergy of antifungal activities between copper(II) and chitosan (solution or dispersion).

51 **Hemicellulose-based pH-sensitive and biodegradable hydrogel for controlled drug delivery**

Original Research Article
Pages 1357-1366
Xiao-Feng Sun, Hai-hong Wang, Zhan-xin Jing, Rajaratnam Mohanathas
(1281 K) |

Highlights

► Hemicelluloses isolated from wheat straw were employed to prepare pH-sensitive hydrogels. ► The swelling ratio of the hydrogel showed apparent transition at physiological pH. ► The swelling kinetics followed Fickian diffusion process in media of pH 1.5. ► The hemicelluloses content and crosslinking density affected the biodegradation. ► Drug release was controlled together by hydrogel and the intrinsic character of drug.

52 **Starch derivative-based superabsorbent with integration of water-retaining and controlled-release fertilizers**

Original Research Article
Pages 1367-1376
Kang Zhong, Zuan-Tao Lin, Xi-Liang Zheng, Gang-Biao Jiang, Yu-Sheng Fang, Xiao-Yun Mao, Zong-Wen Liao
(753 K) |

Supplementary content

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Highlights

► The synthetic superabsorbent is based on sulfonated corn starch. ► The superabsorbent integrates water-retaining and controlled-release fertilizers. ► The maximum swelling capacity: 498 g g^{-1} (water), 65 g g^{-1} (0.9 wt.% NaCl solution). ► The synthetic superabsorbent polymer is biodegradable. ► The starch sulfate could improve the phosphorus release greatly.

53 **Stabilization of mitochondrial and microsomal function of fucoidan from *Sargassum plagiophyllum* in diethylnitrosamine induced hepatocarcinogenesis**

Original Research Article
Pages 1377-1385
Veeraperumal Suresh, Chinnathambi Anbazhagan, Ramar Thangam, Dharmaraj Senthilkumar, Namasivayam Senthilkumar, Soundarapandian Kannan, Ramasamy Rengasamy, Perumal Palani
(1452 K) |

Graphical abstract

Highlights

► Sulphated polysaccharide was extracted from brown seaweed of *Sargassum plagiophyllum*. ► Entire thallus having SPs and blade contains more polysaccharides than other parts. ► Q-Sepharose fast flow anion-exchange chromatography was used to purify fucoidan. ► Fucoidan involved in oxidative stress and mitochondrial damage in Wister rats. ► Fucoidan treated HCC rat liver exhibited different pathological appearances.

54 **Combined UV-protecting and reactive printing of Cellulosic/wool blends**

Original Research Article
Pages 1386-1394
N.A. Ibrahim, E.M.R. El-Zairy, W.A. Abdalla, H.M. Khalil
(1113 K) |

Highlights

► Reactive printing of Cellulose/wool blends. ► Modification of printing formulation using UV-absorbers or blockers. ► High quality prints with a remarkable UV-protective function.

55 **Determining the effects of microwave heating on the ordered structures of rice starch by NMR**

Original Research Article
Pages 1395-1401
Daming Fan, Wenrui Ma, Liyun Wang, Jianlian Huang, Fengmin Zhang, Jianxin Zhao, Hao Zhang, Wei Chen
(650 K) |

Highlights

► Set up three heating models to study the effect of microwave on rice starch. ► Use ^{13}C CP/MAS NMR to investigate the ordered and disordered structures of starch. ► The heating rate has major effect on the ordered and disordered structure of starch. ► The electromagnetic effect of microwave did not affect the starch structure contents.

56 **Stabilisation of silver and copper nanoparticles in a chemically modified chitosan matrix**

Original Research Article
Pages 1402-1407
Anand D. Tiwari, Ajay K. Mishra, Shivani B. Mishra, Alex T. Kuvarega, Bhekie B. Mamba
(920 K) |

Highlights

► Stabilisation of Ag (20 nm) and Cu (50 nm) nanoparticles. ► Better optical properties for silver nanoparticles as surface plasmon band (407 nm). ► Optical properties of copper were found better than silver nanoparticles.

57 **Production and characterization of extracellular carbohydrate polymer from *Cyanothece* sp. CCY 0110**

Original Research Article
Pages 1408-1415
Rita Mota, Rodrigo Guimarães, Zsófia Büttel, Federico Rossi, Giovanni Colica, Carla J. Silva, Carla Santos, Luís Gales, Andrea Zille, Roberto De Philippis, Sara B. Pereira, Paula Tamagnini
(956 K) |

Highlights

► The marine cyanobacterium *Cyanothece* sp. CCY 0110 is an efficient RPS producer. ► Amount of carbohydrates released is mainly related to the number of cells (growth). ► Light is a key factor with high light intensities enhancing RPS production. ► RPS: Nine residues (two uronic acids), sulfate groups, peptides, thermostable, amorphous. ► Potential for biotechnological applications.

58 **Quantitative relationship between electrospinning parameters and starch fiber diameter**

Original Research Article
Pages 1416-1422
Lingyan Kong, Gregory R. Ziegler
(2053 K) |

Highlights

► Fractional factorial experimental design in a constrained region. ► Empirical modeling of the relationship between selected process parameters and starch fiber diameter. ► Contour plots used to predict the direction to minimize and maximize the starch fiber diameter.

59 **The photocrosslinkable tissue adhesive based on copolymeric dextran/HEMA**

Original Research Article
Pages 1423-1431
Tao Wang, Xueyan Mu, Haibo Li, Weilong Wu, Jun Nie, Dongzhi Yang
(2276 K) |

Highlights

► Photocrosslinkable gels were prepared from copolymeric urethane dextran and HEMA. ► The process of gelation was fast and simple with the help of photocuring. ► The addition of HEMA remarkably improved the adhesive strength and cell attachment. ► These gels were adequate to be novel tissue adhesives.

60 **Present status and applications of bacterial cellulose-based materials for skin tissue repair**

Original Research Article
Pages 1432-1442
Lina Fu, Jin Zhang, Guang Yang
(1421 K) |

Graphical abstract

Highlights

► BC is expected to be a commodity material in various fields. ► We summarize basic properties and bio-fabrication of BC for skin tissue repair. ► Composites prepared by using BC in conjunction with polymers are addressed. ► Experimental and clinical results show a good performance of BC-based materials.

61 **Stability and solubility enhancement of ellagic acid in cellulose ester solid dispersions**

Original Research Article
Pages 1443-1450
Bin Li, Kim Harich, Lindsay Wegiel, Lynne S. Taylor, Kevin J. Edgar
(1003 K) |

Supplementary content

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Highlights

► Carboxycellulose ester dispersions prevent ellagic acid degradation, crystallization. ► Carboxycellulose esters prevent low pH release and recrystallization of ellagic acid. ► HPMCAS strongly enhances ellagic acid solution concentration. ► Dispersion in polymer blends can provide synergistic drug stabilization and release.

62 ☐ **Molecular and supra-molecular structure of waxy starches developed from cassava (*Manihot esculenta* Crantz)**

Original Research Article
Pages 1451-1462
Agnès Rolland-Sabaté, Teresa Sanchez, Alain Buléon, Paul Colonna, Hernan Ceballos, Shan-Shan Zhao, Peng Zhang, Dominique Dufour
(817 K) |

Supplementary content

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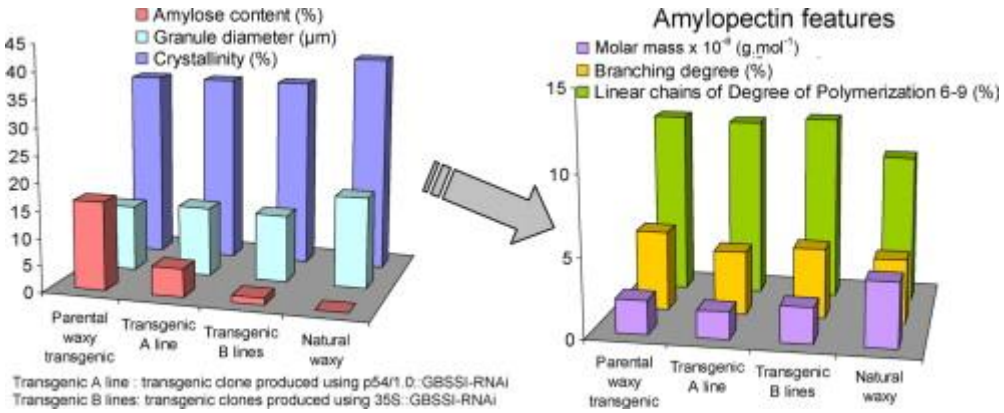
Graphical abstract



Highlights

► Multiscale deep structural characterization of a series of transgenic waxy cassava. ► Differences in starch structure between natural and transgenic waxy cassava lines. ► Link

between structural features and the mutated gene expression approached. ► Structure of transgenic waxy cassava amylopectins similar to their parental one.

63 **Evaluation of free and immobilized *Aspergillus niger* NRC1ami pectinase applicable in industrial processes**

Original Research Article
Pages 1463-1469
Mona A. Esawy, Amira A. Gamal, Zeinat Kamel, Abdel-Mohsen S. Ismail, Ahmed F. Abdel-Fattah
(570 K) |

Highlights

► The free and immobilized *Aspergillus niger NRC1ami24* pectinase properties were studied. ► All the obtained results confirmed the priority of immobilized enzyme. ► The immobilized enzyme recommended strongly to be used in industrial applications.

64 **Chitosan–hyaluronan/nano chondroitin sulfate ternary composite sponges for medical use**

Original Research Article
Pages 1470-1476
B.S. Anisha, Deepthi Sankar, Annapoorna Mohandas, K.P. Chennazhi, Shantikumar V. Nair, R. Jayakumar
(1755 K) |

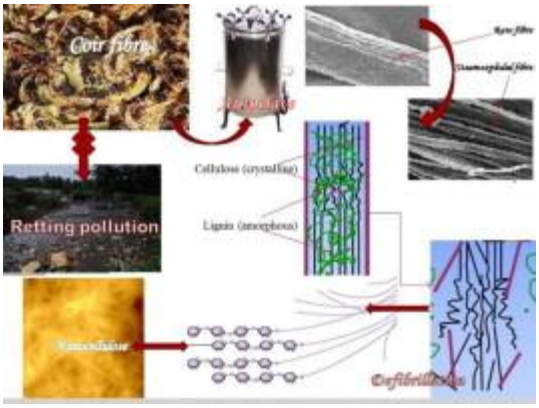
Highlights

► A biocompatible and biodegradable chitosan–HYA/nCS composite sponge was developed. ► The nanocomposite sponge showed optimum porosity, swelling and biodegradation. ► These sponges showed enhanced blood clotting and platelet activation. ► Nanocomposite sponges showed enhanced cell viability, attachment and proliferation.

65 **Environmental friendly method for the extraction of coir fibre and isolation of nanofibre**

Original Research Article
Pages 1477-1483
Eldho Abraham, B. Deepa, L.A. Pothen, J. Cintil, S. Thomas, M.J. John, R. Anandjiwala, S.S. Narine
(925 K) |

Graphical abstract



Highlights

► An environmental friendly method for the extraction of coir fibre. ► Enhancing the effective utilization of coir fibre and to avoid its retting process. ► Reveals the presence of lignin–cellulose complex in the raw coir fibre. ► Successfully isolated a homogenous dispersion of nanocellulose fibrils.

66 **Physicochemical and functional characteristics of lentil starch**

Original Research Article
Pages 1484-1496
M. Joshi, P. Aldred, S. McKnight, J.F. Panozzo, S. Kasapis, R. Adhikari, B. Adhikari
(1350 K) |

Highlights

► Physicochemical and functional properties of lentil starch were compared to those of corn and potato starches. ► Amylose content of these starches followed: lentil starch > corn starch > potato starch order. ► Crystallinity and gelatinization enthalpy followed: potato starch > corn starch > lentil order. ► Gelatinization and pasting temperatures of lentil starch were in between corn and potato starches. ► Lentil starch gels had the highest storage modulus, gel strength and pasting viscosity.

67 **Removal of Remazol turquoise Blue G-133 from aqueous solution using modified waste newspaper fiber**

Original Research Article
Pages 1497-1502
Xiaoyu Zhang, Jia Tan, Xinhao Wei, Lijuan Wang
(585 K) |

Highlights

► Modified waste newspaper fiber (MWNF) was utilized as a sorbent for the removal of RTB G-133 from aqueous solution. ► The maximum adsorption capacity reached 260 mg g^{-1}. ► Adsorption kinetics of RTB G-133 on MWNF in a batch process well followed pseudo-second order model. ► Langmuir isotherm model well described the adsorption of RTB G-133 on MWNF. ► The adsorption of RTB G-133 on MWNF is a spontaneous endothermic process.

Highlights

► Effect of 4αGTase-treated starch on stability of W/O/W during heating was studied. ► Effect of included 4αGTase-treated starch was dependent on the PGPR levels. ► Development of agent for temperature-triggered release system using starch.

Highlights

► We developed the thermosensitive ferulic acid-linked hydrogel. ► The gelation temperature of the developed hydrogel was 32.17 °C under neutral pH. ► The developed biocompatible hydrogel can treat cells from the oxidative stress.

Highlights

► Modification of wool using MCT-βCD. ► Post-printing using sodium alginate thickener. ► After-treatment with Ag-NP's and Triclosan derivatives. ► Wool prints with pronounced antibacterial activity.

71 **Dielectric studies of amylose, amylopectin and amylose–stearic acid complexes**

Original Research Article
Pages 1530-1538
Richard A. Pethrick, Ma Song
(932 K) |

Highlights

► Dielectric property of amylose, amylopectin and amylose–stearic acid complex. ► Activation energy for CH_2OH dipole rotation sensitive to molecular structure. ► Study of chain backbone local reorientation dynamics. ► Effects of complex formation on dynamics explored. ► Effect of gel structure in complex on dielectric behaviour explored.

72 **Enhancing some functional properties of viscose fabric**

Original Research Article
Pages 1539-1545
H.M. Fahmy, R.A.A. Eid, S.S. Hashem, A. Amr
(696 K) |

Highlights

► Tinosan® CEL enhances the antibacterial properties of viscose fabrics. ► Combination of PVP with some nano-particles enhances the functional properties. ► Combination of Silicon®-SLH softener and Tinosan® CEL enhances the antibacterial properties.

73 **Polyion–counterion interactions in sodium carboxymethylcellulose–ethylene glycol–water ternary solutions**

Original Research Article
Pages 1546-1554
Ramesh Sharma, Chanchal Das, Sanjay Dahal, Bijan Das
(820 K) |

Highlights

► Sodium carboxymethylcellulose was studied in aqueous glycol (EG) conductometrically. ► Concentration-dependent moderate counterion condensation (24–33%) was observed. ► Counterion condensation is spontaneous and depends upon EG-content and temperature. ► A major part of the current is transported by the carboxymethylcellulose polyions. ► Monomers feel more friction as EG-content increases and temperature decreases.

74 **Natural porous agar materials from macroalgae**

Original Research Article
Pages 1555-1560
Matteo Francavilla, Antonio Pineda, Carol S.K. Lin, Massimo Franchi, Pasquale Trotta, Antonio A. Romero, Rafael Luque
(624 K) |

Supplementary content

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Highlights

► We report a microwave-assisted methodology for agar extraction from *Gracilaria gracilis*. ► The biopolymer could be transformed into a novel family of mesoporous materials. ► They could be used as templates for the production of nanocrystals of metal oxides.

75 **Biochemical properties of *Hemigraphis alternata* incorporated chitosan hydrogel scaffold**

Pages 1561-1565
M. Annapoorna, P.T. Sudheesh Kumar, Lakshmi R. Lakshman, Vinoth-Kumar Lakshmanan, Shantikumar V. Nair, R. Jayakumar
(1003 K) |

Highlights

► Cost effective synthesis of herbal based composite scaffold. ► The scaffold showed an adequate porosity, water uptake and degradation. ► The scaffold posses an effective blood clotting and antibacterial activity. ► The herbal scaffold showed enhanced cell attachment and proliferation.

76 **Studies on the orthogonal assembly of β-cyclodextrin-poly (ε-caprolactone) and ferrocene-poly (ethylene oxide)**

Original Research Article

Pages 1566-1572
Jiang Ming-Wei, Guo Cheng-Gong, Wang Liang, Li Ya-Kun, Wang Cai-Qi
(911 K) |

Highlights

► β-cyclodextrin-PCL (CD-PCL) with a hollow cavity and hydrophobic tails was obtained. ► CD-PCL orthogonally constructed into a new supramolecular copolymer with FcPEG. ► CD-PCL/FcPEG self-assembled into nanospheres, while CD-PCL formed into vesicles. ► A new route to form different nano structures with biodegradability was developed.

77 **Effects of supercritical water and mechanochemical grinding treatments on physicochemical properties of chitin**

Original Research Article
Pages 1573-1578
Mitsumasa Osada, Chika Miura, Yuko S. Nakagawa, Mikio Kaihara, Mitsuru Nikaido, Kazuhide Totani
(1251 K) |

Highlights

► Effect of supercritical water and mechanochemical grinding on properties of chitin was studied. ► Pretreatment reduced mean molecular weight, crystallinity index, and crystallite size. ► The *d*-spacing of chitin increased after the pretreatment. ► The enzymatic degradation ratio with pretreatment was 93% (5% without pretreatment). ► Pretreatment improved chitin hydrophilicity and enhanced enzyme access.

78 **Biodegradable multilayer barrier films based on alginate/polyethyleneimine and biaxially oriented poly(lactic acid)**

Original Research Article
Pages 1579-1585
Chun-Hong Gu, Jia-Jun Wang, Yang Yu, Hui Sun, Ning Shuai, Bing Wei
(1377 K) |

Highlights

► Biodegradable multilayer films were prepared based on alginate and BOPLA. ► The oxygen barrier of the ALG/PEI coated BOPLA film was significantly improved. ► WVP, tensile properties and optical clarity were also studied. ► A possible barrier mechanism was proposed.

79 **Mannose-poly(ethylene glycol)-linked SPION targeted to antigen presenting cells for magnetic resonance imaging on lymph node**

Original Research Article
Pages 1586-1595
Muthunarayanan Muthiah, Hieu Vu-Quang, You-Kyoung Kim, Joon Haeng Rhee, Sang Hyeon Kang, Soo Youn Jun, Yun-Jaie Choi, Yong Yeon Jeong, Chong-Su Cho, In-Kyu Park
(1644 K) |

Highlights

► Mannose in the Mannose-PEG-SPION efficiently targets the APCs in lymph node. ► Mannose-PEG-SPION, after intravenous injection in rats, was tracked by MR imaging. ► The accumulation of Mannose-PEG-SPION in the lymph node was also confirmed by Prussian blue staining. ► Mannose-PEG-SPION was found to have a great potential for LN specific MR imaging.

80 **Evaluation of corncob hemicellulosic hydrolysate for xylitol production by adapted strain of *Candida tropicalis***

Original Research Article
Pages 1596-1601
Swati Misra, Shailendra Raghuwanshi, R.K. Saxena
(466 K) |

Highlights

► 21.98 g/L of xylose obtained with optimized conditions as 1:8 (w/v), 1% H_2SO_4 and 30 min ► Adapted strain of *C. tropicalis* results 1.22-fold increase in yield and 1.70-fold enhanced productivity. ► Hydrolysate concentrated under vacuum using rotavapor is an efficient process. ► Immobilized cells of *C. tropicalis* resulted in 70% (approx.) efficiency up to third cycle. ► Xylitol production could be scaled up to 10 L fermentor.

81 **Extraction optimization and bioactivity of exopolysaccharides from *Agaricus bisporus***

Original Research Article
Pages 1602-1607
Yong Mao, Jian Mao, Xiangyong Meng
(765 K) |

Highlights

► *Agaricus bisporus* was used for production of EPS. ► RSM was used for EPS extraction from fermentation broth in submerged culture of *Agaricus bisporus*. ► *Agaricus bisporus* EPS showed good antioxidant properties *in vitro*. ► *Agaricus bisporus* EPS showed good hypoglycemic activity.

Highlights

► DFA III production of coupled enzyme reaction was founded. ► DFA III yield was obtained about 100 mg/g. ► Inulin would be substituted by sucrose for DFA III preparation.

Highlights

► The concept of degradation of xanthan with H_2O_2 is modest. ► The hydrolysis conditions were optimized. ► The xanthan-derived oligosacchrides have high hydroxyl radical scavenging activity.

Highlights

► Heparin-folate-retinoic acid bioconjugates for targeted delivery of a photosensitizer. ► The bioconjugates could self-assemble and encapsulate the photosensitizer. ► The bioconjugates

showed targeted anti-cancer effect of retinoic acid. ► Pheo A in the nanoparticles showed remarkable phototoxicity and targeting effects.

85 **Starch nanoparticles formation via high power ultrasonication**

Original Research Article
Pages 1625-1632
Sihem Bel Haaj, Albert Magnin, Christian Pétrier, Sami Boufi
(1785 K) |

Highlights

► Nano-sized starch particles (NSP) were prepared using a purely physical. ► The starch nanoparticles were obtained by high-intensity ultrasonication at low temperature. ► The nanosized character was confirmed by DLS and FE-SEM observation. ► The present approach leads to a high yield in nanoparticles and do not require any chemical treatment.

86 **Improved stability and controlled release of ω3/ω6 polyunsaturated fatty acids by spring dextrin encapsulation**

Original Research Article
Pages 1633-1640
Jin Xu, Wenxiu Zhao, Yawei Ning, Mohanad Bashari, Fengfeng Wu, Haiying Chen, Na Yang, Zhengyu Jin, Baocai Xu, Lixia Zhang, Xueming Xu
(1376 K) |

Highlights

► Spring dextrin encapsulation complexes can improve the stability and controlled release of α-linolenic acid (or linoleic acid). ► Enzymatic digestion release is related to the degree of unsaturation of the fatty acid. ► Less linear polyunsaturated fatty acid requires a wider helix cavity. ► Van der Waals attraction is the primary driving force toward complexation.

87 **Physico-chemical studies and emulsifying properties of *N*-propyl-*N*-methylene phosphonic chitosan**

Original Research Article
Pages 1641-1646
Liliana Albertengo, Sonia Farenzena, Adriana Debbaudt, Adriana Zuñiga, Pablo Schulz, Maria Susana Rodriguez
(833 K) |

Highlights

► Low concentration solutions of chitosan derivative are formed by free molecules. ► At higher concentrations chitosan derivative form aggregates in several steps. ► In alkaline medium coiled molecules stretch and give a cooperative reaction. ► Derivative has emulsifying properties forming O/W emulsions. ► Emulsions have high stability to long time storage.

88 **Effect of dry heat treatment with xanthan on waxy rice starch**

Original Research Article
Pages 1647-1652
Yue Li, Huien Zhang, Charles F. Shoemaker, Zhiting Xu, Song Zhu, Fang Zhong
(479 K) |

89 **On the importance of organization of glucan chains on thermal properties of starch**

Original Research Article
Pages 1653-1659
Varatharajan Vamadevan, Eric Bertoft, Koushik Seetharaman
(602 K) |

Supplementary content

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Highlights

► The internal organization of chains in amylopectin influence thermal properties. ► Thermal properties cannot be solely explained in terms of chain length distribution. ► The exterior chain length influences gelatinization enthalpy.

90 **Sulfation of *Aegle marmelos* gum: Synthesis, physico-chemical and functional characterization**

Original Research Article
Pages 1660-1668
Manish Jindal, Vikas Rana, Vineet Kumar, Ram S. Singh, John F. Kennedy, Ashok K. Tiwary
(834 K) |

Highlights

► Ratio of CSA:Pyr was found to exert maximum influence on the degree of substitution ► FTIR-ATR and NMR studies confirmed sulfation to have occurred in the gum. ► sBFG2 gave higher swelling in both acidic and alkaline pH. ► sBFG2 was superior firmness, cohesiveness, consistency and index of viscosity. ► sBFG2 exhibited greater viscosity and work of shear.

91 **Cellulose/$CaCO_3$ nanocomposites: Microwave ionic liquid synthesis, characterization, and biological activity**

Original Research Article
Pages 1669-1676
Ming-Guo Ma, Yan-Yan Dong, Lian-Hua Fu, Shu-Ming Li, Run-Cang Sun
(1815 K) |

Highlights

► Cellulose/CaCO3 nanocomposites were successfully prepared. ► A green strategy of microwave-assisted ionic liquid method was developed. ► The solvents had an effect on the shape of products. ► The influence of alkali extraction cellulose concentration was investigated. ► The biological activity of cellulose/CaCO3 nanocomposites was evaluated.

92 **An approach to the impact of nanoscale vat coloration of cotton on reducing agent account**

Original Research Article
Pages 1677-1684
O.A. Hakeim, S.H. Nassar, A.A. Raghab, L.A.W. Abdou
(1150 K) |

Highlights

► Nanoscale vat dyes with particle sizes ~20 nm were successfully prepared. ► Pigmentation of vat dyes was carried out producing a new crystal form. ► The ball milling and chemical structure of dyes were influential. ► The nanosize vat color exhausted on cotton more than the conventional one. ► The nanosize vat colors can behave as a leuco form in absence of reducing agent. ► This focus reflects on environmental concern with respect to reducing agent.

93 **Pharmaceutical applications of various natural gums, mucilages and their modified forms**

Review Article
Pages 1685-1699
Vipul D. Prajapati, Girish K. Jani, Naresh G. Moradiya, Narayan P. Randeria
(644 K) |

Highlights

► Various naturally available gums and mucilages are classified in different ways. ► More than 80 natural sources of gums and 50 mucilages sources are described. ► Pharmaceutical applications of reported gums and mucilages are explained in tables.

94 **Pulsed electric field-assisted modification of pectin from sugar beet pulp**

Original Research Article
Pages 1700-1704
Sen Ma, Zhong-he Wang
(484 K) |

Highlights

► Pectin-arachates were prepared in one-step modification without any solvent. ► Pulsed electric field (PEF) has a favorable effect on synthesis of pectin-arachates. ► The degree of esterification (DE) ranging from 61 to 84 were obtained with PEF assist.

95 **Mixture design applied for the study of the tartaric acid effect on starch/polyester films**

Original Research Article
Pages 1705-1710
J.B. Olivato, M.M. Nobrega, C.M.O. Müller, M.A. Shirai, F. Yamashita, M.V.E. Grossmann
(627 K) |

Highlights

► The effect of tartaric acid in starch/PBAT blends were evaluated. ► A mixture design was used to evaluate the effects in mechanical and barrier properties. ► Intermediate proportions of tartaric acid produced films with better properties. ► Biodegradable films with good properties were obtained. ► This showed to be an interesting alternative to the non-biodegradable packaging.

96 **Thermo-mechanical behaviors of thermoplastic starch derived from sugar palm tree (*Arenga pinnata*)**

Original Research Article
Pages 1711-1716
J. Sahari, S.M. Sapuan, E.S. Zainudin, M.A. Maleque
(901 K) |

Highlights

► We successfully develop thermoplastic starch derived from sugar palm tree. ► We examine that the addition of glycerol decrease the Tg of plasticized SPS. ► The mechanical properties of plasticized SPS increase with increasing of glycerol. ► The water absorption of plasticized SPS decrease with increasing of glycerol. ► We investigate the morphological fracture through scanning electron microscopy.

97 ***In situ* modifications to bacterial cellulose with the water insoluble polymer poly-3-hydroxybutyrate**

Original Research Article
Pages 1717-1723
Dianne R. Ruka, George P. Simon, Katherine M. Dean
(1163 K) |

Highlights

► Properties of bacterial cellulose (BC) can be altered using non-growth based additives. ► BC properties were modified with the addition of poly-3-hydroxybutyrate (PHB). ► PHB was incorporated into the BC fibrils during production. ► PHB modified BC offers an improved interface with BC in a PHB composite matrix.

98 **Screening of polysaccharides for preparation of α-amylase conjugate to enhance stability and storage life**

Original Research Article
Pages 1724-1729
Swati B. Jadhav, Rekha S. Singhal
(762 K) |

Supplementary content

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Highlights

► Screening of polysaccharides for conjugation of α-amylase to enhance stability. ► Conjugation of α-amylase with dextran showed best thermal and pH stability. ► Dextran conjugate showed antimicrobial activity against challenged/added organism. ► Dextran conjugate suppressed aerobic flora in liquid formulation of α-amylase.

99 **Preparation, characterization and antioxidant activity of two partially N-acetylated chitotrioses**

Original Research Article
Pages 1730-1736
Kecheng Li, Song Liu, Ronge Xing, Yukun Qin, Pengcheng Li
(789 K) |

Highlights

► An N-acetylated chitotriose mixture is prepared. ► N-acetylchitotriose (D2A) and N,N′-diacetylchitotriose (DA2) were separated. ► The main isomers of D2A and DA2 were DDA and ADA, respectively. ► N-acetylation enhanced the antioxidant activity of chitotriose.

100 **The crystal structure of mono-ethylenediamine β-chitin from synchrotron X-ray fiber diffraction**

Original Research Article
Pages 1737-1742
Daisuke Sawada, Satoshi Kimura, Yoshiharu Nishiyama, Paul Langan, Masahisa Wada
(1220 K) |

Supplementary content

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Highlights

► The hydroxymethyl group O6 takes the *gt* conformation. ► The complexed ethylenediamine molecule has a trans conformation. ► The amine group was accepting hydrogen-bonding from O6 as in the case of cellulose.

101 **Brucite nanoplates reinforced starch bionanocomposites** Original Research Article
Pages 1743-1751
Francys K.V. Moreira, Daniel C.A. Pedro, Gregory M. Glenn, José M. Marconcini, Luiz H.C. Mattoso
(1196 K) |

Highlights

► Starch and brucite have attractive potential to develop bionanocomposites. ► Brucite nanoplates can interact with starch matrices though hydrogen bonding. ► Increasing brucite amount greatly increase mechanical properties of starch films. ► Brucite nanoplates could be effective to enhance the thermal stability of starch. ► Relationships between bionanocomposite property and brucite amount are reported.

Highlights

► Cellulose/collagen hydrolysate (RC/CH) films were prepared by a ‘green’ way. ► Combined with RC film improved the CH stability in wet condition. ► Crosslinking with genipin improved the mechanical properties of RC/CH films. ► These composite films showed potential application in the biomaterials field.

Highlights

► Extraction yield was optimized by the utilization of response surface methodology. ► Optimum operational conditions for maximizing extraction yield were obtained. ► All the enzymes and non-enzymatic antioxidant were assayed. ► EUP can protect the tissue oxidative damage in rabbits.

Highlights

► PLA/corn cob composites were prepared from agricultural waste. ► The different strength of the components was proved by direct measurements. ► Two consecutive micromechanical deformation processes were detected in composites containing the *hard fraction* of corn cob. ► At sufficiently large shear stresses large *soft particles* break easily during compounding. ► The final properties depend unambiguously on the micromechanical deformations.

Highlights

► An isolated polysaccharide (SPI) from *Ilex paraguariensis* was characterized as a rhamnogalacturonan. ► Via oral administration, SPI decreased the pro-inflammatory response. ► Also, SPI was able to prevent the lethality induced by sepsis in mice.

Highlights

► Fe_3O_4/MWNT/Chitosan nanocomposites were prepared by a simple solution evaporation method. ► A synergistic effect of Fe_3O_4 and MWNT enhanced electrical conductivity. ► The synergistic effect also enhanced mechanical properties and thermal stability. ► Interactions between MWNT and Fe_3O_4 surfaces generated more conductive channels. ► Using Fe_3O_4 led to higher crystallinity and crosslink density within the polymer.

Highlights

► Crosslinking kinetics of dextran/epichlorohydrin systems were rheologically evaluated. ► A critical concentration was found for ECH and NaOH to reach optimum properties. ► A rheokinetic model was used to predict the dynamical properties of the hydrogels. ► Hydrogels network structure were characterized by swelling measurement.

Highlights

► Gelatinization of a wide range of starch/plasticizer/water suspensions was studied. ► Diglycerol and polyglycerol demonstrate high gelatinization temperatures. ► Water solubility of plasticizers governs the thermal dependence of gelatinization. ► Static and dynamic gelatinization was compared for high MW plasticizers. ► Shear has a significant effect on the conclusion temperature of gelatinization.

Highlights

► The sulfur esterification levels of cellulose nanowhiskers were quantified using three different methods. ► The efficiency of two desulfation methods of cellulose nanowhiskers was evaluated. ► The substitution states of the surface hydroxyl groups on cellulose nanowhiskers were studied and quantified for the first time.

Highlights

► Pectin material was isolated from the wood greenery of Abies sibirica under acidic conditions. Its structure was established by chemical and NMR studies. ► Pectin contains regions of galacturonan, rhamnogalacturonan and RG-I. ► The side chains of RG-I have blocks of 1,4-β-galactan and branched 1,5-α-arabinan.

Highlights

► Glucomannan acetates (GMAcs) with different degrees of substitution were synthesized. ► The peaks in the ^{1}H and ^{13}C NMR spectra of GM triacetate were assigned in detail. ► All GMAcs are amorphous and formed transparent films. ► Solubility thermal and mechanical properties of GMAc films were investigated.

Highlights

► Inclusion complex formation between amisulpride and gamma cyclodextrin was investigated. ► Bulky molecule of amisulpride was completely included inside larger gamma cyclodextrin cavity. ► 3.74 times solubility enhancement of amisulpride was achieved after complexation. ► Complex formation was confirmed by molecular docking, FTIR, DSC, XRD and NMR investigations.

Highlights

► Thiourea was used to activate hydrogen peroxide in bleaching of cotton fabrics. ► Bleaching was carried out at relatively low hydrogen peroxide concentration. ► Bleached fabrics showed acceptable whiteness and good tensile properties.

Highlights

► Xanthan gum (XG) relieved osteoarthritis (OA) pain in a rat OA model. ► XG reduced the cartilage degradation induced by monosodium iodoacetate (MIA). ► Pre-treatment with XG

could reduce OA pain and cartilage degradation induced by MIA. ► The rheological properties of XG and sodium hyaluronate injections were studied comparatively.

115 **Genotype diversity in structure of amylopectin of waxy rice and its influence on gelatinization properties** Original Research Article
Pages 1858-1864
Jheng-Hua Lin, Harinder Singh, Jhih-Ying Ciao, Wen-Tzu Kao, Wei-Hsiang Huang, Yung-Ho Chang
(315 K) |

Highlights

► Structural and gelatinization properties of 20 waxy rice starches were compared. ► Pasting properties were governed by architecture of whole starch granule. ► Swelling of granules depends on the interactions between amylopectin chains. ► Gelatinization thermal properties also depend on the interactions between chains.

116 **Process conditions affect starch structure and its interactions with proteins in rice pasta** Original Research Article
Pages 1865-1872
Alberto Barbiroli, Francesco Bonomi, Maria Cristina Casiraghi, Stefania Iametti, Maria Ambrogina Pagani, Alessandra Marti
(578 K) | Supplementary content |

Highlights

► Novel processes to prepare rice pasta with satisfactory properties were compared. ► Cooking quality of rice pasta relate to structural features of starch and proteins. ► Amylopectin structure was most sensitive to treatments used for production of rice pasta. ► Parboiling affected rice protein reticulation to a lesser extent than extrusion-cooking. ► Process-related structural changes had an impact on the glycaemic index of rice pasta.

117 **Impact of urea on the three-dimensional structure, viscoelastic and thermal behavior of iota-carrageenan** Original Research Article
Pages 1873-1879
Bhavesh K. Patel, Osvaldo H. Campanella, Srinivas Janaswamy
(844 K) |

Highlights

► Urea substantially modifies solution and thermal properties of iota-carrageenan. ► Lower urea concentrations induce stability in iota-carrageenan gels. ► Highly ordered iota-carrageenan networks are seen in the presence of urea.

Highlights

► Fabrication of pectin–OREC composites. ► Deposition of chitosan and pectin–OREC on cellulose acetate nanofibers via LBL. ► Characterization of LBL structured nanofibrous scaffolds. ► Study the bacterial inhibition abilities of the scaffolds. ► Investigate the cytotoxicity of scaffolds.

Highlights

► A temperature- and pH-responsive cellulose membrane was developed in a diffusion device. ► PNIPAAm and PDEAEMA were separately grafted from two sides of the membrane. ► The fabrication of the membrane was simplified by using ARGET ATRP in the device.

Highlights

► Green synthesis of silver and gold nanoparticles. ► First time use of arabinoxylan from ispaghula. ► Exceptional high stability of synthesized particles. ► Highly biocompatible nanoparticles.

(882 K) |

Highlights

► Polysaccharides were firstly extracted from *Kadsura marmorata* fruits. ► KPS III-1 was firstly isolated and purified by DEAE and Sephadex G100 chromatography. ► The preliminary characterization of KPSIII-1 was detected and analyzed firstly by GC. ► Firstly reported that KPSIII-1 was consisted primarily of Xyl and Gal A.

Highlights

► *Lasiodiplodia theobromae* MMLR was cultivated for secretion of a β-(1→6)-d-glucan. ► The polymer was derivatized by sulfonation and its structure investigated using UV–vis, FT-IR and ^{13}C NMR spectroscopy. ► The ^{13}C NMR spectra showed that sulfonyl groups were inserted mainly on C-2 and C-4. ► The sulfonated β-(1→6)-d-glucan presented anticoagulant activity.

Highlights

► Developed solid dosage form of a prodrug of diethylenetriaminepentaacetic acid. ► May be useful for radionuclide decorporation by oral administration. ► High content prodrug-containing alginate beads produced. ► Prodrug did not react with excipients during formation. ► Increased stability of prodrug was observed when encapsulated.

(1869 K) |

Highlights

► Poly(propylene carbonate) (PPC)/cellulose acetate butyrate (CAB) blends were prepared using melt-blending method for the first time. ► The blends exhibit partial miscibility due to the existence of hydrogen bonding interactions between the two components. ► The blends show significant enhancement of mechanical properties, thermal stability compared to neat PPC. ► The blends are highly transparent over the whole compositions.

125 **Characterization of a novel natural cellulosic fiber from *Prosopis juliflora* bark**
Original Research Article
Pages 1928-1933
S.S. Saravanakumar, A. Kumaravel, T. Nagarajan, P. Sudhakar, R. Baskaran
(723 K) |

Highlights

► Cellulose content of *Prosopis juliflora* fiber (PJF) was found to be 61.65%. ► Density (580 kg/m^3) of PJF was found to be relatively much lower. ► Anatomy of bark and fiber of *Prosopis juliflora* was studied for the first time. ► Tensile strength of PJF was determined. ► Thermal stability of PJF was found to be comparable with other bark fibers.

126 **Straw N-halamines: Evaluation in single and multistage filtration systems**
Original Research Article
Pages 1934-1941
Abd El-Shafey I. Ahmed, Gabriel Cavalli, Michael E. Bushell, John N. Wardell, Steve Pedley, Katarina Charles, John N. Hay
(466 K) |

Highlights

► Cellulose based N-halamines were evaluated against water microorganism. ► This was performed using single and multi-stage filtration systems. ► They showed comparable results to synthetic polymers from the same category. ► Particles size, flow rate and modification method affected the biocidal activity.

127 **Oligosaccharide mass profiling of nutritionally important *Salicornia brachiata*, an extreme halophyte**
Pages 1942-1945
Avinash Mishra, Mukul Joshi, Bhavanath Jha
(278 K) | Supplementary content |

Highlights

► *Salicornia brachiata* – extreme halophytes with nutritional values. ► Oligosaccharide mass profiling using MALDI TOF-TOF MS. ► OLIMP represented by characteristic mass peaks of oligosaccharides. ► Presence of xyloglucan oligomers: XXG, XXXG, XXFG, XLXG and XLFG. ► Xyloglucan oligosaccharides building blocks dominated by XXXG.

Highlights

► Pine and eucalyptus woods are dissolved in AmimCl under microwave radiation. ► Cellulose is regenerated with methanol from the wood liquors. ► Regenerated cellulose is characterized and compared to microcrystalline cellulose. ► Regenerated cellulose is amorphous and the thermal stability is low. ► Regenerated cellulose is obtained free from lignin.

Highlights

► Zinc oxide nanoparticles were successfully synthesized using BC as a template. ► The synthesized method is very simple and green. ► BC/ZnO shows good mechanical properties and high photocatalytic activity.

Highlights

► Xylan citrate is of biodegradation and has more functional carboxyl groups. ► Xylan citrate was prepared by environmental-friendly semi-dry oven method. ► Xylan citrate has the good absorption capacity for metal ions and methyl orange.

Highlights

► Shear dynamic and steady state rheology of cellulose acetate/EMIMAc studied. ► CA/EMIMAc solutions obey Cox–Merz rule. ► Cellulose acetate intrinsic viscosity decreases with temperature increase. ► CA intrinsic viscosity is less temperature sensitive than that of cellulose. ► CA/EMIMAc solutions follow the trends reported for cellulose acetates dissolved in other solvents.

Highlights

► Maillard reaction products (MRPs) were prepared from chitosan and xylose. ► MRPs showed better antimicrobial, antioxidant and darkening inhibitory effect in semi-dried noodle. ► Textural and cooking quality of semi-dried noodles were also improved by MRPs. ► 0.35% MRPs (6 h) resulted in an extension of the shelf-life of semi-dried noodles for more than 7 days.

Highlights

► Purification and characterization of β-d-xylosidase from *L. brevis* NCDC01. ► The purified enzyme is monomeric with an apparent molecular mass of ~58.0 kDa. ► The pH and temperature optima were 6.0 and 40 °C respectively. ► The enzyme was highly specific to pNP-β-d-xylopyranoside. ► This study provides an insight into the role of β-d-xylosidase in XOS metabolism.

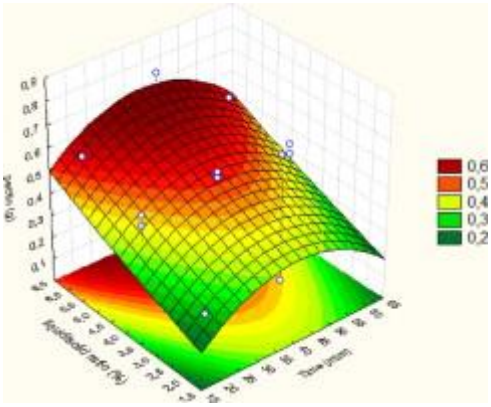
Highlights

► No study on expression of exoinulinase gene from *Aspergillus ficuum* in *Escherichia coli* was reported. ► The exoinulinase encoded by *exo I* gene from *A. ficuum* was expressed in *E. coli*. ► The biochemical characterization of recombinant exoinulinase was investigated.

Highlights

► Degradation effect on Mw of *Enteromorpha prolifera* polysaccharide is investigated. ► Microwave-assistance highly accelerates degradation rate. ► Polysaccharides with low Mws are obtained by microwave-assistance acid hydrolysis. ► Degradation hardly breaks significant structural units of sulfated polysaccharide. ► Antioxidant activities of sulfated polysaccharides with different Mws are investigated.

Graphical abstract



Highlights

► Sisal waste was used as a source of pectin. ► A statistical Box–Behnken design was applied. ► The liquid/solid ratio of sisal waste significantly influenced of the aqueous extraction of pectin. ► Aqueous extraction represented an attractive environmentally friendly process.

137 **Psyllium husk gum: An attractive carbohydrate biopolymer for the production of stable canthaxanthin emulsions** Original Research Article
Pages 2002-2011
Seyed Mohammad Taghi Gharibzahedi, Seyed Hadi Razavi, Seyed Mohammad Mousavi
(829 K) |

Highlights

► An optimized canthaxanthin emulsion using ultrasound emulsification was developed. ► Whey protein isolate (WPI) and psyllium husk gum (PHG) were used for the stability. ► Response surface methodology (RSM) was efficiency used for finding optimal point. ► A polynomial equation was adequate to predict the stability as the response.

138 **Isolation and characteristics analysis of a novel high bacterial cellulose producing strain *Gluconacetobacter intermedius* CIs26** Original Research Article
Pages 2012-2017
Ying Yang, Jingjing Jia, Jianrong Xing, Jianbing Chen, Shengmin Lu
(691 K) |

Highlights

► CIs26 is a new isolate of *Gluconacetobacter intermedius* group. ► Physiological characteristics of CIs26 were not the same as description in Bergey's Manual. ► Citrus waste

could simulate BC production by CIs26 efficiently. ► BC yield reaching to 7.2 g/L in CWS medium. ► Cultivation of CIs26 in citrus waste have a perspective in BC manufacture.

Highlights

► UAE of polysaccharide from pumpkin. ► Central composite rotatable design was applied to find out the optimum conditions. ► Second order polynomial regression model was fitted to data. ► Optimal conditions were determined by Derringer's desired function methodology. ► Experimental values showed good agreement with the values predicted by the model.

Highlights

► Effect of chitosan coatings on postharvest green asparagus quality was evaluated. ► 0.25% HMC and 0.50 LMC treatments extended a shelf life of green asparagus. ► The present results are useful for further development of natural food preservative.

Highlights

► Amorphous solid dispersions up to 50% quercetin in carboxyl-containing cellulose esters. ► Carboxyl-containing cellulose esters stabilize amorphous quercetin in solid, solution phases. ► Amorphous dispersion in PVP prevents quercetin chemical degradation in solution. ► PVP strongly enhances quercetin solution concentration but releases at low pH.

Highlights

► Cellulose nanowhiskers nanoporous networks formed in electrospun nanofibrous membranes. ► The introduction of DTAB influences the nanoporous networks. ► Simple air immersing-drying process is feasible for the networks formation.

Highlights

► Fluorescent chitosan was prepared by coupling 4-bromo naphthalic anhydride. ► Chitosan-*graft*-PEI copolymer was prepared through naphthalimide moiety. ► pDNA complexation ability of chitosan markedly increased after copolymerization. ► The toxicity of PEI markedly decreased upon graft copolymerization. ► The novel copolymers might be used safely as drug and gene carrier.

Highlights

► GM reduced mechanical allodynia and the levels of interleukin 1-β after PSNL. ► Nociception induced by glutamate, NMDA and *trans*-ACPD was reduced by GM. ► GM reduces nociception induced by proinflammatory cytokines (IL-1β and TNF-α). ► Polysaccharide GM has antinociceptive effect in models of acute and chronic pain.

Highlights

► Depolymerisation of starch-based industrial waste into reducing sugars. ► Valorisation of industrial waste into high value-added chemicals. ► Utilisation of non-conventional technologies – low and high ultrasonic frequencies and microwave irradiations.

Highlights

► Contaminants in purified carbohydrate preparations can cause confounding effects. ► Proper validation of possible immune-stimulating effects is therefore crucial. ► Polymyxin B is insufficient to rule out LPS contamination of β-glucan samples. ► Targeted enzymatic degradation can assess carbohydrate specific effects.

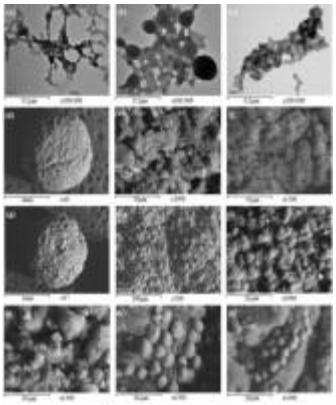
Highlights

► Polysaccharide extracted from *Enteromorpha linza* was degraded with the oxidation method. ► The antioxidant activity of all the samples was investigated in two systems. ► The degraded sample with lower molecular weight possessed higher antioxidant activity.

Highlights

► We synthesize amino groups functional silver nanoparticles by one-step reaction. ► We fabricate silver nanoparticles grafted cotton fabrics via a “green” approach. ► Silver nanoparticles grafted cotton fabrics have excellent antibacterial property. ► Silver nanoparticles grafted cotton fabrics have outstanding laundering durability.

Graphical abstract



Highlights

► Polymethyl methacrylate-*g*-chitosan was prepared by free-radicals polymerization pass way. ► α-Chymotrypsin was immobilized onto polymethyl methacrylate-*g*-chitosan. ► α-Chymotrypsin maintained high percentage of its catalytic activity after immobilization process.

Highlights

► Adsorption of lignocelluloses on PCC was studied in cationic polymers/PHL systems. ► CPAM and PDADMAC improved the adsorption of lignocelluloses on PCC. ► PDADMAC was more effective in improving the adsorption of oligosugars on PCC. ► Maximum lignocelluloses adsorption was 0.79 g/g on PCC (0.53 g/g was oligosugars).

Highlights

► A new polysaccharide was isolated from *Gynostemma pentaphyllum* Makino. ► Its chemical structure was determined. ► The polysaccharide showed antioxidant and bile acid binding capacities.

Highlights

► Jute fibre was grafted with tannin via epoxy-activation by epichlorohydrin. ► Surface modification was executed under mild condition in an aqueous medium. ► Fibre grafting was evidenced by physical, spectral and thermal characterization. ► Efficient grafting of tannin made jute fibre more resistant towards biodegradation. ► The FTIR spectra were analysed utilizing Voigt equation to confirm the grafting.

Highlights

► Replicable process for the deposition of clear layered CS/CNs nanostructures. ► Thickness and proportion of CS & CNs, thereby permeability, can be tuned by pH. ► 780 nm-thick coating provides the same oxygen barrier as 1.3 mm-thick A-PET. ► Minimal bilayers required for O_2 barrier can be estimated by AFM and ellipsometry. ► Safety and sustainability of CS/CNs coating could promote food packaging applications.

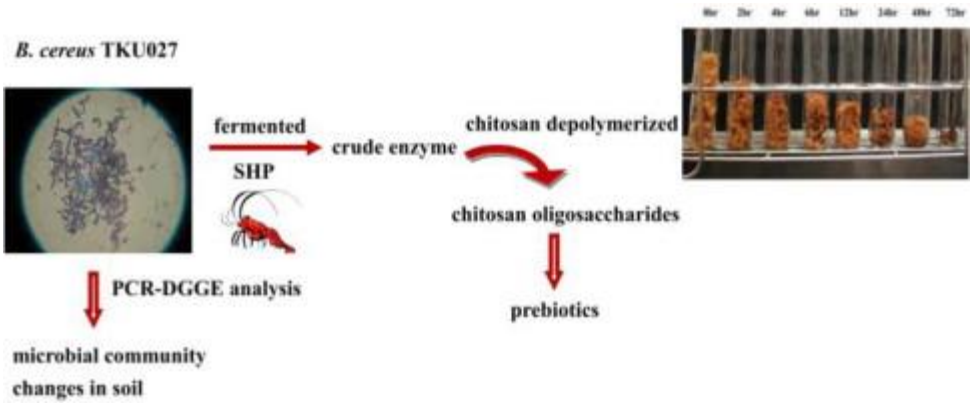
154 **Structure of a novel α-glucan substitute with the rare 6-deoxy-D-altrose from *Lactarius lividatus* (mushroom)** Original Research Article
Pages 2135-2140
Masakuni Tako, Yahiko Dobashi, Junpei Shimabukuro, Takuya Yogi, Keiko Uechi, Yukihiro Tamaki, Teruko Konishi
(799 K) | Supplementary content |

Highlights

► The polysaccharide isolated from *Lactarius lividatus* was highly branched α-d-glucan. ► The terminal residues were 6-deoxy-β-d-altropyranose and α-d-galactopyranose. ► This work is the first demonstration of the rare 6-deoxy-d-altropyranose moiety on polysaccharides.

155 **Applied development of crude enzyme from *Bacillus cereus* in prebiotics and microbial community changes in soil** Original Research Article
Pages 2141-2148
Tzu-Wen Liang, Chin-Pei Liu, Chunhung Wu, San-Lang Wang
(865 K) |

Graphical abstract



Highlights

► The chitosan was depolymerized by TKU027 crude enzyme. ► The chitosan oligomers with DP 4–9 were identified by MALDI-TOF analysis. ► The low DP chitosan oligomers can enhance the growth of lactic acid bacteria. ► The high DP chitosan oligomers inhibit the growth of lactic acid bacteria. ► We investigated biodegradation and the bacterial community changes upon SHP amended in mangrove river sediment.

156 **Dextranase: Hyper production of dextran degrading enzyme from newly isolated strain of *Bacillus licheniformis*** Original Research Article

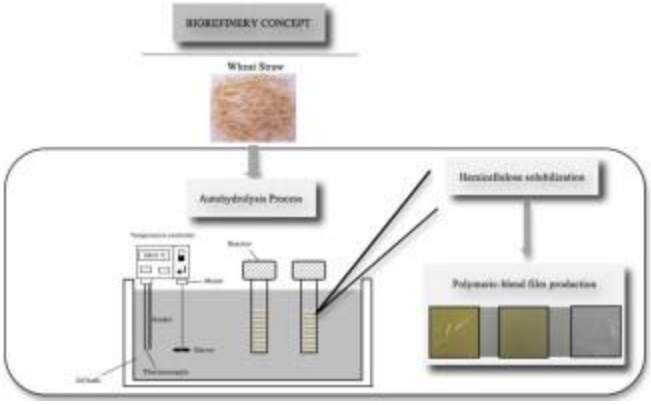
Pages 2149-2153
Rashida Rahmat Zohra, Afsheen Aman, Raheela Rahmat Zohra, Asma Ansari, Maria Ghani, Shah Ali Ul Qader
(476 K) |

Highlights

► New *Bacillus* strain for dextranase production was isolated. ► High production of dextranase was reported first time from *Bacillus licheniformis*. ► New medium was developed for the production of dextranase. ► Novel dextranase was produced capable of degrading low molecular weight dextran.

157 **Biorefinery valorization of autohydrolysis wheat straw hemicellulose to be applied in a polymer-blend film** Original Research Article
Pages 2154-2162
Héctor A. Ruiz, Miguel A. Cerqueira, Hélder D. Silva, Rosa M. Rodríguez-Jasso, António A. Vicente, José A. Teixeira
(819 K) |

Graphical abstract



Highlights

► Fractionation of hemicellulose and production of polymeric blend film according to biorefinery concept. ► Autohydrolysis is an environmentally friendly technology. ► Hemicellulose was extracted from wheat straw using autohydrolysis process. ► Autohydrolysis extracted hemicellulose is a good material in the reinforcement of polymeric blend films. ► Extracted hemicellulose improved the physical and mechanical properties of the polymeric blend films.

Highlights

► A new aldehyde hyaluronic acid derivative was obtained, by coupling an acetal spacer, and characterized by ^{1}H NMR. ► Aldehyde hyaluronic acid derivative was selectively conjugated to proteins at the *N*-terminus. ► Model enzymes preserved activity after HAYlation, HA conjugation, and increased their thermal stability. ► HA-insulin conjugate showed a lowering effect on blood glucose level in rats longer than that of insulin.

Highlights

► An eco-friendly biodegradable material was obtained and used for effective removal of dye. ► Activated carbon is prepared by Prosopis Juliflora bark. ► Alginate polymer composite bead was prepared by ionic polymerization method. ► Aniline blue dye has chosen for modeling the adsorption studies. ► Isotherms, kinetics and thermodynamics equations are assessed for modeling.

Highlights

► Novel poly(vinyl alcohol)/citric acid/chitosan (PCC) beads were prepared. ► The surface characteristics of PCC beads (II) were determined for use as adsorbents. ► PCC beads were evaluated for removal of Cr^{3+}in aqueous solution. ► The Cr^{3+} ion sorption onto PCC beads (II) reaches its maximum value at pH 6.0. ► The high efficiency and reusability of PCC beads (II) make them an attractive sorbent.

Highlights

► Two novel polysaccharide fractions were isolated from *Gomphidius rutilus* mycelium. ► GRMP1 possessed better antioxidant activity *in vitro* than GRMP2. ► GRMP1 and GRMP2 have significant lymphocyte proliferation activity.

Highlights

► A novel WPI/Au nanocomposite hydrogels were synthesized through a green process method. ► The Au° particles affect the hydrogel strength. ► They improved the biological activity of the biodegradable hydrogels. ► P(WPI-AM) Au° hydrogels can be considered as novel kind of functional hydrogels. ► They may find possible applications in the medical fields.

Highlights

► Graft copolymerization of polymethylmethacrylate and xanthan gum. ► XG–g-PMMA can efficiently used for the optical resolution of α-amino acids. ► Enantioselectivity increases with increase in % grafting i.e. chiral active centres. ► Simplicity, efficiency and relatively low cost procedure to analyze enantiomers of amino acids.

(1007 K) |

Highlights

► Thermal processing capability of cellulose was enhanced by wheat gluten additives. ► Strong interactions between wheat gluten and amorphous cellulose matrix were observed. ► Mechanical performance of the materials was improved significantly. ► Phase structural changes of the cellulose component were examined.

165 **Anti-ovarian cancer potential of two acidic polysaccharides from the rhizoma of *Menispermum dauricum*** Original Research Article
Pages 2212-2217
Mei Lin, Bairong Xia, Meng Yang, Shu Gao, Yanqiu Huo, Ge Lou
(651 K) |

Highlights

► Two acidic polysaccharides (MDP-A1 and MDP-A2) were isolated from the rhizome of *Menispermum dauricum*. ► The physicochemical properties of MDP-A1 and MDP-A2 were examined. ► MDP-A1 and MDP-A2 were able to inhibit cell proliferation of SKOV3 cells. ► MDP-A1 and MDP-A2 caused induction of caspase 3/8, but slightly affected caspase-9 activity. ► MDP-A1 and MDP-A2 suppressed the tumor growth in mice transplanted with SKOV3 cells.

166 **A novel plug-controlled colon-specific pulsatile capsule with tablet of curcumin-loaded SMEDDS** Original Research Article
Pages 2218-2223
Yuanrui Huang, Rui Tian, Wenjing Hu, Yuntao Jia, Jingqing Zhang, Huiming Jiang, Liangke Zhang
(529 K) |

Highlights

► The capsule has the potential for colon-specific delivery of water-insoluble drug. ► It is an enzyme-triggered colon-specific pulsatile drug delivery system. ► The lag time was controlled by the composition of the plug tablet.

167 **Successive alkali extraction and structural characterization of hemicelluloses from sweet sorghum stem** Original Research Article
Pages 2224-2231
Shao-Long Sun, Jia-Long Wen, Ming-Guo Ma, Run-Cang Sun
(897 K) |

Highlights

► The successive extractions dissolved 76.3% original hemicelluloses. ► Water-soluble hemicelluloses mainly consisted of the starch and α-glucan. ► Higher molecular weight of hemicelluloses results in a higher thermal stability. ► Alkaline-extractable hemicelluloses are l-arabino-4-*O*-methyl-d-glucurono-d-xylan.

Highlights

► Electrospun poly(vinyl alcohol)/alginate/organic rectorite mats. ► Characterize the morphology and structure of the composite mats. ► Study the thermal properties of the as-spun mats. ► Investigate the antibacterial activity of the nanofibrous mats.

Highlights

► We purified a homogeneous polysaccharide from *Pleurotus eryngii* called PEPS1. ► Homogeneity and molecular weight (1.88×10^4 Da) of PEPS1 was determined by HPLC. ► α-d-(1 → 6)-Gal*p* and α-(1 → 6)-3-*O*-Me-d-Gal*p* constructed the backbone of PEPS1. ► More information about the structure of PEPS1 was proposed by NMR analysis.

Highlights

► Carboxylated agarose was prepared by TEMPO oxidation system and characterized. ► Ag-g-DA was obtained through EDC condensation reaction and characterized. ► Carboxylated agarose and Ag-g-DA showed no cytotoxicity and enhanced cell adhesion.

Highlights

► Modified salep was used as organocatalyst. ► The catalyst has high loading level of hydroxide ions. ► The present protocol represents a simple route to synthesize 4*H*-benzo[*b*]pyrans. ► The catalyst could be recovered and reused many times.

Highlights

► Sugar beet polysaccharides were extracted by heating for 10 min with steam. ► UV absorbing moieties in pectin were skewed to the lower end of the molar mass distribution. ► Alkaline soluble polysaccharides contained rhamnogalacturonan I and homogalacturonan pectin.

Highlights

► We synthesized a new thermogelling polymer glycol chitin. ► Glycol chitin showed thermo-sensitive sol–gel transition with fast gelation kinetic. ► Glycol chitin exhibited no significant biological toxicity. ► Doxorubicin incorporated into glycol chitin gel was released in a sustained pattern.

(787 K) |

Highlights

► *Serratia marcescens* displayed strong chitinolytic activity on colloidal chitin medium. ► Active band of chitinase isozymes (53, 44, and 34 kDa) were observed on SDS-PAGE gel. ► The range of p*I* values of chitinase isozymes was 5.4–5.8 on 2D gels. ► *S. marcescens* produced GlcNAc monomers on TLC plates. ► Chitinase of *S. marcescens* inhibited the mycelial growth of *Rhizoctonia solani.*

175 **Comparative study of the complex forming ability and enantioselectivity of cyclodextrin polymers by CE and ^{1}H NMR** Original Research Article
Pages 2282-2292
Cécile Danel, Nathalie Azaroual, Cédric Chavaria, Pascal Odou, Bernard Martel, Claude Vaccher
(1008 K) | Supplementary content |

Highlights

► Complexation of 9 drugs with 6 cyclodextrins and 6 polymers of cyclodextrins. ► Determination of binding constants by affinity capillary electrophoresis and ^{1}H NMR. ► Apparent binding constants up to 5 times higher with the polymers of CDs. ► Polymeric network seems to favour the inclusion of the drugs in the CD cavities. ► Poly-CDs show higher enantioselective abilities than the native or modified CDs.

176 **Flame retardant cotton fabrics treated with organophosphorus polymer** Original Research Article
Pages 2293-2298
A. Abou-Okeil, S.M. El-Sawy, F.A. Abdel-Mohdy
(829 K) |

Highlights

► Methacryloloxyethylorthophoshor tetraethyl diamidate (MPD) was prepared. ► The structure of MPD was confirmed by IR, NMR and mass spectroscopy. ► MPD was used as flame retarding agent for cotton fabrics. ► The results obtained were compared with. ► MPD have the ability to act as flame retarding agent.

177 **Potential of using multiscale kenaf fibers as reinforcing filler in cassava starch-kenaf biocomposites** Original Research Article
Pages 2299-2305
Siti Yasmine Zanariah Zainuddin, Ishak Ahmad, Hanieh Kargarzadeh, Ibrahim

Abdullah, Alain Dufresne
(2260 K) |

Highlights

► Cellulose nanocrystal is successfully extracted from kenaf fibers. ► Thermoplastic cassava starch (TPCS) biocomposite reinforced with different fiber compositions and treatments is prepared. ► Mechanical properties of the TPCS biocomposite increase with fiber treatments. ► TPCS reinforced with cellulose nanocrystal (CNC) shows the highest tensile strength and modulus.

178 **Characterization of arenga starch in comparison with sago starch** Original Research Article
Pages 2306-2313
Dede R. Adawiyah, Tomoko Sasaki, Kaoru Kohyama
(761 K) |

Highlights

► Physicochemical properties of two types of palm starches (arenga and sago) are compared. ► Arenga and sago starches have similar amylose contents and peak gelatinization temperature. ► Arenga starch has a narrower range of gelatinization temperature than sago starch. ► Arenga starch provides less viscous sol, but more rigid gel than sago.

179 **Synthesis and swelling properties of β-cyclodextrin-based superabsorbent resin with network structure** Original Research Article
Pages 2314-2320
Zhanhua Huang, Shouxin Liu, Guizhen Fang, Bin Zhang
(1184 K) |

Highlights

► Novel superabsorbent β-cyclodextrin-based resin was obtained by the inverse suspension method. ► The resin hydrogel exhibited typically three-dimensional network structure. ► The resin is thermoplastic with excellent salt resistance. ► The hydrogel could be degraded by *Lentinus edodes*.

180 **Kinetics and mechanism of oxidation of chondroitin-4-sulfate polysaccharide by chromic acid in aqueous perchlorate solutions** Original Research Article
Pages 2321-2326
Refat Hassan, Samia Ibrahim, Abdel Rahman Dahy, Ishaq Zaafarany, Fahd Tirkistani, Hideo Takagi

(532 K) |

Highlights

► Kinetics of oxidation of chondroitin-4-sulfate by chromic acid in acidic solution. ► Kinetic evidence of presence of unstable intermediates Cr(IV) species. ► Mechanistic approach of electron-transfer process in oxidation of sulfated polysaccharides. ► A novel synthesis of diketo-acid derivative coordination biopolymer precursor as a chelating agent. ► Removal of toxic metal cations and radionuclides from the environment by such product.

181 **Changes in the physical properties of xanthan gum induced by a dynamic high-pressure treatment** Original Research Article
Pages 2327-2336
Sandra I. Laneuville, Sylvie L. Turgeon, Paul Paquin
(740 K) |

Highlights

► Microfluidization of xanthan gum results in relatively mild molecular degradation. ►At low treatment severity, only xanthan aggregates were disrupted. ►After more severe treatment, xanthan lost its ability to reaggregate. ►Xanthan aggregation pattern influenced flow and flow induced birefringence. ►Xanthan in the ordered state was more sensitive to mechanical degradation.

182 **Editorial Board**
Page CO3
(375 K) |