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PERSPECTIVE

Current knowledge on biosynthesis, biological activity, and chemical modification of the exopolysaccharide, pullulan

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Kirill I. Shingel*

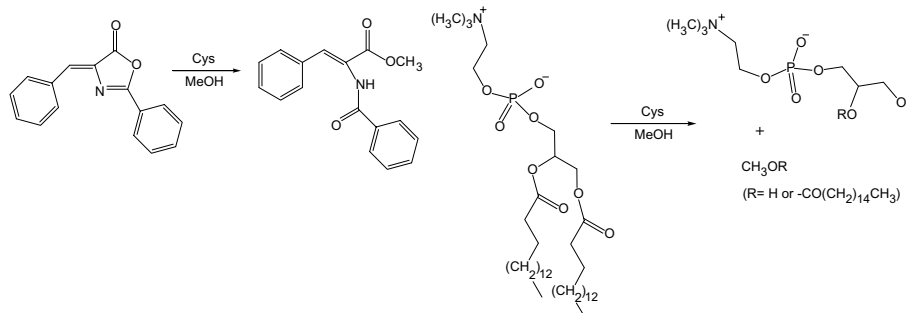
The article presents an overview of the latest advances in investigations of the biosynthesis, molecular properties, and associated biological activity of pullulan.

FULL PAPERS

Cyclosophorase as a catalytic carbohydrate for methanolysis

pp 461–468

Sanghoo Lee and Seunho Jung*



Comparative evaluation of D-glucosyl thiuronium, glucosylthio heterocycles, Daonil, and insulin as inhibitors for hepatic glycosidases

pp 469–476

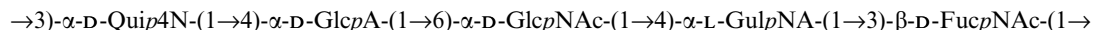
Olfat M. El din Awad, Wafaa E. Attia and El Sayed H. El Ashry*

Comparison of the in vivo and in vitro effects of *S*-(2,3,4,6-tetra-*O*-acetyl-β-D-glucopyranosyl) thiuronium bromide, 2-(2,3,4,6-tetra-*O*-acetyl-β-D-glucopyranosylthio)-1,3,4-thiadiazolin-5-thione, 2-(2,3,4,6-tetra-*O*-acetyl-β-D-glucopyranosylthio)-1,3-benzoxazole, Daonil, and insulin on glycosidase enzymes.

Structure of the O-polysaccharide of *Idiomarina zobellii* KMM 231^T containing two unusual amino sugars with the free amino group, 4-amino-4,6-dideoxy-D-glucose and 2-amino-2-deoxy-L-guluronic acid

pp 477–482

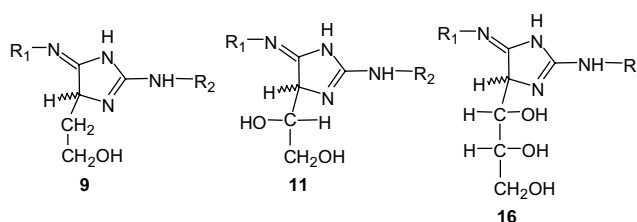
Michelle Kilcoyne, Andrei V. Perepelov, Svetlana V. Tomshich, Nadezhda A. Komandrova, Alexander S. Shashkov, Ludmila A. Romanenko, Yuriy A. Knirel and Angela V. Savage*



Characterization and detection of lysine–arginine cross-links derived from dehydroascorbic acid

pp 483–491

Oliver Reihl,* Markus O. Lederer and Wolfgang Schwack

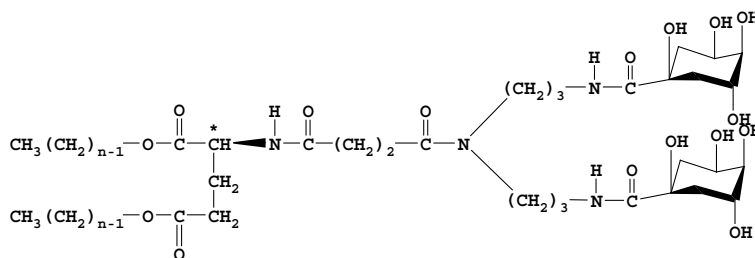


Synthesis are reported for the lysine–arginine cross-links 9, 11, and 16.

Preparation of gemini-type amphiphiles bearing cyclitol head groups and their application as high-performance modifiers for lipases

pp 493–501

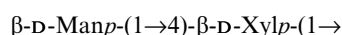
Yurie Mine, Kimitoshi Fukunaga,* Ken-ichi Samejima, Makoto Yoshimoto, Katsumi Nakao and Yoshiaki Sugimura



Structural studies of the capsular polysaccharide of a non-*neoformans* *Cryptococcus* species identified as *C. laurentii*, which was reclassified as *Cryptococcus flavescens*, from a patient with AIDS

pp 503–509

Reiko Ikeda* and Takumi Maeda



Surface polysaccharide of *Cryptococcus laurentii* clinical isolate contains mannosylxylose side chain that is a novel structure in polysaccharides of *C. neoformans* and other *Cryptococcus* species.

A highly regular fraction of a fucoidan from the brown seaweed *Fucus distichus* L.

pp 511–517

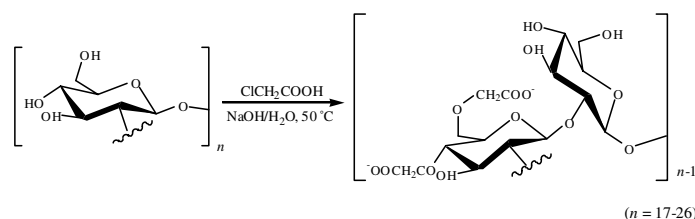
Maria I. Bilan, Alexey A. Grachev, Nadezhda E. Ustuzhanina, Alexander S. Shashkov, Nikolay E. Nifantiev and Anatolii I. Usov*

Structure of a fucoidan consisting of trisulfated disaccharide repeating units has been elucidated mainly by 1D and 2D ^1H and ^{13}C NMR spectroscopy: $\rightarrow 3)\text{-}\alpha\text{-L-Fucp}(2,4\text{-di-SO}_3^-)\text{-(1}\rightarrow 4)\text{-}\alpha\text{-L-Fucp}(2\text{SO}_3^-)\text{-(1}\rightarrow$

Synthesis and characterization of carboxymethylated cyclosophoraose, and its inclusion complexation behavior

pp 519–527

Sanghoo Lee, Heylin Park, Donghyuk Seo, Youngjin Choi and Seunho Jung*

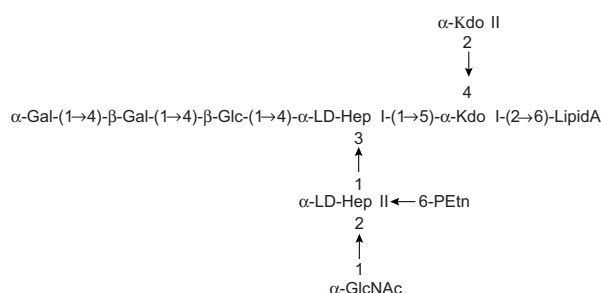


Neutral cyclosophoraoses (cyclic $\beta\text{-(1}\rightarrow 2)\text{-D-glucans}$) isolated from *Rhizobium leguminosarum* bv. *trifolii* were substituted with carboxymethyl groups through a one-step chemical modification, giving carboxymethylated cyclosophoraoses (CM-Cys) that showed an improved complex-forming ability compared with native cyclosophoraoses (Cys).

Structural analysis of the lipooligosaccharide from the commensal *Haemophilus somnus* genome strain 129Pt

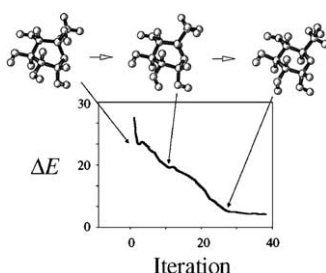
pp 529–535

Frank St. Michael, Michael D. Howard, Jianjun Li, A. Jane Duncan, Thomas J. Inzana and Andrew D. Cox*

**B3LYP/6-311++G** study of α - and β -D-glucopyranose and 1,5-anhydro-D-glucitol: $^4\text{C}_1$ and $^1\text{C}_4$ chairs, $^3\text{O}B$ and $B_{3,0}$ boats, and skew-boat conformations**

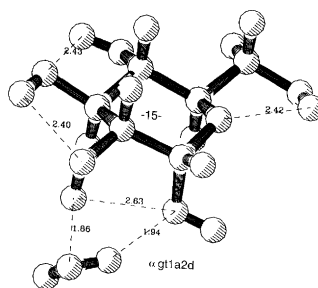
pp 537–551

M. Appell, G. Strati, J. L. Willett and F. A. Momany*



B3LYP/6-311++G study of monohydrates of α - and β -D-glucopyranose: hydrogen bonding, stress energies, and effect of hydration on internal coordinates****pp 553–567**

F. A. Momany,* M. Appell, G. Strati and J. L. Willett



Characterization of the crystalline structure of cellulose using static and dynamic FT-IR spectroscopy**pp 569–578**

Margaretha Åkerholm, Barbara Hinterstoisser and Lennart Salmén*

A new method based on dynamic FT-IR spectroscopy for the estimation of the allomorph composition of native cellulose in pulp samples is presented.

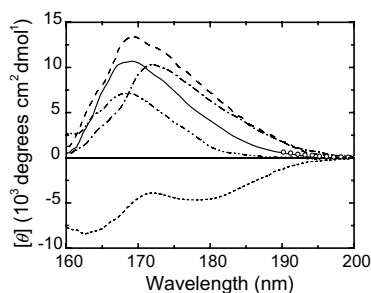
Inactivated enzymes as probes of the structure of arabinoxylans as observed by atomic force microscopy**pp 579–590**

Elizabeth L. Adams, Paul A. Kroon, Gary Williamson, Harry J. Gilbert and Victor J. Morris*

Binding of inactivated xylanases to arabinoxylans has been imaged by AFM and used to map structural heterogeneity of the molecules.

Vacuum-ultraviolet circular dichroism study of saccharides by synchrotron radiation spectrophotometry**pp 591–597**

Koichi Matsuo and Kunihiro Gekko*



Cu(II) complex formation with xylitol in alkaline solutions

pp 599–605

Eugenijus Norkus,* Jūratė Vaičiūnienė, Tapani Vuorinen, Ernestas Gaidamauskas, Jonas Reklaitis, Anna-Stiina Jääskeläinen and Debbie C. Crans

Equilibria in alkaline solutions of xylitol and Cu(II) ions were investigated by means of ^{13}C NMR, Raman spectroscopy, polarography and spectrophotometry. Composition, stability, diffusion and optical characteristics of the complex species formed were determined.

Tertiary structure of human α_1 -acid glycoprotein (orosomucoid). Straightforward fluorescence experiments revealing the presence of a binding pocket

pp 607–612

Jihad R. Albani*

Displacement experiments of TNS bound to α_1 -acid glycoprotein by hemin revealed the presence of a pocket within the protein, where both hemin and TNS bind. The association constant of the hemin– α_1 -acid glycoprotein complex is 30 times higher than that of the TNS– α_1 -acid glycoprotein complex. Energy-transfer experiments between Trp residues of α_1 -acid glycoprotein and hemin show an important energy transfer: the efficiency (E) of Trp fluorescence quenching is equal to 80% and the Förster distance R_0 is equal to 25.6 Å.

Blocking nonspecific adsorption of native food-borne microorganisms by immunomagnetic beads with ι -carrageenan

pp 613–621

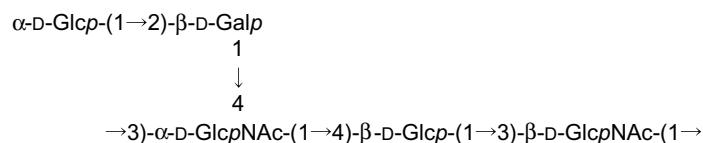
Peter Irwin,* Andrew Gehring, Shu-I Tu and Chin-Yi Chen

We present the partitioning characteristics of various immunomagnetic beads with respect to the nonspecific adsorption of several nontarget food-borne organisms \pm an assortment of blocking agents. We found that varying ι -carrageenan from 0% to 0.02% resulted in the equilibrium capture efficiency (ξ) significantly diminishing from 0.69 (e.g., 69% cell capture; $\Delta G^0 = -19 \pm 3 \text{ kJ mol}^{-1}$) to 0.05 ($\Delta G^0 = -11 \pm 2 \text{ kJ mol}^{-1}$; $\Delta\Delta G^0 \sim -9 \text{ kJ mol}^{-1}$) at ca. 0.03% ι -carrageenan where ξ leveled off. An optimum blocking ability was achieved against nontarget *E. coli* K12-like organisms with 0.04% ι -carrageenan suspended in 100 mM phosphate buffer.

Structure of the neutral O-polysaccharide and biological activities of the lipopolysaccharide of *Proteus mirabilis* O20

pp 623–628

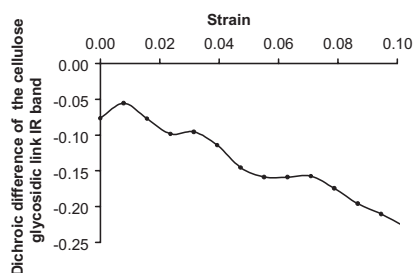
Anna N. Kondakova, Rafal Fudala,* Katarzyna Bednarska,* Sof'ya N. Senchenkova, Yuriy A. Knirel and Wieslaw Kaca



FT-IR study of the *Chara corallina* cell wall under deformation

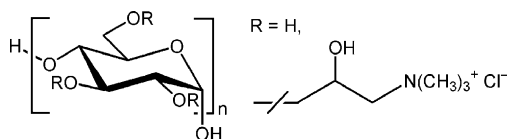
pp 629–635

Geraldine A. Toole, Marta Kačuráková, Andrew C. Smith,* Keith W. Waldron and Reginald H. Wilson

**Enzymatic degradation and electrospray tandem mass spectrometry as tools for determining the structure of cationic starches prepared by wet and dry methods**

pp 637–648

Wiebke Tüting, Kerstin Wegemann and Petra Mischnick*

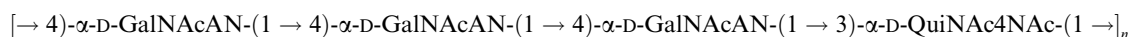


Cationic starches from various semi-technical processes (slurry, paste, dry and extrusion) were investigated by ESIMS and ESIMS² after enzymatic degradation with α -amylase and subsequent amyloglucosidase digestion.

Characterization of the lipopolysaccharide O-antigen of *Francisella novicida* (U112)

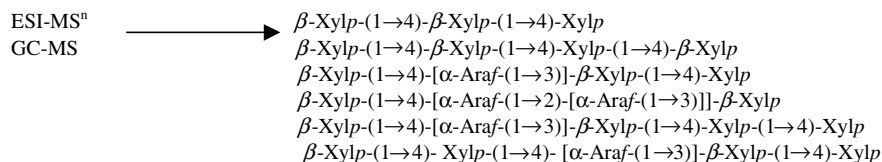
pp 649–654

Evgeny Vinogradov, Wayne J. Conlan, John S. Gunn and Malcolm B. Perry*

**Differentiation of isomeric oligosaccharide structures by ESI tandem MS and GC-MS**

pp 655–664

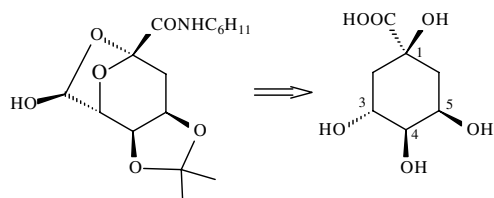
Lobvi E. Matamoros Fernández, Nicolai Obel, Henrik Vibe Scheller and Peter Roepstorff*



Studies for the transformation of carbocycles into carbohydrates: approach toward the synthesis of higher sugar derivatives

pp 665–671

Lúcia Helena Brito Baptistella* and Giselle Cerchiaro

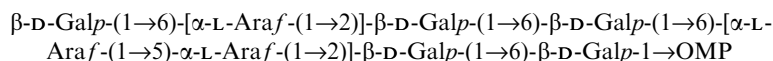


A highly stereocontrolled synthesis of a heptose derivative has been developed using naturally occurring (–)-quinic acid as a chiral starting material.

An effective synthesis of an arabinogalactan with a β -(1 \rightarrow 6)-linked galactopyranose backbone and α -(1 \rightarrow 2) arabinofuranose side chains

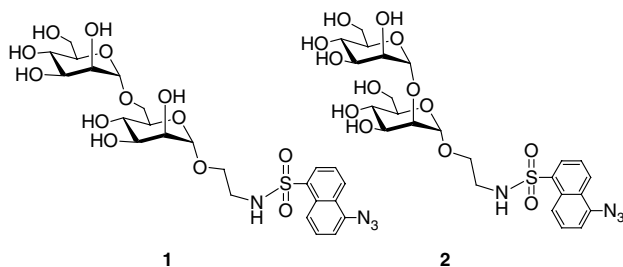
pp 673–681

Aixiao Li, Ying Zeng and Fanzuo Kong*

**Synthesis of mannopyranose disaccharides as photoaffinity probes for mannosyltransferases in *Mycobacterium tuberculosis***

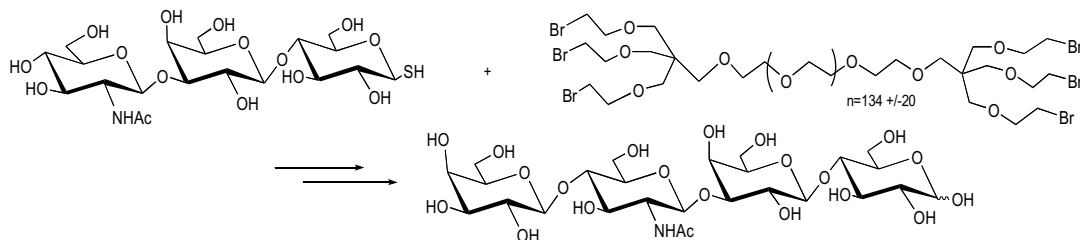
pp 683–691

Ashish K. Pathak, Vibha Pathak, James M. Riordan, Sudagar S. Gurucha, Gurdial S. Besra and Robert C. Reynolds*

**Enzymatic supported synthesis of lacto-*N*-neotetraose using dendrimeric polyethylene glycol**

pp 693–698

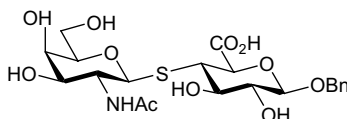
Laetitia Renaudie, Richard Daniellou, Claudine Augé and Christine Le Narvor*



The synthesis of a novel thio-linked disaccharide of chondroitin as a potential inhibitor of polysaccharide lyases

pp 699–703

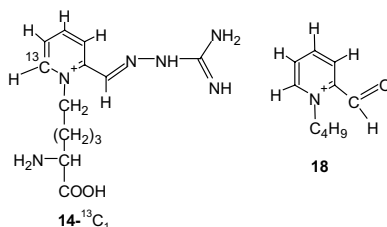
Carl S. Rye and Stephen G. Withers*



Pyridinium-carbaldehyde: active Maillard reaction product from the reaction of hexoses with lysine residues

pp 705–714

Oliver Reihl, Klaus M. Biemel, Markus O. Lederer and Wolfgang Schwack*



Syntheses are described for the Maillard reaction product **14**-¹³C₁ and the model compound **18**.

NOTES

A novel α-glucosidase inhibitor from pine bark

pp 715–717

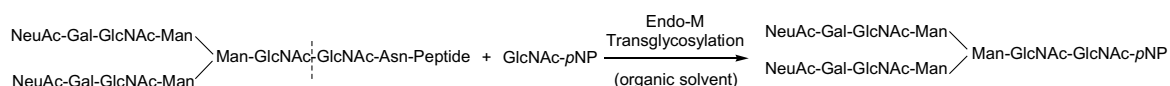
Yong-Mu Kim, Myeong-Hyeon Wang and Hae-Ik Rhee*

Pinus densiflora bark extracts, from among more than 1400 species examined, showed the highest inhibition activity against several carbohydrate-hydrolysing enzymes.

High efficiency of transferring a native sugar chain from a glycopeptide by a microbial endoglycosidase in organic solvents

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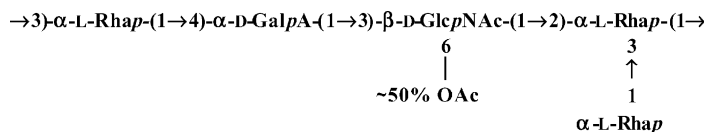
Eri Akaike, Maki Tsutsumida, Kenji Osumi, Masaya Fujita, Takashi Yamanoi,* Kenji Yamamoto and Kiyotaka Fujita



Structure of the O-polysaccharide from the lipopolysaccharide of *Hafnia alvei* strain PCM 1529

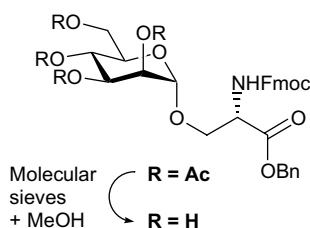
pp 723–727

Ewa Katzenellenbogen,* Nina A. Kocharova, Maria Bogulska, Alexander S. Shashkov and Yuriy A. Knirel

**Practical de-O-acylation reactions promoted by molecular sieves**

pp 729–732

K. P. Ravindranathan Kartha,* Balaram Mukhopadhyay and Robert A. Field

**The O-polysaccharide of *Pseudomonas syringae* pv. *mori* NCPPB 1656 is a $\beta\text{-(1}\rightarrow 2\text{)}$ -linked homopolymer of L-rhamnose**

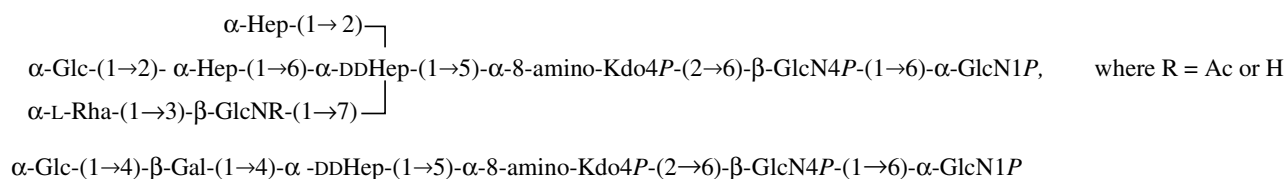
pp 733–735

George V. Zatonsky, Evelina L. Zdorovenko, Alexander S. Shashkov, Yuriy A. Knirel* and Vladimir Ovod

**The structure of the core region of the lipopolysaccharide from *Shewanella algae* BrY, containing 8-amino-3,8-dideoxy-D-manno-oct-2-ulonic acid**

pp 737–740

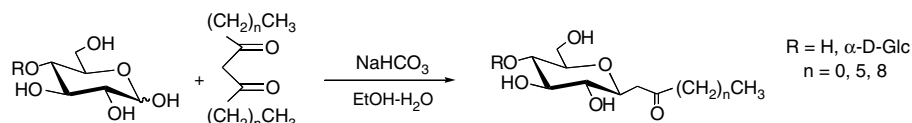
Evgeny Vinogradov,* Anton Korenevsky and Terry J. Beveridge



One-step synthesis of β -C-glycolipid derivatives from unprotected sugars

pp 741–745

Yaël Hersant, Robert Abou-Jneid, Yves Canac, André Lubineau, Michel Philippe, Didier Semeria, Xavier Radisson and Marie-Christine Scherrmann*



*Corresponding author

COVER

Well-defined glycoforms of glycoproteins can easily be obtained by oxidative coupling of synthetic thioaldoses with proteins that have a cysteine moiety in lieu of an asparagine residue carrying natural N-linked oligosaccharides. In vitro glycosylation offers several advantages such as quantitative conjugation, incorporation of oligosaccharides that display high bioactivities and the possibility of using convenient bacterial or yeast protein expression systems. The figure is related to Geert-Jan Boons' *Carbohydrate Research Award* paper, *Carbohydr. Res.*, **2004**, 339, 181–193.



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