

## BIBLIOGRAPHY ON CARBOHYDRATE POLYMERS

### 1 Books, Reviews and Symposia

Woodward J//Oak Ridge Natl Lab, Div Chem Technol, POB 2008, Oak Ridge, Tn 37831, USA  
J BIOTECHNOL 1989, 11 (4) 299

Immobilized cellulases for cellulose utilization (Minireview)

Doubet S, Bock K, Smith D, Darvill A, Alber-sheim P//Univ Georgia, Complex Carbohydrate Res Ctr, 220 Riverbend Rd, Athens, Ga 30603, USA

TRENDS BIOCHEM SCI 1989, 14 (12) 475

The complex carbohydrate structure database

Evered D, Whelan J (Eds)

John Wiley & Sons Ltd (Chichester), 1989, 298 pp, \$57.95 Hardbound, ISBN: 0-471-92305-2

Biology of Hyaluronan

Ciba Foundation Symposia, Vol 143

Symp on the Biology of Hyaluronan, Ciba Fdn, London, England, Sept 27-29, 1988.

Bertocchi C, Navarini L, Cesaro A\*, Anastasio M//\*Lab Technol Biopolym - LBT, Res Ctr, POLY - bios, Area di Ricerca, Padriciano 99, I-34012 Trieste, Italy

CARBOHYD POLYM 1990, 12 (2) 127

Polysaccharides from cyanobacteria (Review Paper)

Dekker RFH//CSIRO, Div Biotechnol, Private Bag 10, Clayton, Vic 3168, Australia

BRAZ J MED BIOL RES 1989, 22 (12) 1441

Enzymatic hydrolysis of plant polysaccharides: Substrates for fermentation (Review)

Franz G//Univ Regensburg, Dept Pharm, D-8400 Regensburg, Fed Rep Ger

PLANTA MED 1989, (6) (DEC) 493

Polysaccharides in pharmacy: Current applications and future concepts (Review)

Kempf W//Address not available

STARCH 1989, 41 (10) 401

11th Potato Convention 1989 at Detmold (Report) (German, English Abstract)

### 2 Cellulose

Borsa J, Kalman F, Rusznak I//Tech Univ Buda-pest, Dept Organ Chem Technol, Cagymanyosi 16 V3, H-1111 Budapest, Hungary

COLLOID POLYM SCI 1989, 267 (10) 915

Equilibrium sorption of crystal violet by carboxy-methylated cellulose with low degree of substitution

Bagga SL, Jain RK, Gur IS\*, Bhatnagar HL// \*Kurukshetra Univ, Dept Chem, Kurukshetra 132119, Haryana, India

BRIT POLYM J 1990, 22 (2) 107

Thermal and spectroscopic studies on flame-re-tardant cotton cellulose modified with THPC-urea-ADP and its transition metal complexes

Budd J, Herrington TM//Univ Reading, Dept Chem, Reading RG6 2AD, Berks, England

COLLOID SURFACE 1989, 41 (3-4) 363

The adsorption of aluminium from aqueous solution by cellulose fibres

Chakrabarti AC, Storey KB\*// \*Carleton Univ, Inst Biochem, Ottawa, Ontario, Canada K1S 5B6

APPL BIOCHEM BIOTECH 1989, 22 (3) 263

Enhanced glucose production from cellulose using coimmobilized cellulase and beta-glucosidase

Comfort AR, Albert EC, Langer R\*// \*MIT, Dept Chem Engr, Room E25-342, Cambridge, Ma 02139, USA

BIOTECHNOL BIOENG 1989, 34 (11) 1366

Immobilized enzyme cellulose hollow fibers: I. Immobilization of heparinase

Comfort AR, Albert EC, Langer R\*// \*MIT, Dept Chem Engr, Room E25-342, Cambridge, Ma 02139, USA

As a service to subscribers, each issue of the Journal contains a bibliography of newly published material in the field of carbohydrate polymers. The bibliography is divided into ten sections: 1 Books, Reviews and Symposia; 2 Cellulose; 3 Cellulose-degrading Enzymes; 4 Cyclodextrins; 5 Lignin; 6 Polysaccharides - Named; 7 Polysaccharides - Other; 8 Lipopolysaccharides; 9 Starch; 10 Starch-degrading Enzymes. Within each section, articles are listed in alphabetical order with respect to the subject. When there are no publications to appear under one of these headings, that section will be omitted.

BIOTECHNOL BIOENG 1989, 34 (11) 1374

Immobilized enzyme cellulose hollow fibers: II. Kinetic analysis

Comfort AR, Albert EC, Langer R\*//MIT, Dept Chem Engrn, Room E25-342, Cambridge, Ma 02139, USA

BIOTECHNOL BIOENG 1989, 34 (11) 1383

Immobilized enzyme cellulose hollow fibers: III. Physical properties and in vitro biocompatibility

Fiedler S, Fussel M, Sattler K\*//Acad Sci GDR, Inst Biotechnol, Permoserstr 15, DDR-7050 Leipzig, Ger Dem Rep

ZBL MIKROBIOL 1989, 144 (7) 473

Production and application of bacterial cellulose. 1. A survey on state of research and investigations concerning fermentation kinetics

Flink P, Stenberg B//Royal Inst Technol, Dept Polymer Technol, S-10044 Stockholm 70, Sweden  
BRIT POLYM J 1990, 22 (2) 147

Mechanical properties of natural rubber/grafted cellulose fibre composites

Gao S, Bao Q//Analyt Testing Ctr Gansu Province, Lanzhou, Peoples R China

J LIQ CHROMATOGR 1989, 12 (11) 2083

Determination of interfacial parameters of cellulose acetate membrane materials by HPLC

Godinho MH, Seurin MJ, Maissa P, Sixou P//Univ Nova Lisboa, Fac Ciencias & Technol, Dept Ciencia Mat, P-2825 Monte de Caparica, Portugal

LIQ CRYST 1989, 5 (6) 1711

Mesophase formation and intrinsic viscosity for some low-molecular-weight cellulose acetate samples

Kamide K, Matsuda Y, Iijima H, Okajima K//Asahi Chem Ind Co Ltd, Fundamental Res Lab Fibers & Fiber Forming Polymers, 11-7 Haccho-nawate, Takatsuki, Osaka 569, Japan

BRIT POLYM J 1990, 22 (2) 167

Effect of culture conditions of acetic acid bacteria on cellulose biosynthesis

Kester JJ, Fennema O//Procter & Gamble Co, Winton Hill Tech Ctr, 6071 Ctr Hill Rd, Cincinnati, Oh 45224, USA

J FOOD SCI 1989, 54 (6) 1383

An edible film of lipids and cellulose ethers: Barrier properties to moisture vapor trans-

mission and structural evaluation

Kester JJ, Fennema O//Procter & Gamble Co, Winton Hill Tech Ctr, 6071 Ctr Hill Rd, Cincinnati, Oh 45224, USA

J FOOD SCI 1989, 54 (6) 1390

An edible film of lipids and cellulose ethers: Performance in a model frozen-food system

Greener IK, Fennema O//Univ Wisconsin, Dept Food Sci, Madison, Wi 53706, USA

J FOOD SCI 1989, 54 (6) 1393

Barrier properties and surface characteristics of edible, bilayer films

Greener IK, Fennema O//Univ Wisconsin, Dept Food Sci, Madison, Wi 53706, USA

J FOOD SCI 1989, 54 (6) 1400

Evaluation of edible, bilayer films for use as moisture barriers for food

Leza ML, Casinos I, Guzman GM//Univ Pais Vasco, Fac Ciencias Quim, Dept Ciencia & Tecnol Polimeros, Apdo 1072, E-20080 San Sebastian, Spain

EUR POLYM J 1989, 25 (12) 1193

Graft copolymerization of 4-vinylpyridine onto cellulose. Effect of temperature

Liu C-K, Cuculo JA, Smith B//US Surg Corp, Mat Res Lab, 150 Glover Ave, Norwalk, Ct 06856, USA

J POLYM SCI-B POLYM PHYS 1989, 27 (12) 2493

Coagulation studies for cellulose in the ammonia/ammonium thiocyanate (NH<sub>3</sub>/NH<sub>4</sub>SCN) direct solvent system

Loth F, Philipp B//Acad Sci GDR, Inst Polymer Chem Erich Correns, Kantstr 55, DDR-1530 Teltow, Ger Dem Rep

MAKROMOL CHEM-MACROMOL SYMP 1989, 30 (OCT) 273

The macroporous network of "bead cellulose" and its response to crosslinking with epichlorohydrin

Luneva NK, Komar VV, Ermolenko IN//Acad Sci BeSSR, Inst Gen & Inorgan Chem, Minsk, Belorussia, USSR

J APPL CHEM-ENGL TR 1989, 62 (3) PT2, 617

Preparation and photographic properties of cellulose esters and polyaminocarboxylic acids

Lynd LR, Grethlein HE, Wolkin RH//Dartmouth Coll, Thayer Sch Engr, Hanover, NH 03755, USA

APPL ENVIRON MICROBIOL 1989, 55 (12) 3131

Fermentation of cellulosic substrates in batch and continuous culture by *Clostridium thermocellum*

Majdanac LD, Teodorovic MJ//Univ Belgrade, Fac Technol & Met, YU-11001 Belgrade, Yugoslavia

ACTA POLYM 1989, 40 (10) 633

The influence of supramolecular structure on the kinetics of the thermal decomposition of alkali treated celluloses

Matsumura K, Hayamizu K, Yamamoto O//Natl Chem Lab Ind, Tsukuba, Ibaraki 305, Japan

J POLYM SCI-B POLYM PHYS 1989, 27 (12) 2407

Angular dependence of  $^1\text{H}$ -NMR and  $^2\text{H}$ -nmr spectra of water absorbed in cellulose film

Metelitsa DI, Astakhova NV, Savenkova MI, Snegireva NS//Acad Sci BeSSR, Inst Bioorgan Chem, Minsk, Belorussia, USSR

ZH FIZ KHIM SSSR 1989, 63 (10) 2736

Adsorption properties of cellulose membranes relative to human immunoglobulin (Russian)

Morita Z, Ishida H, Shimamoto H, Weber R, Rys P//Tokyo Univ Agr & Technol, Sch Engr, Dept Mat Syst Engr, Koganei, Tokyo 184, Japan

J MEMBRANE SCI 1989, 46 (2-3) 283

Anion permeability of cellulosic membranes. Part 1. Porosity of water-swollen membranes

Morita Z, Ishida H, Shimamoto H, Weber R, Rys P//Tokyo Univ Agr & Technol, Sch Engr, Dept Mat Syst Engr, Koganei, Tokyo 184, Japan

J MEMBRANE SCI 1989, 46 (2-3) 299

Anion permeability of cellulosic membranes. Part 2. Effect of fixed groups on permeation of co-ions

Moteleb MMA, Shinouda HG//Univ Cairo, Fac Sci, Dept Chem, Cairo, Egypt

J APPL POLYM SCI 1989, 38 (11) 2079

Effect of the fine structure and electrolytic contaminations on the specific conductance of some cellulosic materials

Nakao T, Tanaka C, Takahashi A, Okano T, Ni-

shimura//Shimane Univ, Fac Radioimmunol, Dept Forestry, Matsue, Shimane 690, Japan

HOLZFORSCHUNG 1989, 43 (6) 419

Long-term changes in degree of crystallinity of wood cellulose

Raj RG, Kokta BV, Dembele F, Sanschagrain B//Univ Quebec, Ctr Res Pulp & Paper, Trois Rivieres GA9 5H7, Quebec, Canada

J APPL POLYM SCI 1989, 38 (11) 1987

Compounding of cellulose fibers with polypropylene: Effect of fiber treatment of dispersion in the polymer matrix

Schwarz H-H, Hicke H-G//Acad Sci GDR, Inst Polymerenchem Erich Correns, Kantstr 55, DDR-1530 Teltow, Ger Dem Rep

J MEMBRANE SCI 1989, 46 (2-3) 325

Influence of casting solution concentration on structure and performance of cellulose acetate membranes

Short RD, Munro HS//Sheffield Univ, Sch Mat, Div Ceram Glasses & Polymer, Northumberland Rd, Sheffield S10 2TZ, England

POLYM COMMUN 1989, 30 (12) 366

Nitration of cellulose by a nitronium ion salt

Stoll M, Fengel D//Univ Munich, Inst Holzforsch, Winzererstr 45, D-8000 Munich 40, Fed Rep Ger

MAKROMOL CHEM-MACRO CHEM PHYS 1989, 190 (10) 2491

On the probability of the existence of periodical substructures in cellulose

Williams RO, McGinty JW//Duramed Pharmaceutical Inc, Pharmaceut Res & Dev, Cincinnati, Oh 45213, USA

J PHARM SCI 1989, 78 (12) 1025

Compaction properties of microcrystalline cellulose and sodium sulfathiazole in combination with talc or magnesium stearate

Yamashiki T, Matsui T, Saitoh M, Okajima K, Kamide K\*//Asahi Chem Ind Co Ltd, Fundamental Res Lab Fibers & Fiber Forming Polym, 11-7 Hacchonawate, Takatsuki, Osaka 569, Japan

BRIT POLYM J 1990, 22 (1) 73

Characterisation of cellulose treated by the steam explosion method. Part 1. Influence of cellulose resources on changes in morphology, degree of polymerisation, solubility and solid structure

Yamashiki T, Matsui T, Saitoh M, Okajima K, Kamide K\*, Sawada T//*Asahi Chem Ind Co Ltd, Fundamental Res Lab Fibers & Fiber Forming Polymers*, 11-7 Hacchonawate, Takatsuki, Osaka 569, Japan

BRIT POLYM J 1990, 22 (2) 121

Characterisation of cellulose treated by the steam explosion method. Part 2: Effect of treatment conditions on changes in morphology, degree of polymerisation, solubility in aqueous sodium hydroxide and supermolecular structure of soft wood pulp during steam explosion

Arwidsson H//*Astra Lakemedel AB*, S-15185 Sodertalje, Sweden

INT J PHARM 1989, 56 (2) 187

Application of intrinsic viscosity and interaction constant as a formulation tool for film coating. 1. Studies on ethyl cellulose 10 cps in organic solvents

Tezuka Y, Imai K, Oshima M, Chiba T//*Nagoka Univ Technol, Dept Mat Sci & Technol*, Nagoka, Niigata 94021, Japan

POLYMER 1989, 30 (12) 2288

Determination of substituent distribution in cellulose ethers by means of a  $^{13}\text{C}$  nuclear magnetic resonance study on their acetylated derivatives: 3. Hydroxyethylcellulose

Fechner PU, Rimpler M//*Schmiedestr 41*, D-3000 Hanover 1, Fed Rep Ger

J CATARACT REFRACT SURG 1989, 15 (6) 685

Comparison of hydroxypropyl methylcellulose 2% (Adatocel<sup>(R)</sup>) and hyaluronic acid 1% (Healon<sup>(R)</sup>)

### 3 Cellulose-degrading Enzymes

Abuja PM, Pilz I\*, Tomme P, Claeysens M//*\*Graz Univ, Inst Phys Chem, Heinrichstr 28*, A-8010 Graz, Austria

BIOCHEM BIOPHYS RES COMMUN 1989, 165 (2) 615

Structural changes in cellobiohydrolase I upon binding of a macromolecular ligand as evident by SAXS investigations

Labudova I, Czajkowska D, Hayn M, Steiner W, Esterbauer H\*//*\*Graz Univ, Inst Biochem, Schuberstr 1*, A-8010 Graz, Austria

J BIOTECHNOL 1989, 12 (2) 123

Investigations on the physiology, mutagenesis and cellulase production of *Gliocladium virens*

Miron J, Yokoyama MT, Lamed R//*Agr Res Org, Volcani Ctr, Inst Anim Sci, Metab Unit*, POB 6, IL-50250 Bet Dagan, Israel

APPL MICROBIOL BIOTECHNOL 1989, 32 (2) 218

Bacterial cell surface structures involved in lucerne cell wall degradation by pure cultures of cellulolytic rumen bacteria

Schulz G, Hirte WF//*Humboldt Univ, Sekt Nahrungsguterwirtschaft & Lebensmitteltechnol*, Max Reichmann Str 16, DDR-1532, Ger Dem Rep

ZBL MIKROBIOL 1989, 144 (7) 443

Phenotypic optimization studies on cellulase production by a selected *Penicillium janthinellum* strain

Sharma VK, Goel R\*//*\*Govind Ballabh Pant Univ Agr & Technol, Dept Microbiol, Pantnagar 263145*, Uttar Pradesh, India

J GEN APPL MICROBIOL TOKYO 1989, 35 (2) 163

High cellulase-producing mutants of *Sporotrichum thermophile*

### 4 Cyclodextrins

CARBOHYD RES 1989, 192 (OCT)

Special Issue: A collection of invited papers dealing with cyclodextrins

Asakura K, Tanaka N, Matsumura S, Yoshikawa S//*Keio Univ, Fac Sci & Technol, Kohoku ku*, 3-14-1-Hiyoshi, Yokohama, Kanagawa 223, Japan

CHEM LETT 1989, (11) 1997

Recognition of tetralin hydroperoxide by cyclodextrins

Ata M, Kubozono Y, Suzuki Y, Aoyagi M, Gondo Y\*//*\*Kyushu Univ 33, Fac Sci, Dept Chem, Higashi ku*, Fukuoka 812, Japan

BULL CHEM SOC JPN 1989, 62 (11) 3706

Induced circular dichroism and molecular orientations of beta-cyclodextrin inclusion complexes with 9,10-anthraquinone and 9,10-phenanthrenequinone

Gelb RI, Schwartz LM\*//*\*Univ Massachusetts, Dept Chem, Boston, Ma 02125*, USA

J INCLUSION PHENOM 1989, 7 (5) 537

Complexation of adamantane-ammonium substrates by beta-cyclodextrin and its O-methylated derivatives

Han L-F, Linert W\*, Schmid R, Jameson RF//  
\*Vienna Tech Univ, Inst Inorgan Chem, Getreidemarkt 9, A-1060 Vienna, Austria  
J CHEM SOC PERKIN TRANS II 1989, (11) 1907

The effect of alpha-cyclodextrin on the oxidation of formic acid by aqueous bromine: Inhibition despite overall rate increase

Harada A, Yamamoto S, Takahashi S//Osaka Univ, Inst Sci & Ind Res, Ibaraki, Osaka 567, Japan

ORGANOMETALLICS 1989, 8 (11) 2560

Preparation and properties of inclusion compounds of transition-metal complexes of cycloocta-1,5-diene and norbornadiene with cyclodextrins

Hodi K, Aigner Z\*, Fahr F, Kata M//Albert Szent Gyorgyi Med Univ, Dept Pharmaceut Technol, POB 121, H-6701 Szeged, Hungary  
STARCH 1989, 41 (10) 392

Electron microscopic study of products containing beta-cyclodextrin

Komiyama M//Univ Tsukuba, Inst Mat Sci, Sakura, Ibaraki 305, Japan

J CHEM SOC PERKIN TRANS 1989, I (11) 2031

Selective syntheses using cyclodextrins as catalysts. Part 5. Para-selective hydroxymethylation of phenol by formaldehyde using hydroxypropyl cyclodextrins

Lin S-Y, Lee C-S//Vet Gen Hosp, Dept Med Res, Biopharmaceut Lab, Taipei, Taiwan  
J INCLUSION PHENOM 1989, 7 (5) 477

The effect of mechanical grinding on the formation and crystallinity changes of the inclusion complex of acetaminophen and beta-cyclodextrin

Lin SY, Kao YH//Vet Gen Hosp, Dept Med Res, Biopharmaceut Lab, Taipei, Taiwan  
INT J PHARMACEUT 1989, 56 (3) 249

Studies on drug interaction in pharmaceutical formulations. 12. Solid particulates of drug beta-cyclodextrin inclusion complexes directly prepared by a spray-drying techniques

Linert W, Han L, Lukovits I//Vienna Tech Univ, Inst Inorgan Chem, Getreidemarkt 9, A-1060 Vienna, Austria

CHEM PHYS 1989, 139 (2-3) 441

The use of the isokinetic relationship and molecular mechanics to investigate molecular interactions

in inclusion complexes of cyclodextrins

Nango M, Higuchi M, Gondo H, Hara M//Univ Osaka Prefecture, Coll Engr, Dept Appl Chem, Sakai, Osaka 591, Japan

J CHEM SOC COMMUN 1989, (20) 1550

Characterization of water soluble/bilayer active beta-cyclodextrin-linked porphyrin derivatives

Nishimura M, Deguchi T, Sanemasa I\*//Kumamoto Univ, Fac Sci, Dept Chem, Kurokami 2-39-1, Kumamoto 860, Japan

BULL CHEM SOC JPN 1989, 62 (11) 3718

Association of carbon tetrachloride, chloroform, and dichloromethane with cyclodextrins in aqueous medium

Okada Y, Koizumi K\*, Ogata K, Ohfuji T//Mukogawa Womens Univ, Fac Pharmaceut Sci, 11-68 Koshien Kyuban cho, Nishinomiya, Hyogo 663, Japan

CHEM PHARM BULL TOKYO 1989, 37 (11) 3096

Inclusion complexes of lipids with branched cyclodextrins

Palepu R, Reinsborough VC//Univ Coll Cape Breton, Dept Chem, Sydney, NS, Canada B1P 6L2

CAN J CHEM 1989, 67 (10) 1550

Solution inclusion complexes of cyclodextrins with sodium perfluorooctanoate

Richmond MD, Hurtubise RJ\*//Univ Wyoming, Dept Chem, Laramie, WY 82071, USA

ANAL CHEM 1989, 61 (23) 2643

Analytical characteristics of beta-cyclodextrin salt mixtures in room-temperature solid-surface luminescence analysis

Sakurai M, Hoshi H, Inoue Y, Chujo R//Tokyo Inst Technol, Dept Biomolec Engr, 12-1-0 Okayama 2 chome, Meguro ku, Tokyo 152, Japan

CHEM PHYS LETT 1989, 163 (2-3) 217

A method for estimating medium effects in heterogeneous systems. Theoretical analysis of complexation-induced <sup>13</sup>C-NMR chemical shift changes in alpha-cyclodextrin-guest systems

Shiraishi F, Kawakami K, Marushima H, Kusunoki K//Kyushu Univ, Dept Chem Engr, Higashi ku, Fukuoka 812, Japan

STARCH 1989, 41 (11) 417

Effect of aliphatic alcohols on formation of cyclodextrin from soluble starch by *Bacillus macerans* cyclodextrin glucanotransferase

Shiraishi T, Fujimoto D, Sakano Y\*\*Tokyo Univ Agr & Technol, Fac Agr, Dept Agr Chem, Biochem Chem Lab, 3-5-8 Saiwai cho, Fuchu, Tokyo 183, Japan

AGR BIOL CHEM TOKYO 1989, 53 (11) 3093  
Synthesis of branched alpha-cyclodextrin carrying a side chain longer than maltose using *Bacillus acidopullulyticus* pullulanase

Voyksner RD, Williams FP, Smith CS, Koble DL, Seltzman HH//Res Triangle Inst, Analyt & Chem Sci, POB 12194, Res Triangle Pk, NC, 27709, USA

BIOMED ENVIRON MASS SPECTROM 1989, 18 (12) 1071

Analysis of cyclodextrins using fast atom bombardment/mass spectrometry and tandem mass spectrometry

Wubbels GG, Cotter WD//Grinnell Coll, Dept Chem, Grinnell, Ia 50112, USA

TETRAHEDRON LETT 1989, 30 (47) 6477

Alpha-cyclodextrin complexation as a probe of heterolytic general base-catalyzed photo-Smiles rearrangements

## 5 Lignin

Aitken MD, Irvine RL//Univ N Carolina, Sch Publ Hlth, Dept Environ Sci & Engr, Chapel Hill, NC 27599, USA

BIOTECHNOL BIOENG 1989, 34 (10) 1251

Stability testing of ligninase and Mn-peroxidase from *Phanerochaete chrysosporium*

Alen R, Vikkula A//Helsinki Univ Technol, Wood Chem Lab, SF-02150 Espoo 15, Finland

HOLZFORSCHUNG 1989, 43 (6) 397

Formation of lignin monomers during alkaline delignification of softwood

Borovkova GG, Borokov VF//Bratsk Ind Inst, Chair Chem, Bratsk, USSR

IZV VYSSH UCH ZAV KHIM KHIM T 1989, 32 (7) 58

Liquid phase oxidation of sulfate lignin

Kelley SS, Glasser WG, Ward TC//Eastman Chem Div, Box 1972, Kingsport, Tn 37662, USA

POLYMER 1989, 30 (12) 2265

Multiphase materials with lignin: 9. Effect of lignin content on interpenetrating polymer network properties

Kern HW, Haider K, Pool W, de Leeuw JW, Ernst L//KFA Julich GmbH, Inst Biotechnol, Postfach 1913, D-5170 Julich 1, Fed Rep Ger  
HOLZFORSCHUNG 1989, 43 (6) 375

Comparison of the action of *Phanerochaete chrysosporium* and its extracellular enzymes (lignin peroxidases) on lignin preparations

Kern HW//KFA Julich GmbH, Inst Biotechnol, Postfach 1913, D-5170 Julich 1, Fed Rep Ger  
APPL MICROBIOL BIOTECHNOL 1989, 32 (2) 223

Improvement in the production of extracellular lignin peroxidases by *Phanerochaete chrysosporium* - effect of solid manganese(IV) oxide

Kobayakawa K, Sato Y, Nakamura S, Fujishima A//Kanagawa Univ, Fac Engr, Dept Appl Chem, Kanagawa ku, Rokkakurashi, Yokohama 221, Japan

BULL CHEM SOC JPN 1989, 62 (11) 3433

Photodecomposition of Kraft lignin catalyzed by titanium dioxide

Shchukin IV, Babkin VA//Irkutsk Inst Organ Chem, Irkutsk, USSR

SOV ELECTROCHEM ENGL TR 1989, 25 (2) 169

Electrochemical oxidation of lignin and lignin-model compounds at the platinum electrode

Tylli H, Olkkonen C, Forsskahl I//Univ Helsinki, Dept Chem, E Hesperiankatu 4, SF-00100 Helsinki 10, Finland

J PHOTOCHEM PHOTOBIOLOG A-CHEM 1989, 49 (3) 397

A sensitivity analysis of the kinetic mechanism for the photodegradation of a model system of relevance to lignin yellowing

## 6 Polysaccharides - Named

Morris VJ, Brownsey GJ, Cairns P, Chilvers GR, Miles MJ//AFRC, Inst Food Res, Norwich Lab, Colney Lane, Norwich NR4 7UA, Norfolk, England

INT J BIOL MACROMOL 1989, 11 (6) 326

Molecular origins of acetan solution properties

Hoffman WL, Jump AA, Kely PJ, Elanogovan N//Presbyterian Med Ctr, Ctr Arthrit Consultat,

8200 Walnut Hill Lane, Dallas, Tx 75321, USA  
ELECTROPHORESIS 1989, 10 (11) 741

Rehydratable agarose gels: Application to isoelectric focusing in 9M urea

Hassan RM, Makhoul MT, Summan AM, Awad A//Univ Assiut, Fac Sci, Dept Chem, Assiut, Egypt

EUR POLYM J 1989, 25 (10) 993

Influence of frequency on specific conductance of polyelectrolyte gels with special correlation between strength of chelation and stability of divalent metal alginate ionotropic gels

Hassan RM, Summan AM, Hassan MK, El-Shattoury SA//Univ Assiut, Fac Sci, Dept Chem, Assiut, Egypt

EUR POLYM J 1989, 25 (12) 1209

Kinetics and mechanism of sol-gel transformation on polyelectrolytes of some transition metal ions, especially cobalt alginate ionotropic membranes

Santosrosa F, Galvan F, Vega JM//Fac Quim Seville, Dept Bioquim Vegetal & Biol Molec, Apartado 553, E-41080 Seville, Spain

APPL MICROBIOL BIOTECHNOL 1989, 32 (3) 285

Photoproduction of ammonium by Chlamydomonas reinhardtii cells immobilized in barium alginate - a reactor feasibility study

Segi N, Yotsuyanagi T\*, Ikeda K//Nagoya City Univ, Fac Pharmaceut Sci, Mizuho ku, Nagoya, Aichi 467, Japan

CHEM PHARM BULL TOKYO 1989, 37 (11) 3092

Interaction of calcium-induced alginate gel beads with propranolol

Sirimana KS//Barnett Gen Hosp, Dept Ear, Nose & Throat, Wellhouse Lane, Barnet, Herts, England

J LARYNGOL OTOL 1989, 103 (11) 1067

Calcium alginate fibre (Kaltostat<sup>(R)</sup>) for nasal packing after trimming of turbinates. A pilot study

Trout GR//Auburn Univ, Dept Physiol Chem, Goethestr 33, D-8000 Munich 2, Fed Rep Ger

J FOOD SCI 1989, 54 (6) 1466

Color and bind strength of restructured pork chops: Effect of calcium carbonate and sodium alginate concentration

Kiyohara H, Yamada H\*//Kitasato Univ, Oriental Med Res Ctr, Minato ku, Tokyo 108, Japan

CARBOHYD RES 1989, 193 (OCT) 173

Structure of an anti-complementary arabinogalactan from the root of Angelica acutiloba Kitagawa

Kiyohara H, Cyong J-C, Yamada H\*//Kitasato Univ, Oriental Med Res Ctr, Minato ku, Tokyo 108, Japan

CARBOHYD RES 1989, 193 (OCT) 193

Relationship between structure and activity of an anti-complementary arabinogalactan from the roots of Angelica acutiloba Kitagawa

Arnaud JP, Lacroix C, Choplin L//Univ Laval, Dept Sci & Technol Aliments, Rech Stela Grp, Quebec City, Quebec, Canada G1K 7P4

BIOTECHNOL BIOENG 1989, 34 (11) 1403

Effect of lactic fermentation on the rheological properties of kappa-carrageenan/locust bean gum mixed gels inoculated with *S. thermophilus*

Stevens ES, Morris ER//Dept Chem, SUNY, Binghamton, NY 13901, USA

CARBOHYD POLYM 1990, 12 (2) 219

The vacuum ultraviolet circular dichroism of carrageenans (Research Note)

Kubota S//Shizuoka Citrus Expt Stn, 2-12-10 Komagdenishi, Shimizu, Shizuoka 424, Japan

APPL ENTOMOL ZOOL 1989, 24 (4) 349

Evaluation of the effect of some chitin synthesis inhibitors against Thrips palmi Karny (Thysanoptera, Thripidae) infesting musk melons

Nishioka Y, Kyotani S, Masui H, Okamura M, Miyazaki M, Okazaki K, Ohnishi S, Yamamoto Y, Ito K//Kochi Med Sch Hosp, Dept Pharm, Okoh cho, Nankoku, Kochi 78151, Japan

CHEM PHARM BULL TOKYO 1989, 37 (11) 3074

Preparation and release characteristics of cisplatin albumin microspheres containing chitin and treated with chitosan

Muzzarelli R, Biagini G, Pugnali A, Filippini O, Baldassarre V, Castaldini CC, Rizzoli C//Univ Ancona, Fac Med, I-60100 Ancona, Italy

BIOMATERIALS 1989, 10 (9) 598

Reconstruction of parodontal tissue with chitosan

Terbojewich M, Carraro C, Cosani A, Focher B, Naggi AM, Torri G//Univ Padua, Dipartimento Chim Organ, via Marzola 1, I-35131 Padua, Italy  
MAKROMOL CHEM-MACRO CHEM PHYS 1989, 190 (11) 2847

Solution studies of chitosan 6-O-sulfate

Cairella M, Giuliani A, Godi R, Vecchi L//Univ Rome la Sapienza, Policlin Umerto I, Ist Terapia Med Sistem, I-00185 Rome, Italy  
CURR THER RES 1989, 46 (5) 797

Effects of diet and diethylaminoethyl-dextran in obese patients with hyperlipoproteinemia

Ciucanu I, Luca C//Ctr Chem Blvd Mihai Viteazul 24, R-1900 Timisoara, Romania  
REV ROUM CHIM 1989, 34 (9-10) 1829

Permethylated dextran as stationary phase in gas chromatography

Kaneo Y, Fujihara Y, Tanaka T, Kozawa Y, Mori H, Iguchi S//Fukuyama Univ, Dept Pharm & Pharmaceut Sci, Fukuyama, Hiroshima 72902, Japan  
PHARMACEUT RES 1989, 6 (12) 1025

Intrahepatic delivery of glutathione by conjugation to dextran

Larsen C, Harboe E, Johansen M, Olesen HP//Royal Danish Sch Pharm, Dept Pharmaceut, 2 Univ Pk, SK-2100 Copenhagen, Denmark  
PHARMACEUT RES 1989, 6 (12) 995

Macromolecular prodrugs. XVI. Colon-targeted delivery - comparison of the rate of release of naproxen from dextran ester prodrugs in homogenates of various segments of the pig gastrointestinal (GI) tract

Sanchez-Chaves M, Arranz F, Diaz C//Inst Ciencia & Technol Polimeros, Juan Cierva 3, E-28006 Madrid, Spain

MAKROMOL CHEM-MACRO CHEM PHYS 1989, 190 (10) 2391

Synthesis and characterization of 2-acetoxybenzoic acid-dextran ester conjugates

Suzuki M, Cutcliffe JA//Agr Canada, Res Stn, POB 1210, Charlottetown, PEI, Canada C1A 7M8

CAN J PLANT SCI 1989, 69 (4) 1327

Fructans in onion bulbs in relation to storage life

Bulpin PV, Gidley MJ\*, Jeffcoat R, Underwood

DR//Unilever Res, Colworth Hse, Sharnbrook, Bedford MK44 1LQ, England

CARBOHYD POLYM 1990, 12 (2) 155

Development of a biotechnological process for the modification of galactomannan polymers with plant alpha-galactosidase

Kapoor VP, Sen AK, Farooqi MIH\*//Natl Bot Res Inst, Lucknow 226001, Uttar Pradesh, India  
INDIAN J CHEM SECT B 1989, 28 (11) 928

Structure of dhaincha galactomannan from the seeds of Sesbania bispinosa

Noble O, Turquois T, Taravel FR//Aqualon France, ZI, F-27460 Alizay, France  
CARBOHYD POLYM 1990, 12 (2) 203

Rheological properties of galactomannan-based gels. Part 1 - Guar and hydroxypropylguar gels in alkaline media

Sanderson GR, Bell VL, Ortega D//Merck & Co Inc, Keco Div, San Diego, Ca 92123, USA  
CEREAL FOOD WORLD 1989, 34 (12) 991

A comparison of gellan gum, agar, kappa-carrageenan, and algin

Floor M, Hofsteede LPM, Groenland WPT, Verhaar LAT, Kieboom APG, van Bakkum H//Delft Univ Technol, Organ Chem Lab, Julianalaan 136, 2628 BL Delft, The Netherlands  
REC TRAV CHIM-J ROY NETH CHEM 1989, 108 (10) 384

Preparation and calcium complexation of oxidized polysaccharides. II. Hydrogen peroxide as co-reactant in the chlorite oxidation of dialdehyde glucans

Kishida E, Sone Y, Misaki A\*//Osaka City Univ, Fac Sci Living, Dept Food & Nutr, Sumiyoshi ku, Osaka 558, Japan

CARBOHYD RES 1989, 193 (OCT) 227

Purification of an antitumor-active, branched (1-3)-beta-D-glucan from Volvariella volvacea, and elucidation of its fine structure

Maheshwari R, Siddiqui MU//Govt Gen Hosp, Dept Clin Biochem, Kakinada 533008, India  
INDIAN J MED RES A-INFECT DIS 1989, 89 (NOV) 396

Immunoprotection by beta-1,3 glucan antigen combination in Plasmodium berghei infection in mice

Molina-Cano JL, Roca de Togores F, Royo C,

Perez A/Inst Rec & Tecnol Agroalimentaries,  
Ctr UPC IRTA, E-25006 Lleida, Spain  
THEORET APPL GENET 1989, 78 (5) 748

Fast-germinating low beta-glucan mutants induced in barley with improved malting quality and yield

Narziss L, Reicheneder E, Edney MJ/Tech Univ Munich, Lehrstuhl & Lab Technol Brauere, D-8050 Freising, Fed Rep Ger

MONATSSCHR BRAUWISSEN 1989, 42 (11) 430

Importance of beta-glucan size and concentration in malting

Yano T, Mangindaan REP, Matsuyama H//Kyushu Univ, Fac Agr, Fisheries Chem Lab, Fukuoka 812, Japan

NIPPON SUISAN GAKKAISHI 1989, 55 (10) 1815

Enhancement of the resistance of carp *Cyprinus carpio* to experimental *Edwardsiella tarda* infection, by some beta-1,3-glucans

Biancardi G, Palmiero L, Ghirardi PE//Piazza Maris Adelaide Savoia 2, I-20129 Milan, Italy

CURR THER RES 1989, 46 (5) 908

Glucomannan in the treatment of overweight patients with osteoarthritis

Oxley D, Wilkinson SG//Univ Hull, Sch Chem, Hull HU6 7RX, N Humberside, England

CARBOHYD RES 1989, 193 (OCT) 241

Structures of neutral glycans isolated from the lipopolysaccharides of reference strains for *Serratia marcescens* serogroups O16 O20

Nono I, Ohno N, Ohsawa M, Oikawa S, Yodoma T//Tokyo Coll Pharm, Hachioji, Tokyo 19203, Japan

J PHARMACOBIO-DYNAM 1989, 12 (11) 671

Modification of immunostimulating activities of grifolan by the treatment with (1-3)-beta-D-glucanase

Murata K, Yokoyama Y, Yoshida K//Tokyo Natl Univ Arts & Mus, Med Ctr, Ueno Pk, Taito ku, Tokyo 110, Japan

J CHROMATOGR-BIOMED APPL 496 (1) 27

High-performance liquid chromatographic identification of disaccharides generated from heparan sulphate isomers using heparitinases

Andrew M, Ofosu F, Brooker L, Buchanan

MR/McMaster Univ, Dept Pediat, 1200 Main St W, Hamilton, Ontario, Canada L8N 3Z5

THROMB RES 1989, 56 (4) 529

The comparison of the pharmacokinetics of a low molecular weight heparin in the newborn and adult pig

Dietrich CP, Nader HB, de Paiva JF, Santos EA, Holme KR, Berlin AS//Univ Fed Rio Grande Norte, Dept Bioquim, Natal, RN, Brazil

INT J BIOL MACROMOL 1989, 11 (6) 361

Heparin in molluscs: Chemical, enzymatic degradation and <sup>13</sup>C and <sup>1</sup>H n.m.r. spectroscopical evidence for the maintenance of the structure through evolution

Ogamo A, Metori A, Uchiyama H, Nagasawa K//Kitasato Univ, Sch Pharmaceut Sci, 5-9-1 Shirokane, Minato ku, Tokyo 108, Japan

CARBOHYD RES 1989, 193 (OCT) 165

Reactivity toward chemical sulfation of hydroxyl groups of heparin

Pini M, Tagliaferri A, Manotti C, Lasagni F, Rinaldi E, Dettori AG//Osped Maggiore Parma, Dept Med 5, Div Med 5A, via Gramsci 14, I-43100 Parma, Italy

INT ANGIOL 1989, 8 (3) 134

Low molecular weight heparin (alpha LHHW) compared with unfractionated heparin in prevention of deep-vein thrombosis after hip fractures

Regelson W//Virginia Commonwealth Univ, Med Coll Virginia, POB 273, Richmond, Va 23298, USA

J NAT CANCER INST 1989, 81 (24) 1929

Anionic dyes, heparin, heparinoids: The rediscovery of polyanionic tumor inhibitors (Letter)

Thomas DP, Barrowcliffe TW, Hemker HC//Natl Inst Biol Stand & Control, Blanche Lane, Potters Bar EN6 3QG, Herts, England

HAEMOSTASIS 1989, 19 (6) 353

A standard for low molecular weight heparins

Ubhi CS, Lam FT, Mavor AID, Giles GR//St James Univ Hosp, Dept Surg, Beckett St, Leeds LS9 7TF, W Yorkshire, England

TRANSPLANTATION 1989, 48 (5) 886

Subcutaneous heparin therapy for cyclosporine-immunosuppressed renal allograft recipients

Lewis R, Kerr N, van Buren C, Lowry P, Sandler C, Frazier OH, Powers P, Herson J, Corriere J,

Kerman R, Kahan B//Univ Texas, Sch Med, Dept Surg, Div Urol, 6431 Fannin, Suite 6018, Houston, Tx 77030, USA

TRANSPLANTATION 1989, 48 (5) 790

Comparative evaluation of urographic contrast media, inulin, and  $^{99m}\text{Tc}$ -DTPA clearance methods for determination of glomerular filtration rate in clinical transplantation

Han YW//USDA, So Reg Res Ctr, New Orleans, La 70179, USA

J IND MICROBIOL 1989, 4 (6) 447

Levan production by *Bacillus polymyxa*

Bancal P, Gaudillere J-P//INRA, Ctr Rech Bordeaux, Physiol Vegetale Stn, F-33140 Pont de la Maye, France

PLANT PHYSIOL BIOCHEM 1989, 27 (5) 745

Oligofructan separation and quantification by high performance liquid chromatography. Application to *Asparagus officinalis* and *Triticum aestivum*

Kinzy W, Schmidt RR\*\*//Univ Konstanz, Fak Chem, Postfach 5560, D-7750 Konstanz, Fed Rep Ger

CARBOHYD RES 1989, 193 (OCT) 33

Synthesis of glycopeptides of the mucin type containing a beta-D-GalpNAc-(1-3)-D-GalpNAc unit

Kiyohara H, Cyong J-C, Yamada H\*\*//Kitasato Univ, Oriental Med Res Ctr, Minato ku, Tokyo 108, Japan

CARBOHYD RES 1989, 193 (OCT) 201

Relationship between structure and activity of the "ramified" region in anti-complementary pectic polysaccharides from *Angelica acutibola* Kitagawa

Koch JL, Nevins DJ\*\*//Univ Calif Davis, Dept Vegetable Crops, Davis, Ca 95616, USA

PLANT PHYSIOL 1989, 91 (3) 816

Tomato fruit cell wall. 1. Use of purified tomato polygalacturonase and pectinmethylesterase to identify developmental changes in pectins

Pal MK, Mandal N//Univ Kalyani, Dept Biochem & Biophys, Kalyani 741235, India

MAKROMOL CHEM-MACRO CHEM PHYS 1989, 190 (10) 2501

Conformational study of sodium pectate from circular dichroism induced in dyes

Kongtawelert P, Brooks PM, Ghosh P\*\*//Royal

N Shore Hosp, Raymond Purves Res Labs, St Leonards, NSW 2065, Australia

J RHEUMATOL 1989, 16 (11) 1454

Pentosan polysulfate (Cartrophen) prevents the hydrocortisone induced loss of hyaluronic acid and proteoglycans from cartilage of rabbit joints as well as normalizes the keratan sulfate levels in their serum

Klein J, Begli AH//Gesell Biotechnol Forsch GmbH, Mascheroder Weg 1, D-3300 Braunschweig, Fed Rep Ger

MAKROMOL CHEM-MACRO CHEM PHYS 1989, 190 (10) 2527

Poly(vinylsaccharide)s, 5. Synthesis and characterization of poly(vinylsaccharide)s of the amide type with disaccharides in the side chain

Mickey DD, Carvalho L, Foulkes K//Univ N Carolina, Dept Surg, Div Urol, 428 Burnett Womack Bldg, CB 7235, Chapel Hill, NC 27599, USA

J UROL 1989, 142 (6) 1594

Combined therapeutic effects of conventional agents and immunomodulator, PSK, on rat prostatic adenocarcinoma

Tomochika H, Gouchi A, Okanobu K, Sasaki A, Fuchimoto S, Orita K//Okayama Univ, Sch Med, Dept Surg 1, Okayama 700, Japan

ACTA MED OKAYAMA 1989, 43 (5) 289

The effect and distribution of a protein-bound polysaccharide preparation, PSK (Krestin<sup>(R)</sup>), intratumorally injected prior to surgery into gastric cancer patients

Fidanza M, Dentini M, Crescenti V, del Vecchio P//Univ Rome la Sapienza, Dept Chem, I-00185 Rome, Italy

INT J BIOL MACROMOL 1989, 11 (6) 372

Influence of changed groups on the conformational stability of succinoglycan in dilute aqueous solution

Beldie C, Dumitriu S\*, Aelenei N, Popa M, Popa MI, Dumitriu D//Inst Polytech Gheorghe Asachi, 23 August 11, R-6600 Iasi, Romania

BIOMATERIALS 1989, 10 (9) 622

Bioactive polymers. LX. Kinetics of delayed release neomycin-xanthan complex

Freyer JP, Fillak D, Jett JH//Univ Calif Los Alamos Sci Lab, Div Life Sci, Cell Biol Grp, Mail Stop M888, Los Alamos, NM 87545, USA

CYTOMETRY 1989, 10 (6) 803

Use of xanthan gum to suspend large particles during flow cytometric analysis and sorting

Peters H-U, Herbst H, Hesselink PGM, Lunsdorf H, Schumpe A, Decker W-D//Gessell Biotechnol Forsch GmbH, Dept Biochem Engn, Natl Res Ctr Biotechnol, D-3300 Braunschweig, Fed Rep Ger

BIOTECHNOL BIOENG 1989, 34 (11) 1393

The influence of agitation rate on xanthan production by *Xanthomonas campestris*

Dobberstein J, Emeis CC//Rhein Westfal TH Aachen, Inst Biol Mikrobiol 4, Worrringer Weg, D-5100 Aachen, Fed Rep Ger

APPL MICROBIOL BIOTECHNOL 1989, 32 (3) 262

Beta-xylanase produced by *Aureobasidium pullulans* CBS-58475

Kardosova A, Capek P, Rosik J//Slovak Acad Sci, Ctr Chem Res, Inst Chem, CS-84238 Bratislava, Czechoslovakia

CHEM PAP-CHEM ZVESTI 1989, 43 (5) 705

4-O-methyl-D-glucurono-D-xylan from the leaves of the marsh mallow (*Althaea officinalis* L var *Rhubusta*)

Reicher F, Gorin PAJ, Sierakowski M-R, Correa JBC//Univ Fed Parana, Dept Bioquim, CP 19046, BR-81504 Curitiba, Parana, Brazil

CARBOHYD RES 1989, 193 (OCT) 23

Highly uneven distribution of O-acetyl groups in the acidic D-xylan of *Mimosa scabrella* (bract-*inga*)

Senior DJ, Mayers PR, Saddler JN//Fortintek Canada Corp, Dept Biotechnol & Chem, 800 Montreal Rd, Ottawa, Ontario, Canada K1G 3Z5

APPL MICROBIOL BIOTECHNOL 1989, 32 (2) 137

Xylanase production by *Trichoderma harzianum* E58

O'Neill RA, Albersheim P\*, Darvill AG//\*Univ Georgia, Complex Carbohydrate Res Ctr, 220 Riverbend Rd, Athens, Ga 30602, USA

J BIOL CHEM 1989, 264 (34) 20430

Purification and characterization of a xyloglucan oligosaccharide-specific xylosidase from pea seedlings

## 7 Polysaccharides - Other

Chang KC, Chang DC, Phatak L//Kansas State Univ Agr & Appl Sci, Dept Biol, Manhattan, Ks 66502, USA

J FOOD SCI 1989, 54 (6) 1615

Effect of germination on oligosaccharides and nonstarch polysaccharides in navy and pinto beans

Cryz SJ, Furer E, Fredeking T, Cross AS, Sadoff JC, Que JU//Swiss Serum & Vaccine Inst, CH-3001 Bern, Switzerland

LANCET 1989, 2 (8678-9) 1533

Effect of race and blood group on the immune response to bacterial polysaccharide and conjugate vaccines (Letter)

Dutton GGS, Ng SK, Parolis LAS, Parolis H\*, Chakraborty AK//\*Univ British Columbia, Dept Chem, Vancouver, BC, Canada V6T 1Y6

CARBOHYD RES 1989, 193 (OCT) 147

A re-investigation of the structure of the capsular polysaccharide of *Klebsiella* K10

t'Hart LA, van der Berg AJJ, Kuis L, van Dijk H, Labadie RP//State Univ Utrecht, Fac Pharm, Dept Pharmacognosy, Catharijnesingel 60, 3511 GH Utrecht, The Netherlands

PLANTA MED 1989, (6) (DEC) 509

An anti-complementary polysaccharide with immunological adjuvant activity from the leaf parenchyma gel of *Aloe vera*

Jansson P-E, Kenne L, Widmalm G//Univ Stockholm, Arrhenius Lab, Dept Organ Chem, S-10691 Stockholm, Sweden

CARBOHYD RES 1989, 193 (OCT) 322

Structure of the O-antigen polysaccharide from *Escherichia coli* O18ac: A revision using computer-assisted structural analysis with the program VASPER

Khan SH, Abbas SA, Matta KL\*//\*New York State Dept Hlth, Roswell Pk Mem Inst, Dept Gynecol Oncol, Elmand Carlton St, Buffalo, NY 14263, USA

CARBOHYD RES 1989, 193 (OCT) 125

Synthesis of some oligosaccharides containing the O-(2-acetamido-2-deoxy-beta-D-glucopyranosyl)-(1-2)-O-alpha-D-mannopyranosyl unit.

Potential substrates for UDP-GlcNAc: alpha-D-

mannopyranosyl (1-6)-N-acetyl-beta-D-glycosaminyltransferase (GnT-V)

McElroy PJ, Henderson FI, Brown DL//Addenbrookes Hosp, Dept Clin Immunol, Hills Rd, Cambridge CB2 2QQ, England  
CLIN EXP IMMUNOL 1989, 78 (3) 402

Immune status and response to immunization with polysaccharide vaccines of a healthy, congenitally asplenic woman

Muller BM, Kraus J, Franz G\*//Univ Regensburg, Dept Pharm, Univ Str 31, D-8400 Regensburg, Fed Rep Ger

PLANTA MED 1989, (6) (DEC) 536

Chemical structure and biological activity of water-soluble polysaccharides from *Cassia augustifolia* leaves

Navarini L, Bertocchi C, Cesaro A\*, Lapasin R, Crescenzi V//Lab Technol Biopolym - LBT, Res Ctr, POLY-bios, Area di Ricerca, Padriciano 99, I-34012 Trieste, Italy

CARBOHYD POLYM 1990, 12 (2) 169

Rheology of aqueous solutions of an extracellular polysaccharide from *Cyanospira capsulata*

Newland P, Bingham B, Tarelli E, Thomas AH\*//Natl Inst Biol Stand & Controls, Div Chem, Blanche Lane, Potters Bar EN6 3QG, Herts, England

J CHROMATOGR 1989, 483 (DEC) 406

High-performance gel permeation chromatography of meningococcal polysaccharides

Parolis LAS, Parolis H\*, Dutton GGS//Rhodes Univ, Sch Pharmaceut Sci, Grahamstown 6140, South Africa

CARBOHYD RES 1989, 193 (OCT) 157

Structure of the capsular antigen of *Escherichia coli* 08:K8:H4

Reddy GC, Susheelamma NS, Tharanathan RN\*//Dept Food Chem, Biochem Sect, Central Food Technol Res Inst, Mysore 570013, India

CARBOHYD POLYM 1990, 12 (2) 189

Composition and properties of mucilaginous polysaccharide from native and fermented black gram flour

Saito K, Nishijima M, Miyazaki T//Sumitomo Chem Co Ltd, Biochem & Toxicol Lab 1-98 3-chome, Konohana ku, Osaka, Japan

CHEM PHARM BULL TOKYO 1989, 37 (11) 3134

Structural analysis of an acidic polysaccharide from *Ganoderma lucidum* (studies on fungal polysaccharides. XXXV)

Shapiro ED, Capobianco LA, Berg AT, Zitt MW//Yale Univ, Sch Med, Dept Pediat, POB 3333, New Haven, Ct 06510, USA

J INFEC DIS 1989, 160 (6) 1064

The immunogenicity of *Hemophilus influenzae* type B polysaccharide-*Neisseria meningitidis* group B outer membrane protein complex vaccine in infants and young children

Shimizu N, Tomoda M\*, Gonda R, Kanari M, Kubota A, Kubota A//Kyoritsu Coll Pharmaceut Sci, Minato ku, Tokyo 105, Japan

CHEM PHARM BULL TOKYO 1989, 37 (11) 3054

An acid polysaccharide having activity on the reticuloendothelial system from the roots and rhizomes of *Saposhnikovia divaricata*

Tanaka NG, Sakamoto N, Inoue K, Korenaga H, Kadoya S, Ogawa H, Osada Y//Daichi Seiyaku Co Ltd, Res Inst, 16-13 Kitakasai 1 chome, Edogawa ku, Tokyo 134, Japan

CANCER RES 1989, 49 (23) 6727

Antitumor effects of an antiangiogenic polysaccharide from an arthrobacter species with or without a steroid

Tandavanitj S, Okutani K//Kagawa Univ, Fac Agr, Miki, Kagawa 76107, Japan

NIPPON SUISAN GAKKAISHI 1989, 55 (10) 1845

The structural investigation of a sulfated polysaccharide produced by a strain of marine *Pseudomonas*

Torgashov VI, Gert EV, Bilyukevich AV, Kaputski FN//VI Lenin State Univ, Phys Chem Problems Res Inst, Minsk, Belorussia, USSR

DOKL AKAD NAUK BSSR 1989, 33 (11) 1017

Homogeneous sulphating of polysaccharides in nitrogen(IV) oxide-DMFA mixture with the emerging reagents methods (Russian, English Abstract)

Tsvetkov YE, Backinowsky LV, Kochetkov NK//ND Zelinskii Organ Chem Inst, Moscow, USSR

CARBOHYD RES 1989, 193 (OCT) 75

Synthesis of a common polysaccharide antigen of *Pseudomonas aeruginosa* as the 6-aminoethyl glycoside

van Steijn AMP, Jetten M, Kamerling JP, Vliegenthart JFG//State Univ Utrecht, Dept Bioorgan Chem, Transitorium 3, POB 80075, 3508 TB Utrecht, The Netherlands

REC TRAV CHIM-J ROY NETH CHEM 1989, 108 (10) 374

Syntheses of tri- and tetrasaccharide fragments of the capsular polysaccharide of *Streptococcus pneumoniae* type 23F

Veeneman GH, Gomes LJF, van Boom JH\*// \*Leiden State Univ, Gorlaeus Labs, POB 9502, 2300 RA Leiden, The Netherlands

TETRAHEDRON 1989, 45 (23) 7433

Synthesis of fragments of a *Streptococcus pneumoniae* type-specific capsular polysaccharide

Veeneman GH, Notermans S, Hoogerhout P, van Boom JH//Gorlaeus Labs, POB 9502, 2300 RA Leiden, The Netherlands

REC TRAV CHIM-J ROY NETH CHEM 1989, 108 (10) 344

Synthesis of an immunologically active component of the extracellular polysaccharide produced by *Aspergillus* and *Penicillium* species

Vinogradov EV, Krajewska-Pietrasik D\*, Kaca W, Shashkov AS, Knirel YA, Kochetkov NK// \*Univ Lodz, Inst Microbiol, UL Banacha 12-16, PL-90237 Lodz, Poland

EUR J BIOCHEM 1989, 185 (3) 645

Structure of *Proteus mirabilis* O27 O-specific polysaccharide containing amino acids and phosphoethanolamine

Wang S-D, Wang DIC//Chemgen Corp, 2501 Res Blvd, Rockville, Md 20850, USA

BIOTECHNOL BIOENG 1989, 34 (10) 1261

Cell adsorption and local accumulation of extracellular polysaccharide in an immobilized *Acinetobacter calcoaceticus* system

Weiss H, Pfefferkorn O, Kotora G, Humphrey BD//Montclair State Coll, Dept Chem, Montclair, NJ 07043, USA

J ELECTROCHEM SOC 1989, 136 (12) 3711

The synthesis and characterization of polyaniline/polysaccharide conducting composites

## *8 Lipopolysaccharides*

Boons GJPH, Overhand M, van der Marel GA, van Boom JH\*// \*Gorlaeus Labs, POB 9502, 2300 RA Leiden, The Netherlands

CARBOHYD RES 1989, 192 (OCT) C1

Synthesis of a trisaccharide of the inner core region of *Citrobacter* PCM 187 lipopolysaccharide that contains L-glycero- $\alpha$ -D-manno-heptopyranosyl units

Bramanti TE, Wong GG, Weintraub ST, Holt SC//Ohio State Univ, Dept Pathol, 333 W 10th Ave, 4170 Graves Hall, Columbus, Oh 43210, USA

ORAL MICROBIOL IMMUNOL 1989, 4 (4) 183

Chemical characterization and biologic properties of lipopolysaccharide from *Bacteroides gingivalis* strains W50, W83, and ATCC 33277

Byrd W, Kadis S\*// \*Univ Georgia, Coll Vet Med, Dept Med Microbiol, Athens, Ga 30602, USA

INFEC IMMUNITY 1989, 57 (12) 3901

Structures and sugar compositions of lipopolysaccharides isolated from seven *Actinobacillus pleuropneumoniae* serotypes

Fukuoka S, Kamishima H, Sode K, Karube I// Govt Ind Res Inst, Shikoku 2-3-3, Hananomiya, Takamatsu 761, Japan

J FERMENT BIOENG 1989, 68 (5) 320

Extracellular lipopolysaccharide production by *Erwinia carotovora*

Gallot B, Marchin B//Lab Mat Organ, BP 24, F-69390 Vernaison, France

LIQ CRYST 1989, 5 (6) 1729

Synthesis and liquid-crystalline behaviour of liposaccharide based comb polymers

Rozalski A, Brade L, Kuhn H-M, Brade H\*, Kosma P, Appelmeik BJ, Kusumoto S, Paulsen H// \*Forschungsinstitut Borstel, Inst Exptl Biol & Med, Parkallee 22, D-2061 Borstel, Fed Rep Ger

CARBOHYD RES 1989, 193 (OCT) 257

Determination of the epitope specificity of monoclonal antibodies against the inner core region of bacterial lipopolysaccharides by use of 3-deoxy-D-manno-octulosonate-containing synthetic antigens

Schafer H, Schmidt W, Lachmann U, Jacker H-J, Milleck J, Werner B, Dressel H//Acad Sci GDR, Zent Inst Isotopen & Strahlenforsch, Robert Rossle Str 10, DDR-1115 Berlin, Ger

PHARMAZIE 1989, 44 (10) 728

Effective incorporation of lipopolysaccharide

into liposomes in order to modulate the pyrogenicity and the release of the tumour necrosis factor

Seydel U, Brandenburg K, Koch MHJ, Rietschel ET//Forschungsinst Borstel, Inst Exptl Biol & Med, Div Biophys, Pk Allee 10, D-2061 Borstel, Fed Rep Ger

EUR J BIOCHEM 1989, 186 (1-2) 325

Supramolecular structure of lipopolysaccharide and free lipid A under physiological conditions as determined by synchrotron small-angle x-ray diffraction

Sonesson A, Jantzen E\*, Bryn K, Larsson L, Eng J//Statens Inst Folkehelse, Geitmyrsveien 75, N-0462 Oslo 4, Norway

ARCH MICROBIOL 1989, 153 (1) 72

Chemical composition of a lipopolysaccharide from *Legionella pneumophila*

## 9 Starch

Banateanu D, Serban M\*//Fac Vet Med Bucharest, Inst Agron, Dept Biochem, Bd Marasti 59, Bucharest, Romania

REV ROUM BIOCHIM 1989, 26 (3) 183

New amylopectin derivatives. 4. An amylopectin bound ligand for the purification of N-acetyl-glutamate 5-phosphotransferase by affinity chromatography

Doublier J-L, Choplin L//INRA, BP 527, F-44026 Nantes 03, France

CARBOHYD RES 1989, 193 (OCT) 215

A rheological description of amylose gelation

Fonslick J, Khan A\*//Penn State Univ, Dept Chem, Dubois, Pa 15801, USA

J POLYM SCI A-POLYM CHEM 1989, 27 (12) 4161

Thermal stability and composition of the amylose-iodine complex

Whittam MA, Orford PD, Ring SG, Clark SA, Parker ML, Cairns P, Miles MJ//AFRC, Inst Food Res, Colney Lane, Norwich NR4 7UA, Norfolk, England

INT J BIOL MACROMOL 1989, 11 (6) 339

Aqueous dissolution of crystalline and amorphous amylose-alcohol complexes

Nebesny E//Tech Univ Lodz, Dept Food Technol, Stefanowskistr 4-10, PL-90924 Lodz, Poland

STARCH 1989, 41 (11) 431

Carbohydrate compositions and molecular structure of dextrins in enzymatic high conversion syrups

Radosta S, Schierbaum F, Reuther F, Anger H//Acad Sci GDR, Zent Inst Ernährung, Arthur Schevner Allee, 114-116, DDR-1505 Bergholz, Ger Dem Rep

STARCH 1989, 41 (10) 395

Polymer-water interaction of maltodextrins. Part I: Water vapour sorption and desorption of maltodextrin powders

Radosta S, Schierbaum F, Yuriev WP//Cent Inst Nutr, Arthur Scheunert Allee 114-116, DDR-1505 Potsdam, Ger Dem Rep

STARCH 1989, 41 (11) 428

Polymer-water interaction of maltodextrins. Part II: NMR study of bound water in liquid maltodextrin-water systems

Schartges D, Berglund KA//Rhein Westfal TH Aachen, Inst Verfahrenstech 1, D-5100 Aachen, Fed Rep Ger

STARCH 1989, 41 (11) 436

Solubility of maltose in the presence of glucose and maltotriose

Chaudhari MR, Kamath ND, Bhide SV, Kale NR//Univ Poona, Dept Chem, Div Biochem, Poona 411007, Maharashtra, India

STARCH 1989, 41 (11) 415

Preparation of crosslinked starch beads as a medium for gel filtration

Cordano G, Yung C, Munoz S, Marrese J, Munoz de la Pena A, Medina J//Univ Chile, Fac Ciencias Quim & Farmaceut, Dept Quim Organ, Casilla 233, Santiago, Chile

BOL SOC CHIL QUIM 1989, 34 (4) 279

Chemical bonding of metronidazole semiesters with starch (Spanish, English Abstract)

de la Rosa APB, Paredes-Lopez O\*, Carabez-Trejo A, Ordorica-Falomir C//Inst Politecn Nacl, CIEA, Unidad Irapuato, Apdo Postal 629, Irapuato 36500, Mexico

STARCH 1989, 41 (11) 424

Enzymatic hydrolysis of amaranth flour - calorimetry and scanning electron microscopy studies

Deffenbaugh LB, Walker CE//Univ Nebraska, Dept Food Sci & Technol, Lincoln, Ne 68583, USA

CEREAL CHEM 1989, 66 (6) 493

Comparison of starch pasting properties in the Brabender viscoamylography and the rapid visco-analyzer

Dellavalle G, Kozlowski A, Colonna P, Tayeb J//Ctr Rech Agroalimentaires, Inst Natl Rech Agronomique, rue Geraudiere, BP 527, F-44026 Nantes 03, France

LEBENS-M-WISS-TECHNOL 1989, 22 (5) 279

Starch transformation estimated by the energy balance on a twin screw extruder

Haeder HE//Landwirtschaftliche Forsch Anstalt Buntehof, Bunteweg 8, D-3000 Hanover 71, Fed Rep Ger

J AGRON CROP SCI 1989, 163 (5) 289

Starch and amylose content in conventional and semi-leafless cultivars of garden and field peas

Hoover R, Hadziyev D//Mem Univ Newfoundland, Dept Biochem, St Johns, Newfoundland, Canada A1B 3X9

STARCH 1989, 41 (10) 376

Effect of storage temperature on some rehydrating properties of potato granules

Huttenrauch R, Fricke S, Zielke P//VEB Jena-pharm, Bereich Forsch & Entwicklung, Otto Schott Str 15, DDR-6900 Jena, Ger Dem Rep PHARMAZIE 1989, 44 (11) 796

Significance of the water content for the tabletting characteristics of various types of starch - a structural problem

Kersting HJ, Kempf W//Bundesforsch Anstalt, Inst Starke & Kartoffeltechnol, Schutzenberg 12, D-4930 Detmold, Fed Rep Ger

STARCH 1989, 41 (11) 420

Acyated wheat gluten as a cobinder in paper sizing (German, English Abstract)

Kopper S, Zehavi U//Univ Oldenburg, Fachbereich Chem, Postfach 2503, D-2900, Oldenburg, Fed Rep Ger

CARBOHYD RES 1989, 193 (OCT) 296

A convenient synthesis of the branching-pointing trisaccharide of starch and glycogen

Marousis SN, Karathanos VT, Saravacos GD//Rutgers State Univ, Cook Coll, New Jersey Agr Expt Stn, Dept Food Sci, New Brunswick, NJ 08903, USA

J FOOD SCI 1989, 54 (6) 1496

Effect of sugars on the water diffusivity in hydrated granular starches

McBurney MI, Cuff DJ, Thompson LU//Univ Alberta, Dept Foods & Nutr, Edmonton, Alberta, Canada T6G 2M8

J SCI FOOD AGR 1990, 50 (1) 79

Rate of fermentation and short chain fatty acid and gas production of 6 starches by human faecal microbiota

Mora-Gutierrez A, Baianu IC\*//Univ Illinois, Dept Food Sci, Agr & Food Chem NMR Facil, Urbana, IL 61801, USA

J AGR FOOD CHEM 1989, 37 (6) 1459

<sup>1</sup>H NMR relaxation and viscosity measurements on solutions and suspensions of carbohydrates and starch from corn: The investigation of carbohydrate hydration and stereochemical and aggregation effects in relation of <sup>17</sup>O and <sup>13</sup>C NMR data for carbohydrate solutions

Nachtergaele W, van Nuffel J//Amylum NV, Burchstr 10, B-9300 Aalst, Belgium

STARCH 1989, 41 (10) 386

Starch as stilt material in carbonless copy paper - new developments

Okieimen FE, Egharevba F//Univ Benin, Dept Chem, Benin City, Nigeria

MAKROMOLEK CHEM-RAP COMM 1989, 10 (11) 575

Graft copolymerization of mixtures of ethyl acrylate and acrylonitrile on starch in the presence of ceric ion

Pal MK, Pal PK//Kalyani Univ, Dept Biochem & Biophys, Kalyani 741235, W Bengal, India

MAKROMOL CHEM-MACRO CHEM PHYS 1989, 190 (11) 2929

Facilitation of quantitative estimation of the composition of starch-iodine blue by specific precipitation

Prabhanjan H//Cent Food Technol Res Inst, Discipline Grain Sci & Technol, Mysore 570013, Karnataka, India

STARCH 1989, 41 (11) 409

Studies on modified tamarind kernel powder. Part I: Preparation and physicochemical properties of sodium salt of carboxymethyl derivatives

Rutschmann MA, Heiniger J, Pliska V, Solms J//Swiss Fed Inst Technol, Dept Food Sci, CH-8092 Zurich, Switzerland

LEBENS-M-WISS-TECHNOL 1989, 22 (5) 240  
Formation of inclusion complexes of starch with different organic compounds. 1. Method of evaluation of binding profiles with menthone as an example

Villareal CP, Juliano BO//Int Rice Res Inst, Dept Cereal Chem, Los Banos 4030, Philippines  
STARCH 1989, 41 (10) 369

Comparative levels of waxy gene product of endosperm starch granules of different rice ecotypes

Wilhelm E, Kempf W, Lehmußsaari A, Caransa A//Bundesforsch Getreide & Kartoffelverarbeitung, Inst Starke & Kartoffeltechnolog, Schützenberg 12, D-4930 Detmold, Fed Rep Ger  
STARCH 1989, 41 (10) 372

Process technology for the production of starch, protein and fiber from oats (German, English Abstract)

### 10 Starch-degrading Enzymes

Ahokas H, Naskali L//Univ Helsinki, Dept Genet, Arkadiankatu 7, SF-00100 Helsinki 10, Finland

J INST BREW 1990, 96 (1) 27

Variations of alpha-amylase, beta-glucanase, pullulanase, proteinase and chitinase activity in germinants of the wild progenitor of barley

Bajpai P, Sharma U, Bajpai PK//Thapar Corp Res & Dev Ctr, Div Chem & Biochem Engr, Patiala 147001, India

BIOTECHNOL APPL BIOCHEM 1989, 11 (6) 610

Effect of corn gluten on alpha-amylase production by *Bacillus licheniformis* TCRDC-B13

Henry RJ//Queensland Wheat Res Inst, POB 2282, Toowoomba, Qld 4350, Australia

J CHROMATOGR 1989, 481 (NOV) 397

Rapid separation of alpha-amylases from barley by ion-exchange high-performance liquid chromatography on non-porous columns

Kilborn RH, Fruger JE, Tipples KH//Canadian Grain Commiss, Grain Res Lab, Winnipeg, Manitoba, Canada R3C 3G8

CAN J PLANT SCI 1989, 69 (4) 1093

The GRL paste viscosity indicator for rapid determination of alpha-amylase in Canadian red spring wheat

Kimura T, Horikoshi K//Toray Industries Ltd, Basic Res Labs, 1111 Teburo, Kamakura 248, Japan

AGR BIOL CHEM TOKYO 1989, 53 (11) 2963  
Production of amylase and pullulanase by an alkalopsychrotrophic *Micrococcus* sp

Likimani TA, Sofos JN, Maga JA, Harper JM//Univ Nairobi, Dept Food Technol & Nutr, POB 29053, Nairobi, Kenya

LEBENS-M-WISS-TECHNOL 1989, 22 (5) 301  
The microstructure of corn/soybean blends extruded with a thermostable alpha-amylase

Monma M, Yamamoto Y, Kagei N, Kainuma K//Address not available

STARCH 1989, 41 (10) 382

Raw starch digestion by alpha-amylase and glucoamylase from *Chalara paradoxa*

Rousset S, Schlich P//INRA, Rech Viande Stn, F-63122 Ceyrat, France

J FERMENT BIOENG 1989, 68 (5) 339

Amylase production in submerged culture using principal component analysis

Ashikari T, Kunisaki S, Matsumoto N, Amachi T, Yoshizumi H//Suntory Ltd, Res Ctr, Inst Fundamental Res, 1-1-1 Wakayamadai, Shimamoto, Osaka 618, Japan

APPL MICROBIOL BIOTECHNOL 1989, 32 (2) 129

Direct fermentation of raw corn to ethanol by yeast transformants containing a modified *Rhizopus glucoamylase* gene

Nandi R, Mukherjee SK\*//Jadavpur Univ, Dept Food Technol & Biochem Engr, Calcutta 700032, W Bengal, India

INDIAN J EXP BIOL 1989, 27 (12) 1101

Effect of various organic compounds on synthesis of glucoamylase by an isolated strain *Penicillium italicum*