

STATISTICAL EVALUATION OF THE CYCLODEXTRIN RELATED LITERATURE PUBLISHED IN THE CYCLODEXTRIN NEWS IN 2012

The year 2012 was significant for the cyclodextrin researchers. The most important events of the year were as follows:

- Scientific opinion of EFSA on the effect of α CD as dietary fiber (postprandial attenuation of the glycaemic and insulinaemic response) was published.
- The 16th International Cyclodextrin Symposium was held in Tianjin, P. R. China with a great success (170 presentations).
- The plan for the clinical trial to see the safety of HPBCD given directly to the cerebrospinal fluid for Niemann Pick Disease Type C patients has been accepted by National Institute of Health (NIH, Baltimore, USA) and the enrolling of patients started in January 2013.

The number of publications and patents increased further in 2012 (Fig. 1). It should be, however, considered that the year 2012 has not been closed yet. A lot of publications are already in press and expected to be published in the last issues of the journals in the first quarter of this year. Based on our experience about 20% enhancement in the numbers can be forecasted.

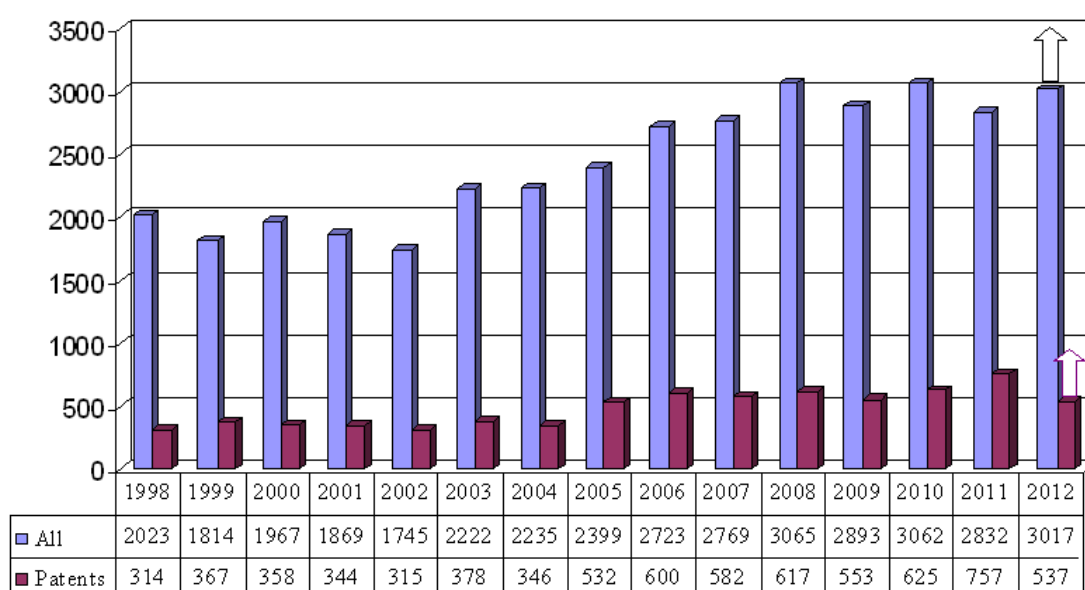


Fig. 1 Number of publications in the past 14 years

The distribution of the publications among the main fields in the CD News classification system has not been changed significantly in the past three years (Fig. 2). The leading application is still the pharmaceutical, followed by chemical and biotechnological applications. There are still numerous papers on studying the structure of cyclodextrin complexes. It is good to know that the production of CDs with modified enzymes from different starches as well as syntheses of new CD derivatives are still frequently studied. The analytical applications in capillary electrophoresis and HPLC became a routine as well as the extraction of cholesterol from cell membranes by using methylated CDs or HPBCD.

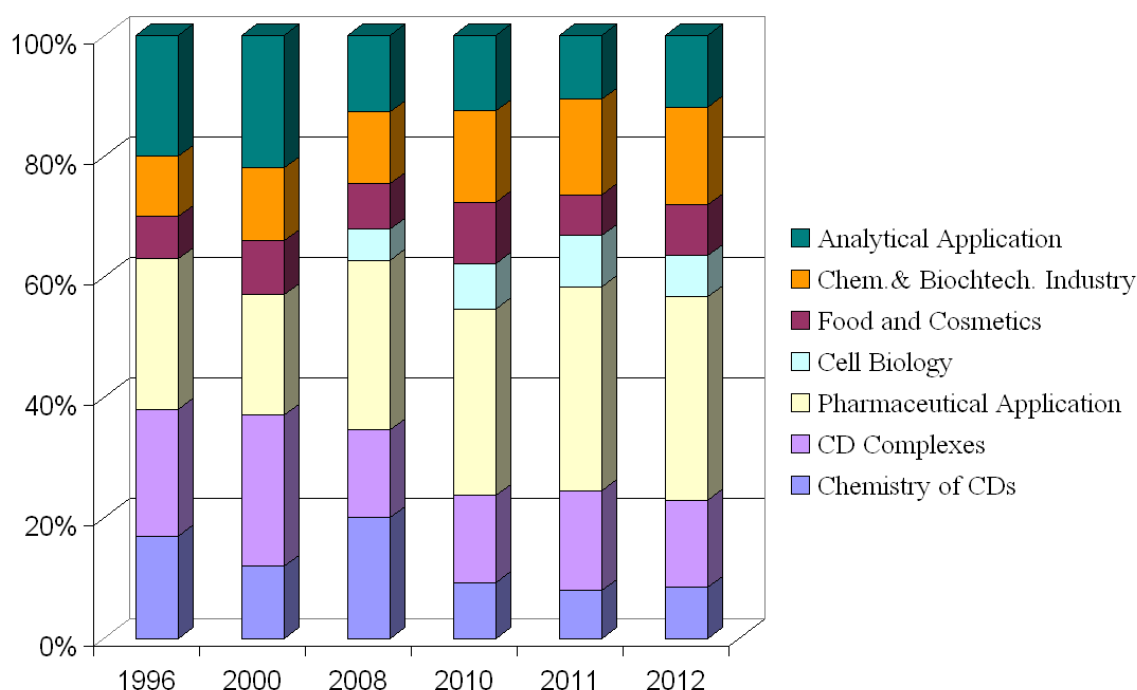


Fig. 2 Distribution of the publications (including patents) among the fields of applications

Among the CD derivatives Sugammadex is getting into the focus: more and more publications appear on the clinical findings with patients of various symptoms concerning the fast reversal of the neuromuscular blockade induced by rocuronium muscle relaxant.

Concerning the country statistics (not shown), the leadership of Asia (China followed by Japan, Korea and India) is more pronounced than before.

As the readers of the Cyclodextrin News have been already informed, starting by the present issue this monthly periodical will be an open access journal in the website of CycloLab. The editors hope that with this renewal more and more scientists, students and entrepreneurs will be regular readers.

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drug-complexed CDs, cytokine-encapsulating biodegradable polymers, natural killer cells

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BCD, GCD, polyphenol, Raman spectra, bioavailability

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polyphenol, pharmacological activity, three hydroxypropyl derivatives of CDs, Raman spectrum

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4. CDs in Cell Biology

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stem cell, skin fibroblasts, Niemann Pick type C disease

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methyl-BCD, lipid raft, gastric cancer cells

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human megakaryocytic leukemia line, methyl-BCD, cytokine Stem Cell Factor, caveolae/lipid rafts

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galactose-specific lectin, surface plasmon resonance, transfection, intracellular trafficking, confocal microscopy

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nervous system, delivery of oligonucleotides to neurons, cationic nanoparticles, hypothalamic neurons, hippocampal neurons, cell viability, luciferase, glyceraldehyde phosphate dehydrogenase

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cholesterol loader, plasma membrane, cryopreservation, degenerated chromatin

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activation of apoptotic signaling cascades, Fas-receptor, depletion of cholesterol by methyl-BCD, disruption of lipid rafts, HaCaT cells

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Altered Caveolar Mediated Purinergic Signaling in Spontaneously Hypertensive Rats with Detrusor Overactivity

caveolar depletion achieved by methyl-BCD, decreased alpha-beta- methylene adenosine triphosphate responses, amplitude of the purinergic component of neurally mediated contractions

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5. CDs in Food, Cosmetics and Agrochemicals

Effects of cyclodextrins on the flavor of goat milk and its yogurt.

4-methyloctanoic acid, lipase-treated goat milk, displacement expts. with phenolphthalein

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Improving Blended Carrot-Orange Juice Quality by the Addition of Cyclodextrins During Enzymatic Clarification

carotene content, HPBCD, GCD, ascorbic acid content, polyphenol content

Karangwa, E Hayat, K Rao, L Nshimiyimana, DS Foh, MBK Li, L Ntwali, J Raymond, LV Xia, SQ Zhang, XM: (2012) Food Bioprocess Technol., 5, 6, 2612-2617

Supportive use of cyclodextrins as decontamination agents for herbicides: the case of fenoxaprop-p-ethyl.

amperometric biosensor, respirometry, soil colloidal components, catalytic effect, photodegradation, bioremediation

Petralito, S., Zanardi, I., Braconi, D., Santucci, A., Memoli, A., Caccamo, E., Travagli, V.: (2012) Asia-Pacific Journal of Chemical Engineering 7(S3), S342-S347

Formation of oil-in-water (O/W) pickering emulsions via complexation between beta-cyclodextrin and selected organic solvents.

decane/BCD/water system, interfacial tension

Davarpanah, Leila, Vahabzadeh, Farzaneh.: (2012) Starch/Staerke 64(11), 898-913

Instant egg white tablet and manufacture method thereof.

BCD, freeze-drying, proteins and amino acids, health food

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6. CDs for other Industrial Applications

Remediation of polychlorinated biphenyl-contaminated soil by soil washing and subsequent TiO₂ photocatalytic degradation

HPBCD, Brij35, dechlorination, hydroxylation, e-waste recycling, photocatalytic degradation

Zhu, XD Zhou, DM Wang, YJ Cang, L Fang, GD Fan, JX: (2012) J. Soils Sediments, 12, 9, 1371-1379

Water-Soluble Pendant Copolymers Bearing Pro line and Permethylated beta-Cyclodextrin: pH-Dependent Catalytic Nanoreactors

proline residues, aldol reactions, cyclohexanone, p-nitrobenzaldehyde, stereoselectivity

Doyaguez, EG Rodriguez-Hernandez, J Corrales, G Fernandez-Mayoralas, A Gallardo, A: (2012) Macromolecules, 45, 19, 7676-7683

Sorption properties of perbenzoylated beta-cyclodextrin deposited onto a carbon support

adsorbent support with a chiral macrocyclic modifier

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Application of Cyclodextrin Derivatives in Metal-Catalyzed Organic Synthesis

review, inverse phase transfer catalysts, regioselectivity, enantioselectivity

Shen, HM Ji, HB: (2012) Chin. J. Org. Chem., 32, 6, 975-985

Functionalization of electrospun beta-cyclodextrin/ polyacrylonitrile (PAN) with silver nanoparticles: Broad- spectrum antibacterial property.

nanofibers, SEM, TEM

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Two Diastereomeric Artificial Enzymes with Different Catalytic Activity

epimeric cyclodextrin-6-C-aldehydes, protection/partial deprotection, oxidation, olefination, dihydroxylation, oxidation of aromatic amines by hydrogen peroxide

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Protein-based wood adhesives.

CD as stabilizer

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A Hybrid Approach for PAHs and Metals Removal from Field- Contaminated Sediment Using Activated Persulfate Oxidation Coupled with Chemical-Enhanced Washing

HPBCD, S,S-ethylenediaminedisuccinic acid, tetrasodium pyrophosphate, hydrochloric acid

Lo, IMC Tanboonchuy, V Yan, DYS Gridanurak, N Liao, CH: (2012) Water Air Soil Pollut., 223, 8, 4801-4811

Method for producing molded foam for furniture from composition comprising modified cyclic oligosaccharides as odor scavengers.

isocyanate, polyol, modified ACD, BCD or GCD

Baumgartner, Guenter.: (2012) WO2012135888A1, 2012/10/11/ PCT Int. Appl., 32pp.

Magnetic nanoparticles grafted with beta-cyclodextrin-polyurethane polymer as a novel nanomagnetic polymer brush catalyst for nucleophilic substitution reactions of benzyl halides in water.

BCD-polyurethane polymer coated Fe₃O₄ magnetic nanoparticle, phase-transfer catalyst, thiocyanate, azide, cyanide and acetate anions, SEM, magnetometry

Kiasat, Ali Reza, Nazari, Simin.: (2012) Journal of Molecular Catalysis A: Chemical 365, 80-86

Medical organosilicon patch and preparation method thereof.

essential oil-BCD inclusion compd., lavender oil, repairing scars

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Method for preparing nano magnetic biological adsorbent based on graphene.

chitosan, glutaraldehyde, separation and enrichment of heavy metal and organic pollutant

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Preparation and Characterization of Polystyrene Microspheres in the Presence of beta- Cyclodextrin

stabilizer, soap-free emulsion polymerization method, SEM, TEM, IR, monodispersity

Wang, W Deng, Y Zhang, LM Fu, J Lu, ZX Xu, LJ: (2012) J. Nanosci. Nanotechnol., 12, 9, 7206-7210



7. CDs in Sensing and Analysis

Selective solid-phase extraction using molecularly imprinted polymers for the analysis of norfloxacin in fish

BCD-methyl methacrylate, acrylamide, ethylene glycol dimethacrylate, HPLC

Zhang, BX Zhao, JC Sha, BJ Xian, M: (2012) Anal. Methods, 4, 10, 3187-3192

Supramolecular Fluorescent Nanoparticles for Targeted Cancer Imaging

calcein-based supramolecular fluorescent nanoparticles, adamantane- functionalized calcein BCD-grafted branched polyethylenimine, folate receptor

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Gadolinium complexes of monophosphinic acid DOTA derivatives conjugated to cyclodextrin scaffolds: efficient MRI contrast agents for higher magnetic fields

1,4,7,10- tetraazacyclododecane-4,7,10-triacetic- 1-methyl[(4- aminophenyl)methyl] phosphinic acid, amino-substituted CDs, isothiocyanate, twisted-square antiprismatic diastereoisomer

Kotkova, Z Helm, L Kotek, J Hermann, P Lukes, I: (2012) Dalton Trans., 41, 43, 13533-13540

Optical planar Bragg grating sensor for real-time detection of benzene, toluene and xylene in solvent vapour

allyl substituted GCD, dip coating

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Ion chromatography and membrane separations using macrocyclic ligands.

review, capacity gradient chromatography of anions, liquid membranes, polymer inclusion membranes

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Chiral HPLC separation on derivatized cyclofructan versus cyclodextrin stationary phases.

chiral stationary phases, dimethylphenyl, R-naphthylethyl, HPLC

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review, transient diastereomeric complexes, HPLC, CE, NMR

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How to simulate affinities for host-guest systems lacking binding mode information: application to the liquid chromatographic separation of hexabromocyclododecane stereoisomers.

simulation of host-guest systems, preferential binding modes, permethylated BCD stationary phase, solvents water and acetonitrile

Durmaz, Vedat, Weber, Marcus, Becker, Roland.: (2012) Journal of Molecular Modeling 18(6), 2399-2408

Theoretical study of beta and gamma-cyclodextrins inclusion complexes with nineteen atropisomeric polychlorobiphenyls.

mol. mechanics, semi-empirical quantum AM1 method, geometry optimization, solvent effect, chromatog. elution order

Mindrila, Georgiana, Mandravel, Cristina, Dobrica, Iuliana, Bugheanu, Paula, Stanculescu, Ioana R.: (2012) Journal of Inclusion Phenomena and Macrocyclic Chemistry 74(1-4), 137-143

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cell-permeable fluorescence sensor

Yu, Miao, Zhang, Guo, Wang, Wenhao, Niu, Jianbin, Zhang, Ning.: (2012) Supramolecular Chemistry 24(11), 799-802

Chiral separation and determination of excitatory amino acids in brain samples by CE- LIF using dual cyclodextrin system.

aspartate and glutamate enantiomers, fluorescent derivatization, 6-monodeoxy-6-mono(3-hydroxy)propylamino-BCD, heptakis(2,6-di-O-methyl)-BCD

Wagner, Zsolt, Tabi, Tamas, Jako, Tamas, Zachar, Gergely, Csillag, Andras, Szoeko, Eva.: (2012) Analytical and Bioanalytical Chemistry 404(8), 2363-2368

Development of a simple and high-throughput method for detecting aflatoxins production in culture media.

CD as fluorescence enhancers

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tetrapeptide analogs, neutral and anionic CDs

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taurocholate, taurochenodeoxycholate, correction of background electrolyte ionic strength

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poly(dimethylsiloxane)/BCD/divinylbenzene - coated stir bar, sol-gel technique

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Capillary electrophoresis methods for the analysis of antimalarials. Part I. Chiral separation methods.

review, chiral selectors, oligosaccharides, CD, oligomaltodextrins, polysaccharides, proteins, quinine/quinidine, cinchonine/cinchonidine

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