Frontiers in polymer science

In association with the journal **polymer**

20-22 MAY 2015, RIVA DEL GARDA, ITALY

CONFERENCE PROGRAMME

Wednesday, 20 May 2015	
11:00	**Registration**
14:00-14:20	**Opening Remarks** Rumen Duhlev, *Elsevier, Oxford, UK*
14:20-15:10	**[PL01] A materials genome approach to mimics of biological membranes and their programmable glycan ligands** Virgil Percec, *University of Pennsylvania, USA*
15:10-16:00	**[PL02] Synthesis of block copolymer nano-objects via polymerisation-induced self-assembly** Steven P. Armes, *University of Sheffield, UK*
16:00-17:30	**Coffee break and Poster session 1 (part 1)**
17:30-18:20	**[PL03] New polymer based approaches for biosensing and regenerative medicine** Molly Stevens, *Imperial College London, UK*
18:20-19:10	**[PL04] Biomimetic block copolymer membranes** Wolfgang Meier, *University of Basel, Switzerland*
19:10-21:00	**Welcome reception and Poster session 1 (part 2)**
Thursday, 21 May 2015	
09:00-09:50	**[PL05] Materials for sustainable growth: Sulfur utilization** Kookheon Char, *Seoul National University, Korea*
09:50-10:40	**[PL06] Global view on water purification with polymeric fibrous membranes** Benjamin Chu, *Stony Brook University, USA*
10:40-12:10	**Coffee break and Poster session 2 (part 1)**
12:10-13:00	**[PL07] Crystalline polymers: Previous and future challenges** Bernard Lotz, *Institut Charles Sadron, France*
13:00-14:30	**Lunch**
13:45-14:30	**Meet the Editors of *Polymer* (Optional Session)**
14:30-15:20	**[PL08] From interesting to useful: The multiple richness's of hybrid porous solids** Gérard Férey, *Academy of Sciences, France*
15:20-16:10	**[PL09] Carbon nanomaterials interfaces** Maurizio Prato, *Università di Trieste, Italy*
16:10-16:30	**Coffee break**
16:30-17:20	**[PL10] Photonic Color: Lab-to-Market** Geoffrey A. Ozin, *University of Toronto, Canada*
17:20-18:10	**[PL11] Challenges in materials synthesis and printing of polymer-based organic solar cells** Andrew B. Holmes, *University of Melbourne, Australia*
18:10-20:00	**Reception and Poster session 2 (part 2)**

Programme Titles Presenters Topics

Coffee break and Poster session 3 (part 1 & 2)

Friday, 22 May 2015, 10:10-12.30
Palameeting

[P3.001]
Use of biocatalysts for the synthesis of furan based polyesters
V. van der Vlist*[1,2], C.G. Boeriu[1,2], G. Eggink[1,2]
[1]Wageningen UR, The Netherlands, [2]Dutch Polymer Institute, The Netherlands

[P3.002]
Simultaneous detection of multi-pesticide residues in complicated matrices using the combination of molecularly imprinted solid-phase extraction and high-performance liquid chromatography
X.M. Chen, L.Y. Zhang, Y. Peng, S.H. Du*, F. Li
School of Pharmacy, Nanjing Medical University, China

[P3.003]
Poly(acrylonitrile-co-acrylic acid) copolymers and their wettability
D. Kahraman Doguscu*, S. Ates, C. Alkan
Gaziosmanpasa University, Turkey

[P3.004]
Increasing wettability of polyacrylonitrile by itoconic acid comonomer insertion
Y. Damlioglu*, D. Kahraman Doguscu, C. Alkan
Gaziosmanpasa University, Turkey

[P3.005]
The new eposy-glass supports for metal complex catalysts.
N. Sienkiewicz*, K. Strzelec, T. Szmechtyk
Lodz University of Technology, Poland

[P3.006]
Preparation of epoxy resin cured with ionic liquids as novel supports for platinum complex catalysts.
N. Sienkiewicz*, K. Strzelec, T. Szmechtyk
Lodz University of Technology, Poland

[P3.007]
Tri-n-butylboron - p-quinone as an effective catalyst system of radical copolymerization of styrene with (meth)acrylates
D.V. Ludin*, Y.L. Kuznetsova, S.D. Zaytsev
Lobachevsky State University of Nizhny Novgorod, Russia

[P3.008]
pH-Sensitive C-ON bond homolysis of alkoxyamines of imidazoline series: A theoretical study
D. Parkhomenko[1,3], M. Edeleva*[1,3], V. Kiselev[4], E. Bagryanskaya[1]
[1]N.N.Vorozhtsov Novosibirsk Institute of Organic Chemistry SB RAS, Russia, [2]International Tomography center SB RAS, Russia, [3]Novosibirsk State University, Russia, [4]Institute of Chemical Kinetics and Combustion SB RAS, Russia

[P3.009]
Sterically hindered imidazoline nitroxides for controlled/living polymerization of methyl methacrylate and styrene
M. Edeleva*[1,3], D. Parkhomenko[1,3], B. Kanagatov[3], L. Tatarova[2], V. Khlestkin[3], D. Morozov[1,3], I. Kirilyuk[1], E. Bagryanskaya[1,3]
[1]N.N.Vorozhtsov Novosibirsk Institute of Organic Chemistry SB RAS, Russia, [2]International Tomography center SB RAS, Russia, [3]Novosibirsk State University, Russia

[P3.010]
Directional freezing of crosslinked pvp as a tool for the generation of highly oriented macroporous hydrogels
J.S. González, H.E. Romeo, C.E. Hoppe*
INTEMA, CONICET, Argentina

[P3.011]
Atom transfer radical polymerization catalyzed by copper trisodium chlorophyllin
B. Gajewska*, N. Bruns
Adolphe Merkle Institute, University of Fribourg, Switzerland

[P3.012]
Latent heat storage characteristics of micro/nano encapsulated eutectic mixture using polystyrene shell
A. Sari, C. Alkan, Y. Mert*, A. Bicer, A. Altintas, D. Kahraman, C. Kizil, C. Bilgin
Gaziosmanpasa University, Turkey

[P3.013]
Thermal energy storage by micro-nanoencapsulated n-octadecane in polystyrene
Y. Mert*, C. Alkan, A. Sari, A. Biçer, D. Kahraman Dögüscü, A. Altintas, C. Kizil, C. Bilgin
Gaziosmanpasa University, Turkey

[P3.014]
New stimuli acrylate-based co-polymers by RAFT polymerization

A.S. Rodrigues*[1,2], M.T. Charreyre[2], A. Favier[2], J.P.S. Farinha[1], C. Baleizão[1]
[1]Instituto Superior Técnico, Universidade de Lisboa, Portugal, [2]ENS de Lyon, France

[P3.015]
PMMA/clay nanocomposites prepared by in situ polymerization assisted by sonication
B.R. Prado[1], M.S. Marchesin[1], J.R. Bartoli*[1], E.N. Ito[2]
[1]State University of Campinas, Brazil, [2]Federal University of Rio Grande do Norte, Brazil

[P3.016]
Study of the mechanical and chemical recycling of poly (lactic acid) (PLA)
M. Cosate, G. Fonseca, M. Lopes, A.R. Morales, L. Mei, J.R. Bartoli*
UNICAMP, Brazil

[P3.017]
Study of biodegradation behavior of compatibilized blends of PLA / PBAT in soil
P.A. Palsikowski, C.N. Kuchnier, N.R. Lovato, A.R. Morales, J.R. Bartoli*
University of Campinas, Brazil

[P3.018]
Graphene oxide functionalization with polysiloxanes for the synthesis of epoxy nanocomposites with improved properties
C.M. Damian*, M.A. Vulcan, I.C. Radu, H. Iovu
University Politehnica of Bucharest, Romania

[P3.019]
Stereo-regular polydienes bearing a functional end-group: one-pot synthetic strategies
S. Georges, P. Zinck, M. Visseaux*
Université Lille 1, France

[P3.020]
Effectively designed molecularly imprinted polymers for selective isolation of the antifungal drug fluconazole
D. Lambropoulou*, S.G. Nanaki, G.Z. Kyzas, D.N. Bikiaris, P. Siafaka
Aristotle University of Thessaloniki, Greece

[P3.021]
Application of hydrodinamic solution properties into gas-liquid phase heterogeneous sulfonation of polystyrene
S. Hendrana.*[1], S. Pujiastuti.[1], I. Rahayu.[2], C. Natalael.[2]
[1]Indonesian Institute of Sciences (LIPI), Indonesia, [2]Universitas Padjadjaran, Indonesia

[P3.022]
New catalysts based on organic-inorganic copolymers containing poly(titanium oxide) and Au and Ag nanoparticles
E.V. Salomatina*, A.Y. Sharova, A.V. Knyazev, L.A. Smirnova
N.I. Lobachevsky State University of Nizhniy Novgorod, Russia

[P3.023]
Metal-bearing nanoparticles from the chelation-driven self-assembly of Diblock Co- and Ter- polymers: Preparation and characterization with AFM and LLS
E. Kepola*, T. Krashia-Christophorou, C.S. Patrickios
University of Cyprus, Cyprus

[P3.024]
Synthesis Of Hybrid Poly(Urea-Urethane)-Poly(Methyl-Methacrylate) Nanoparticles By Miniemulsion Polimerization
E. Alves*, A. Valério, C. Sayer et al
UFSC, Brazil

[P3.025]
Benzoxazine-functionalized graphene oxide for synthesis of new nanocomposites
I. Biru, C. Andronescu, S.A. Garea, H. Iovu*
University Politehnica of Bucharest, Romania

[P3.026]
Self-assembly characterization of amphiphilic linear diblock copolymer and amphiphilic hyperbranched polymers
M. Elladiou*, C.S. Patrickios
University of Cyprus, Cyprus

[P3.027]
New injectable biomaterials based on functionalized graphene with potential application for bone repair
A.M. Pandele*, C. Andronescu, A. Ghebaur, B. Balanuca, A. Mihai, H. Iovu
University Polytechnica of Bucharest, Romania

[P3.028]
The synthesis of poly(L-lactide-co-5-amino-5-methyl-1,3-dioxan-2-one)(P(LLA-co-TAC)) grafted by poly(γ-benzyl-L-glutamate) (PBLG) and its phase separation behaviors
P. Dong*, D.P. Quan
Sun Yat-sen Unniversity, China

[P3.029]
Stimuli-Responsive Hybrid Block Copolymer and Colloidal Architectures
C. Rüttiger*, D. Scheid, C. Schäfer, J. Elbert, M. Gallei et al
Technische Universität Darmstadt, Germany

Title:

Effectively designed Molecularly Imprinted Polymers for selective isolation of the antifungal drug Fluconazole

Authors & affiliations:

Stavroula Nanaki[1]*, George Kyzas*[1]*, Panoraia Siafaka*[1]*, Dimitrios Bikiaris*[1]*, Dimitra Lambropoulou*[2]

[1]*Laboratory of Polymer Chemistry and Technology, Department of Chemistry, Aristotle University of Thessaloniki, GR-541 24, Thessaloniki, Macedonia, Greece*

[2]*Laboratory of Environmental Chemistry, Department of Chemistry, Aristotle University of Thessaloniki, GR-541 24, Thessaloniki, Macedonia, Greece*

Abstract:

Molecular imprinting is a relatively modern technique according to which the selective binding/isolation of target species from a mixture can be achieved. Molecular imprinting presents wide recognition due to stability, easy and low-cost preparation. It is applied using some smart polymeric materials known as MIPs. These polymers are common materials synthesized by classic polymerization reaction using the targets-for-isolation molecule in the polymerization mixture. In this way, the template is imprinted into the polymerization matrix forming numerous imprints in it.

Cyclodextrins, characterized as supramolecular host compounds, belong to a series of cyclic oligosaccharides. The physical conformation of its molecular structure creates a lipophilic inner cavity with hydrophilic outer surfaces that is able to interact with a large variety of guest molecules forming non-covalent inclusion complex.

In this work, MIPs of cyclodextrin were synthesized for the selective adsorption of Fluconazole. Three types of cyclodextrin (beta-, methyl- and hydroxypropyl-) were used. Cyclodextrins were dissolved at DMSO. Toluene-diisocyanate (TDI) used as cross-linker and Fluconazole as template-drug were inserted in the reactor. Synthesis was held at 55^{o}C under magnetic stirring. MIPs were washed with acetone, ethanol and hot water for the removal of unreacted TDI and cyclodextrin. Drug was extracted from MIPs by soxhlet. Characterization occurred using FTIR and XRD. MIPs were evaluated by adsorption studies in different pH, temperatures and initial compound concentration. The non-imprinted polymer (NIP) was also synthesized similarly, without the absence of drug.

Acknowledgements

The support for this study was received from the Greek Ministry of Education and Religious Affairs through Operational Program “Education and Lifelong Learning” of the National Strategic Reference Framework (NSRF) - Research Funding Program “Excellence II (Aristeia II)” under the title “Advanced microextraction approaches based on novel nano- polymers to measure pharmaceuticals, personal care products and their transformation products in the aquatic environment”, which is gratefully appreciated.

EFFECTIVELY DESIGNED MOLECULARLY IMPRINTED POLYMERS FOR SELECTIVE ISOLATION OF THE ANTIFUNGAL DRUG FLUCONAZOLE

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1 Laboratory of Polymer Chemistry and Technology, Department of Chemistry, Aristotle University of Thessaloniki, GR-541 24, Thessaloniki, Macedonia, Greece

2 Laboratory of Environmental Chemistry, Department of Chemistry, Aristotle University of Thessaloniki, GR-541 24, Thessaloniki, Macedonia, Greece

Introduction

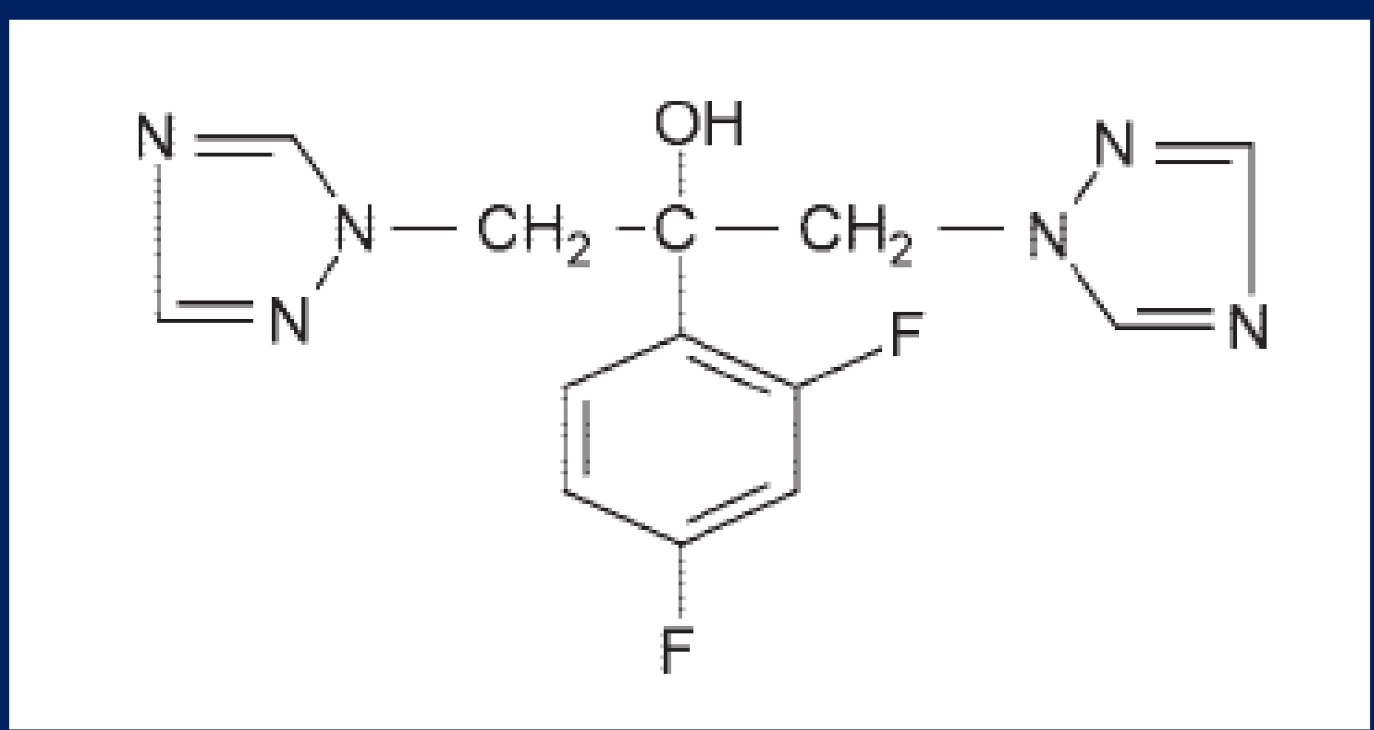
Molecular imprinting is a relatively modern technique according to which the selective binding/isolation of target species from a mixture can be achieved. Molecular imprinting presents wide recognition due to stability, easy and low-cost preparation. It is applied using some smart polymeric materials known as MIPs. These polymers are common materials synthesized by classic polymerization reaction using the targets-for-isolation molecule in the polymerization mixture. In this way, the template is imprinted into the polymerization matrix forming numerous imprints in it.

Cyclodextrins, characterized as supramolecular host compounds, belong to a series of cyclic oligosaccharides. The physical conformation of its molecular structure creates a lipophilic inner cavity with hydrophilic outer surfaces that is able to interact with a large variety of guest molecules forming non-covalent inclusion complex. In this work, MIPs of cyclodextrin were synthesized for the selective adsorption of Fluconazole.

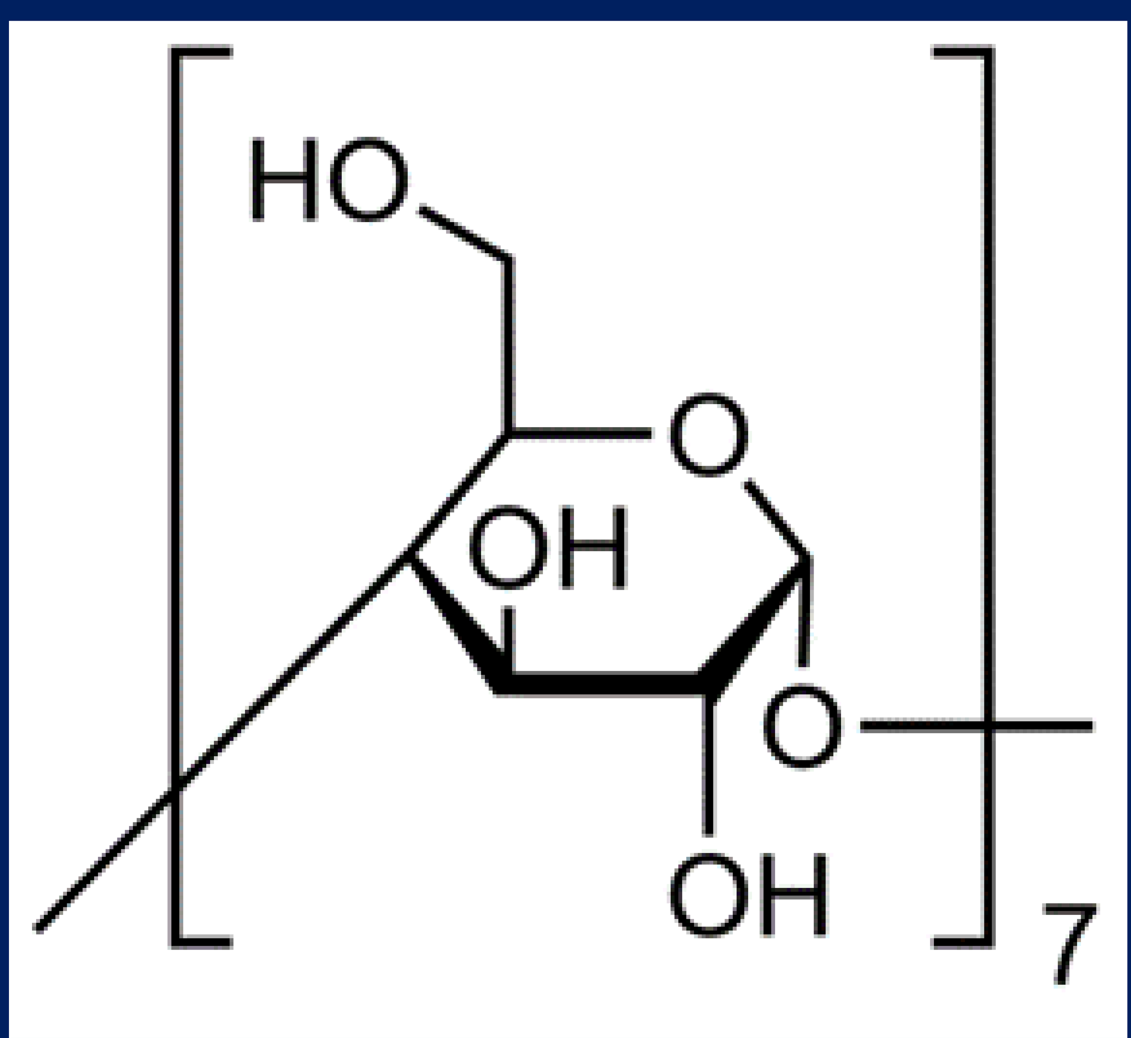
Fluconazole is an azole-based antifungal drug with low toxicity and shows very significant efficacy against Candida albicans.

Synthesis of MIPs

Three types of cyclodextrin (beta-, methyl- and hydroxypropyl-) were used. Cyclodextrins were dissolved at DMSO. Tolylene-diisocyanate (TDI) used as cross-linker and Fluconazole as template-drug were inserted in the reactor. Synthesis was held at 55oC under magnetic stirring. MIPs were washed with acetone, ethanol and hot water for the removal of unreacted TDI and cyclodextrin. Drug was extracted from MIPs by soxhlet. Characterization occurred using FTIR and XRD. MIPs were evaluated by adsorption studies in different pH, temperatures and initial compound concentration. The non-imprinted polymer (NIP) was also synthesized similarly, without the absence of drug.

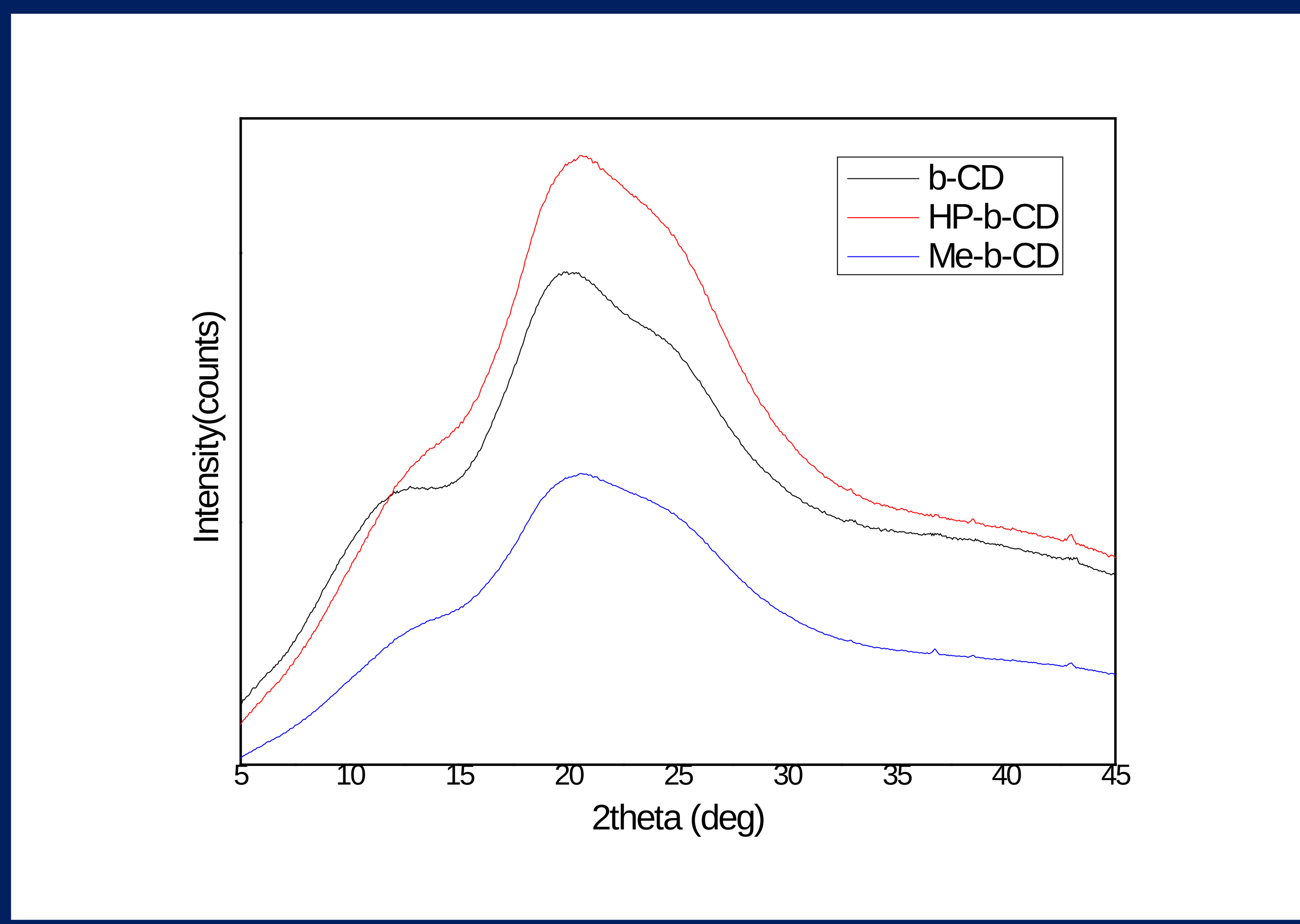


Chemical structure of Fluconazole



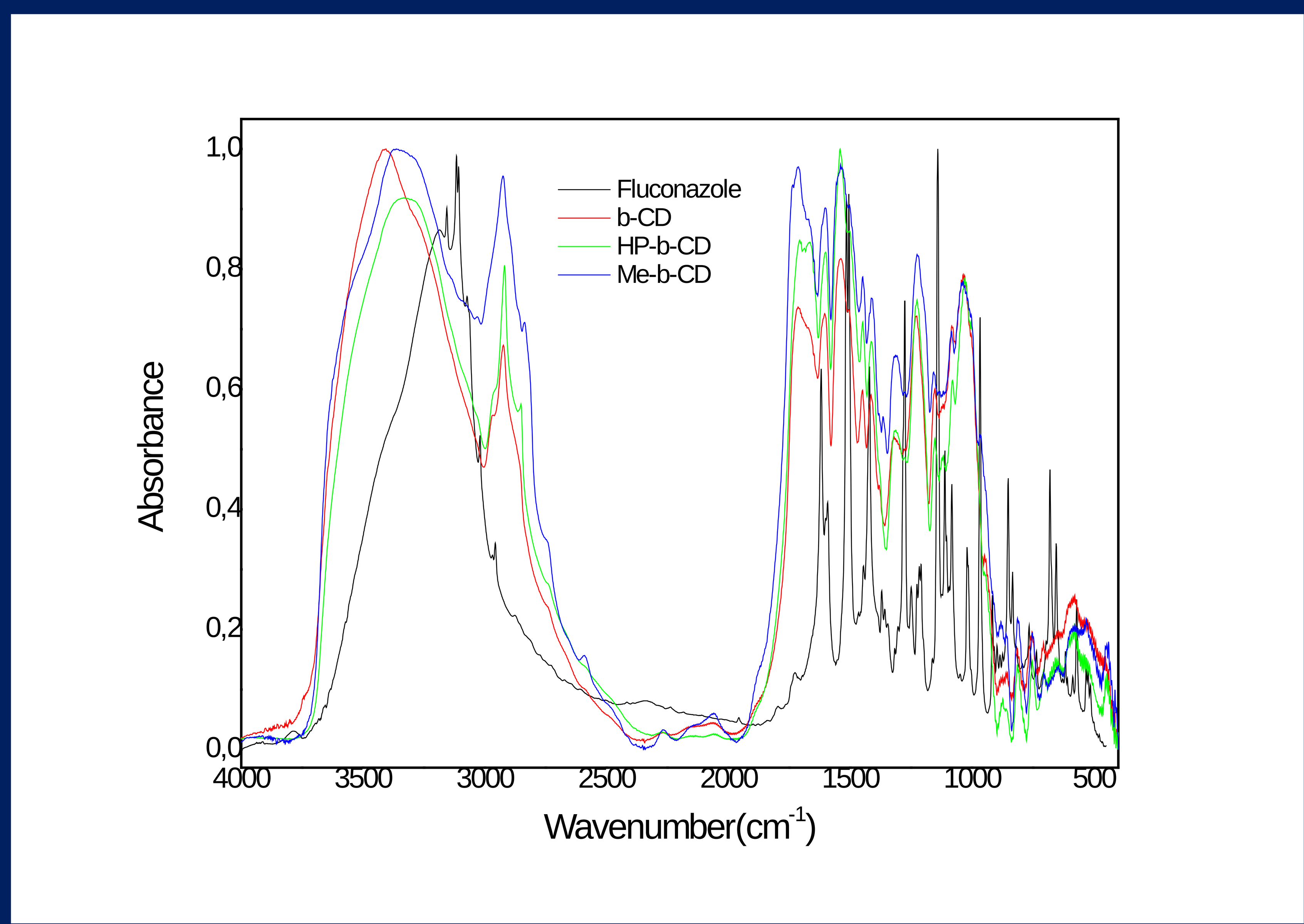
Chemical structure of beta- cyclodextrin

XRD was used to examine the crystallinity of the initial cyclodextrins. As seen all three types of cyclodextrins are amorphous as they show a broad wide peak.



XRD patterns of cyclodextrins

FT-IR spectra of all net cyclodextrins and Fluconazole showed the characteristic peaks.



FT-IR spectra of net cyclodextrins and fluconazole

HPLC Analysis

Identification and quantification of fluconazole was accomplished with HPLC-DAD and CNW Athena C18, 120 Å, 4.6mm *250mm, 5 μm column. Isocratic elution was used and the mobile phase was ACN/H_2O (pH=4) 30/70 v/v. The flow-rate was 1 mL/min, the column temperature was 25 ^oC and the injection volume was 20 μL. The detection wavelength was set at 210 nm. The UV spectra and the retention time of trimethoprim standard were used for the identification.

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