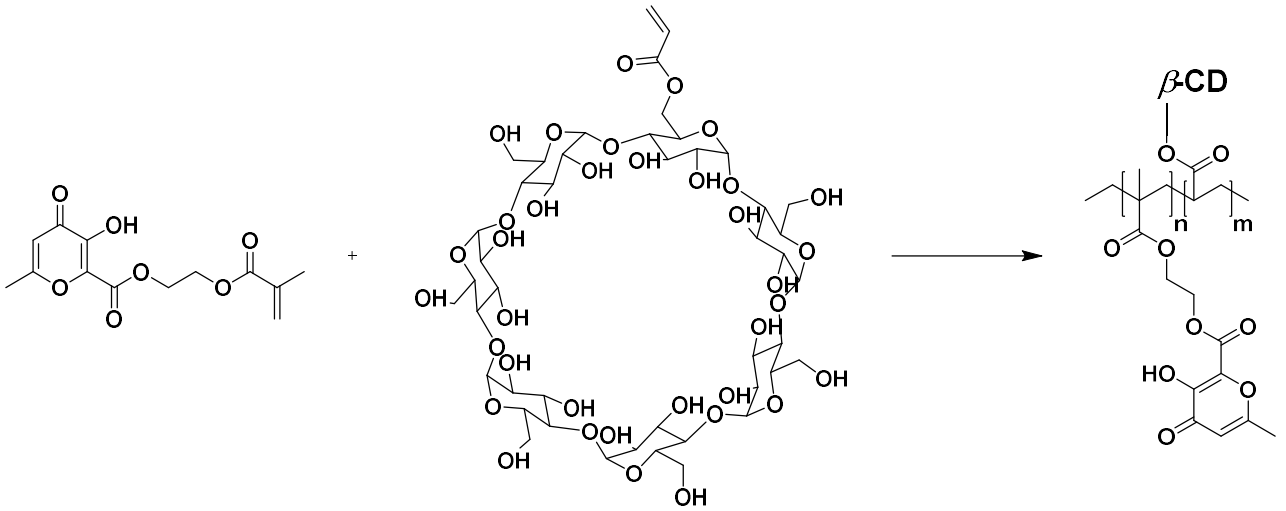
ASEC 2023
The 4th International Electronic Conference on Applied Sciences
27 October – 10 November 2023 | Online

Porous material for antimicrobial applications based on β-cyclodextrin and maltol derivative

V. Patamia, C. Zagni, V. Fuochi, S. Dattilo, S. Furnari, P. M. Furneri, G. Floresta, A. Rescifina

Università di Catania

iPCB ISTITUTO PER I POLIMERI COMPOSITI E BIOMATERIALI



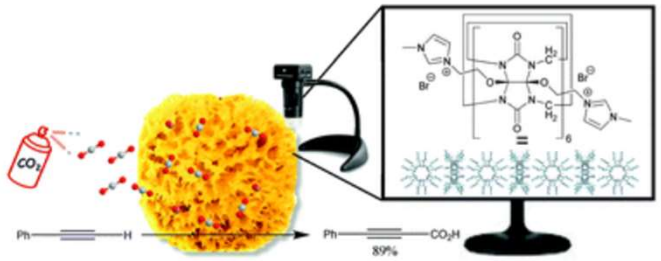
RECENTLY …

Communication

Nanosponges based on self-assembled starfish-shaped cucurbit[6]urils functionalized with imidazolium arms

Vincenzo Patamia, Davide Gentile, Roberto Fiorenza, Vera Muccilli, Placido G. Mineo, Salvatore Scirè and Antonio Rescifina

A highly porous structure that allows CO_2 capture, the possibility to reuse the adsorbed CO_2 for organic synthesis, and an exciting thermal stability up to around 800 °C.



The article was first published on 09 Mar 2021
Chem. Commun., 2021, **57**, 3664-3667
https://doi.org/10.1039/D1CC00990G

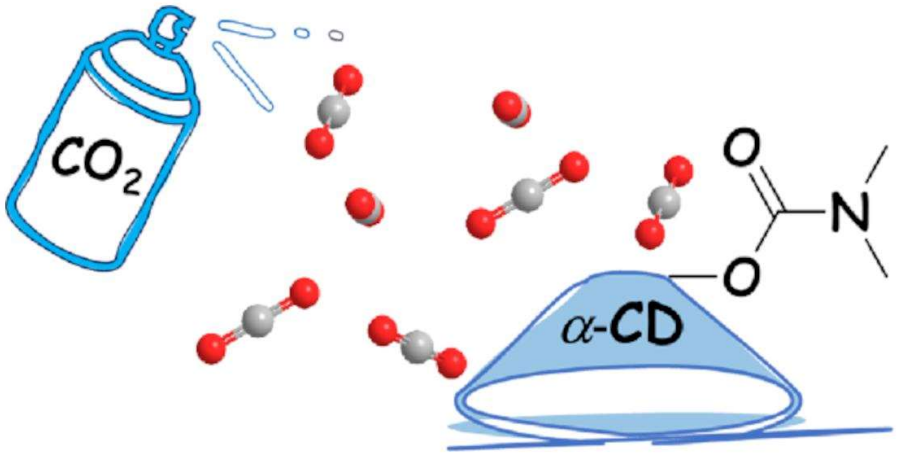
catalysts

MDPI

Article

Carbamoyl-Decorated Cyclodextrins for Carbon Dioxide Adsorption

Vincenzo Patamia [1], Rosario Tomarchio [1], Roberto Fiorenza [2], Chiara Zagni [1], Salvatore Scirè [2], Giuseppe Floresta [1] and Antonio Rescifina [1,*]



ASEC 2023 applied sciences

RECENTLY …

Università di Catania

MATERIALS CHEMISTRY FRONTIERS

CCS CHINESE CHEMICAL SOCIETY · ICCAS · ROYAL SOCIETY OF CHEMISTRY

RESEARCH ARTICLE

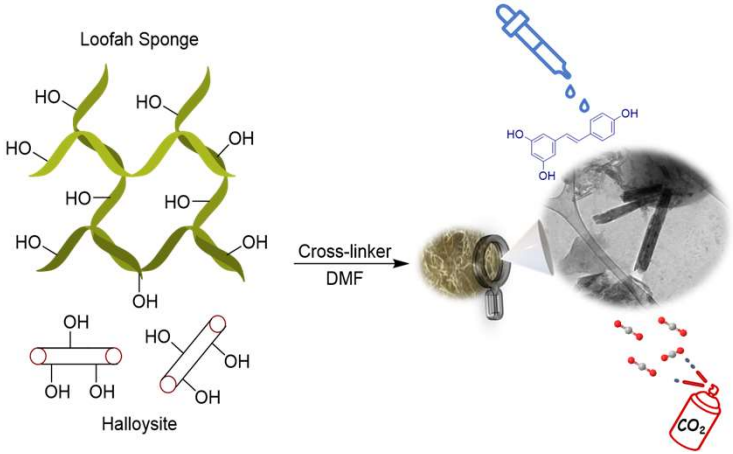
View Article Online
View Journal

Check for updates

Cite this: DOI: 10.1039/d2qm00505k

A sustainable porous composite material based o loofah-halloysite for gas adsorption and drug delivery†‡

Vincenzo Patamia, §*[a] Roberto Fiorenza, §[b] Ilaria Brullo,[a] Massimo Zambito Marsala,[c] Stefano Andrea Balsamo,[b] Alfio Distefano,[d] Pio Maria Furneri,[d] Vincenzina Barbera,[c] Salvatore Scirè[b] and Antonio Rescifina*[a]



MATERIALS CHEMISTRY FRONTIERS

CCS CHINESE CHEMICAL SOCIETY · ICCAS · ROYAL SOCIETY OF CHEMISTRY

RESEARCH ARTICLE

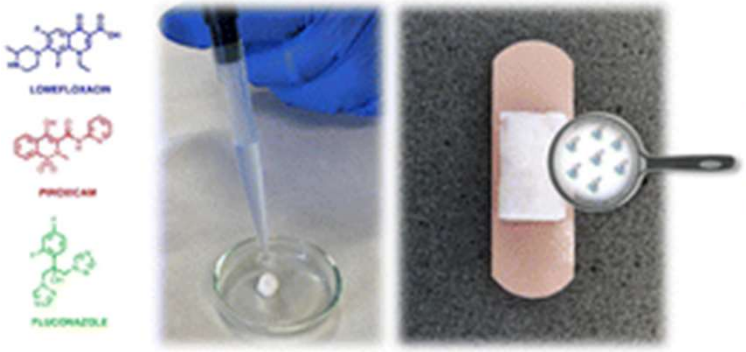
View Article Online
View Journal | View Issue

Check for updates

Cite this: *Mater. Chem. Front.*, 2023, 7, 2693

Sponge-like macroporous cyclodextrin-based cryogels for controlled drug delivery†

Chiara Zagni, ‡[a] Alessandro Coco, ‡[b] Tommaso Mecca,*[c] Giusy Curcuruto,[b] Vincenzo Patamia,[a] Katia Mangano,[d] Antonio Rescifina*[ab] and Sabrina Carola Carroccio[b]



RECENTLY …

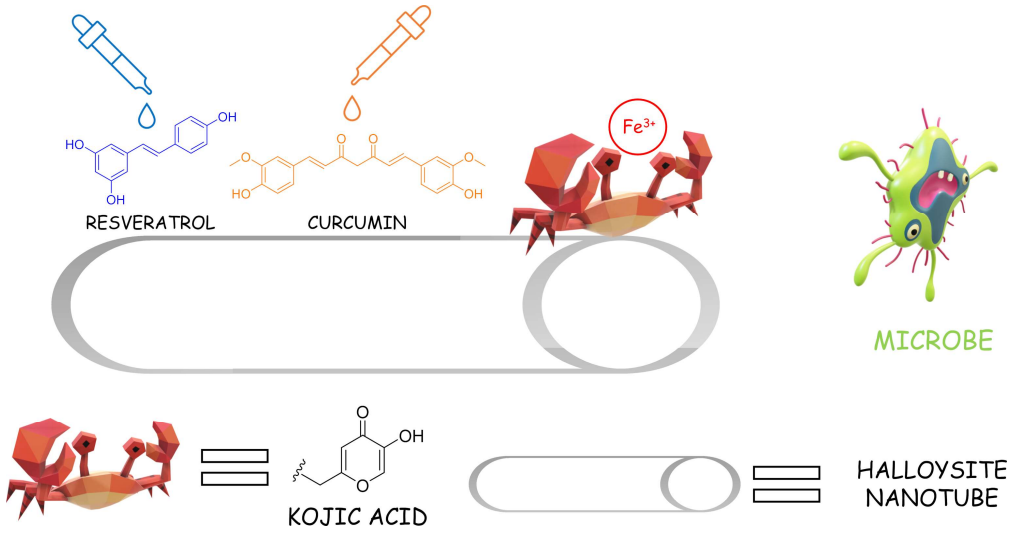
nanomaterials

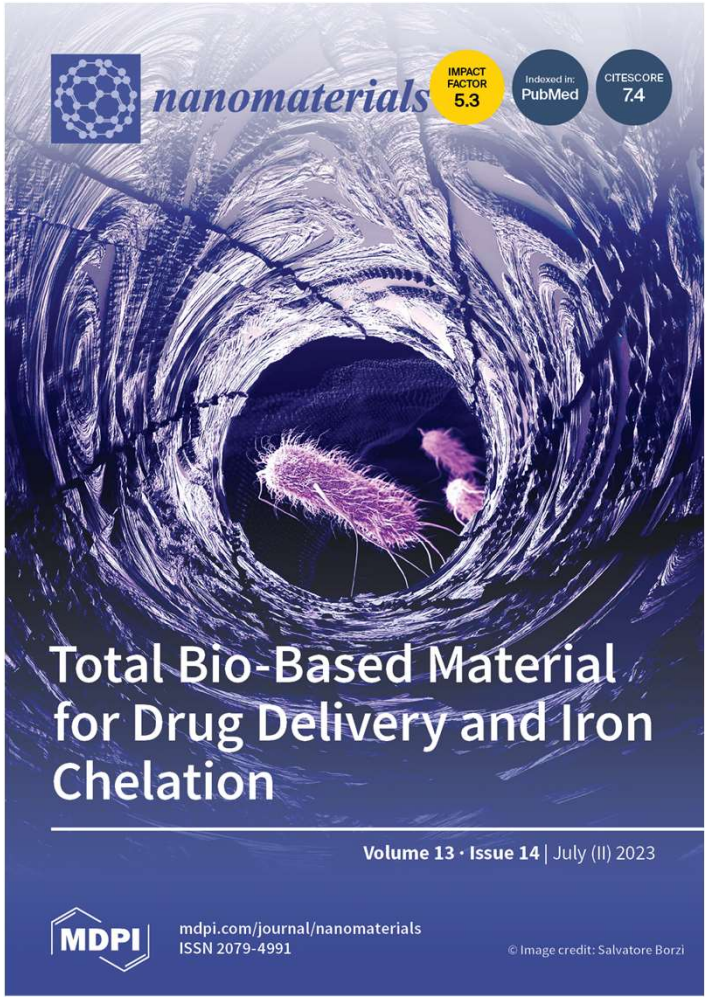
MDPI

Article

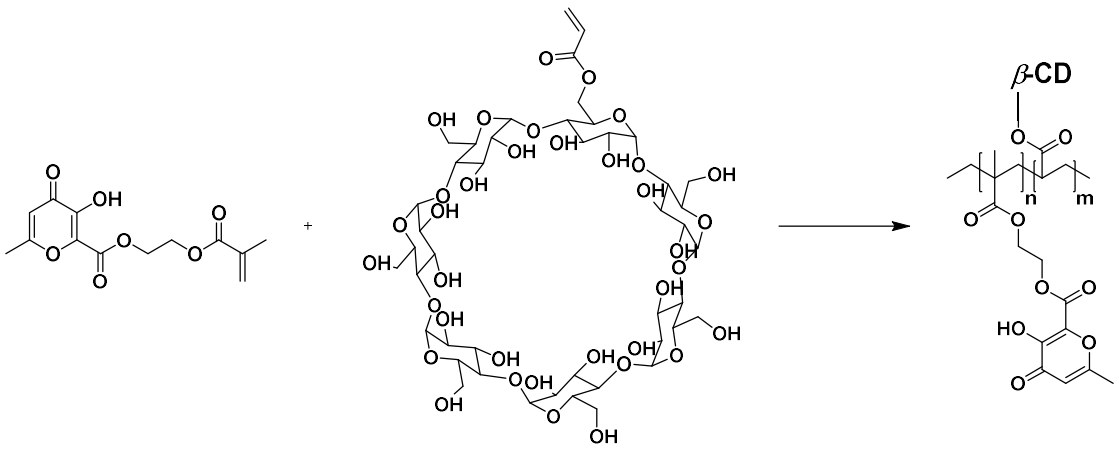
Total Bio-Based Material for Drug Delivery and Iron Chelation to Fight Cancer through Antimicrobial Activity

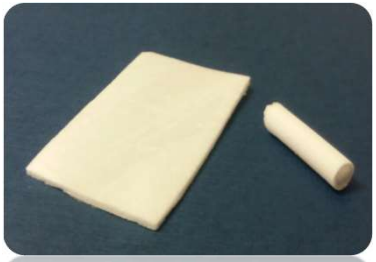
Vincenzo Patamia [1], Chiara Zagni [1], Roberto Fiorenza [2], Virginia Fuochi [3,4], Sandro Dattilo [5], Paolo Maria Riccobene [5], Pio Maria Furneri [3,4], Giuseppe Floresta [1,*] and Antonio Rescifina [1,*]





AIM OF THE WORK

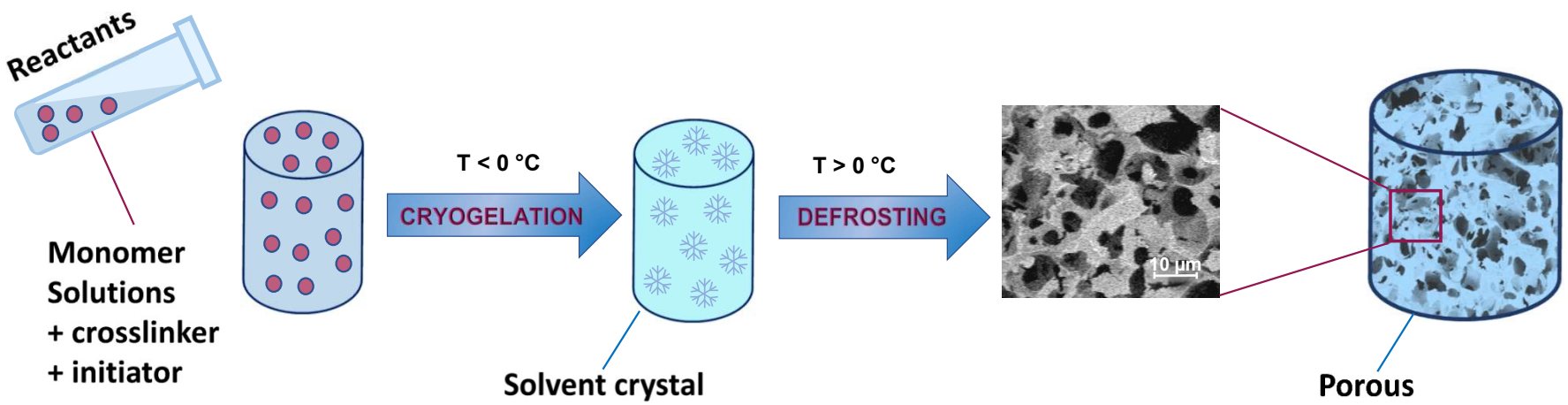




DRUG LOADING
IRON CHELATION
CAPABILITIES

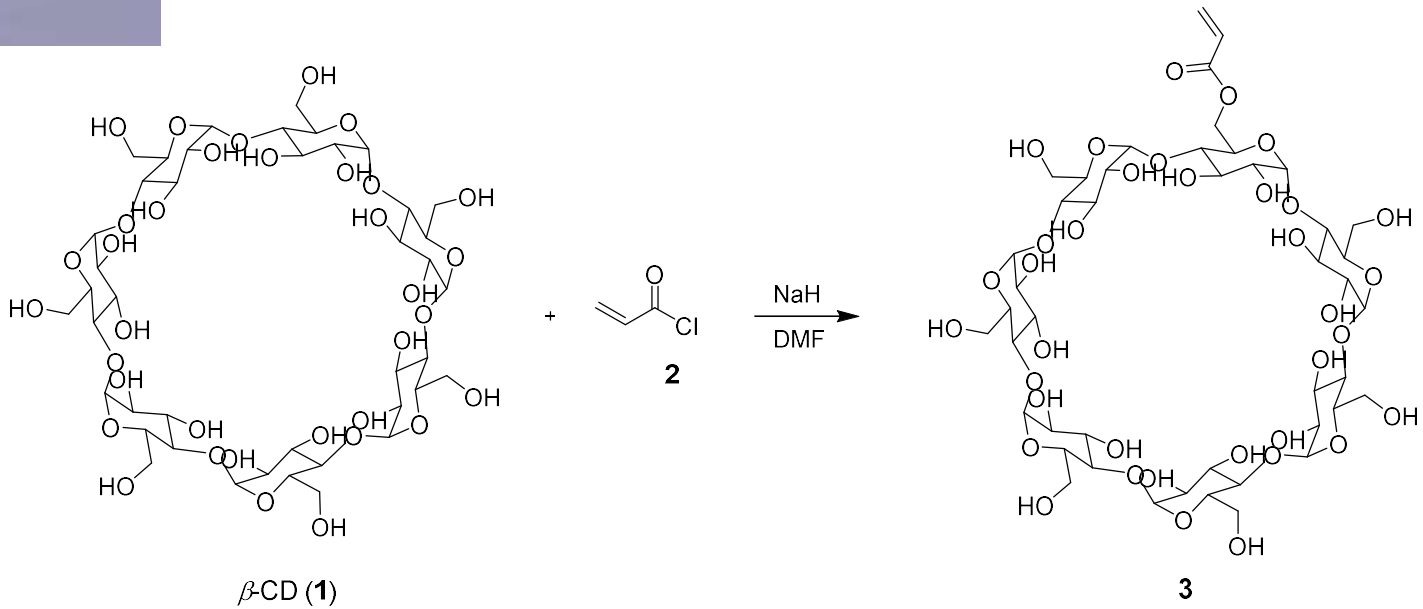
SYNTHESIS

CRYO-POLYMERIZATION

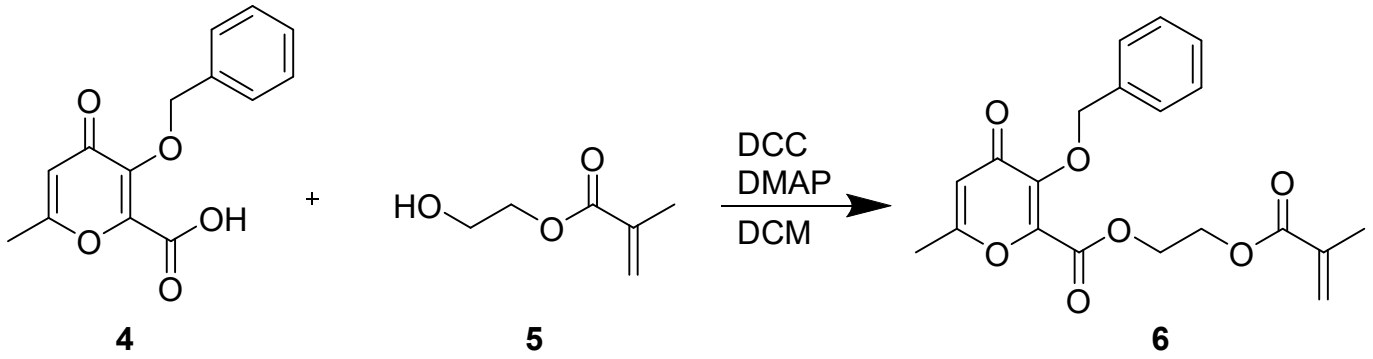


Schematic diagram of cryogels synthetic procedure

SYNTHESIS

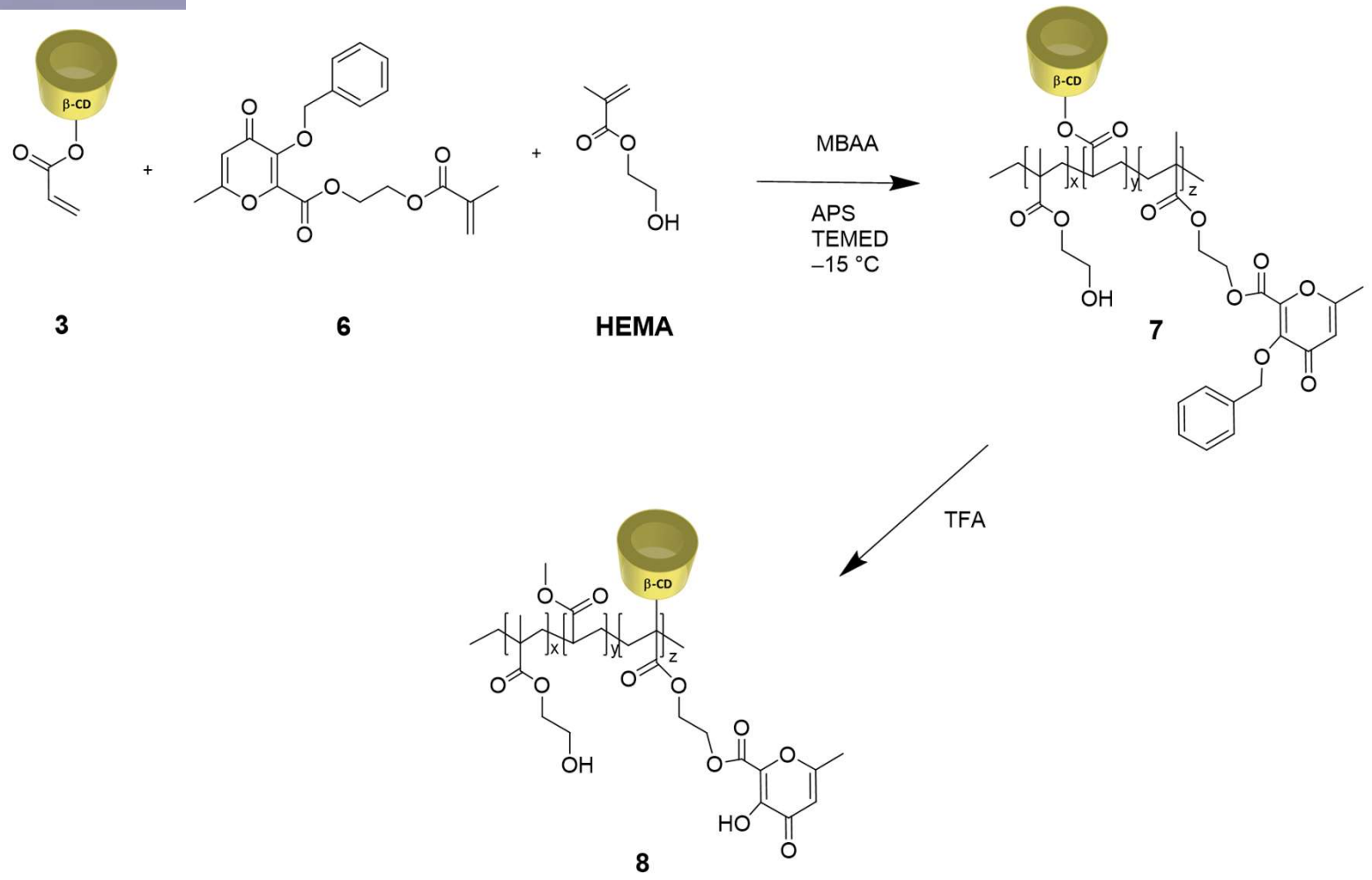


β-CD (**1**) + **2** → **3**



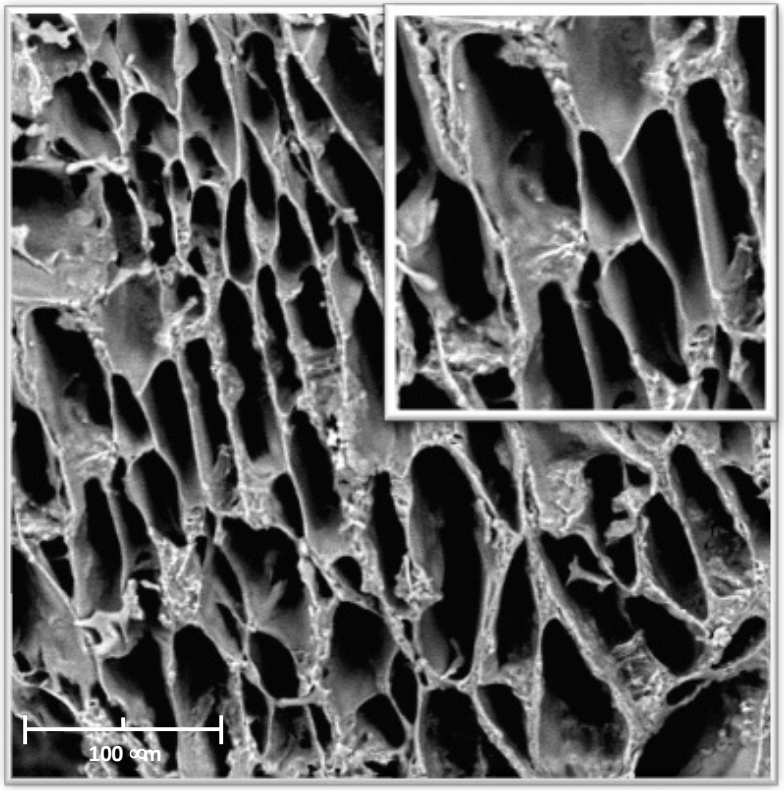
4 + **5** → **6**

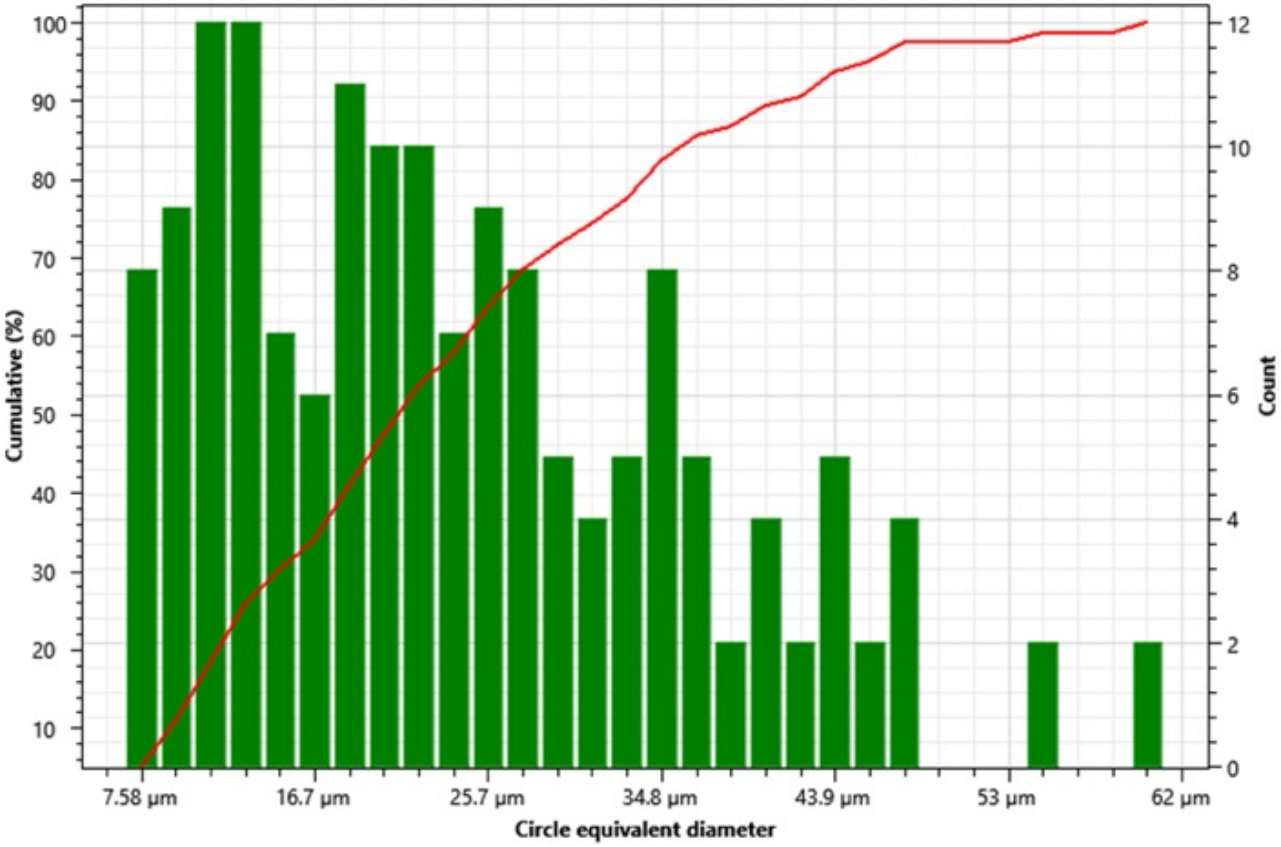
SYNTHESIS



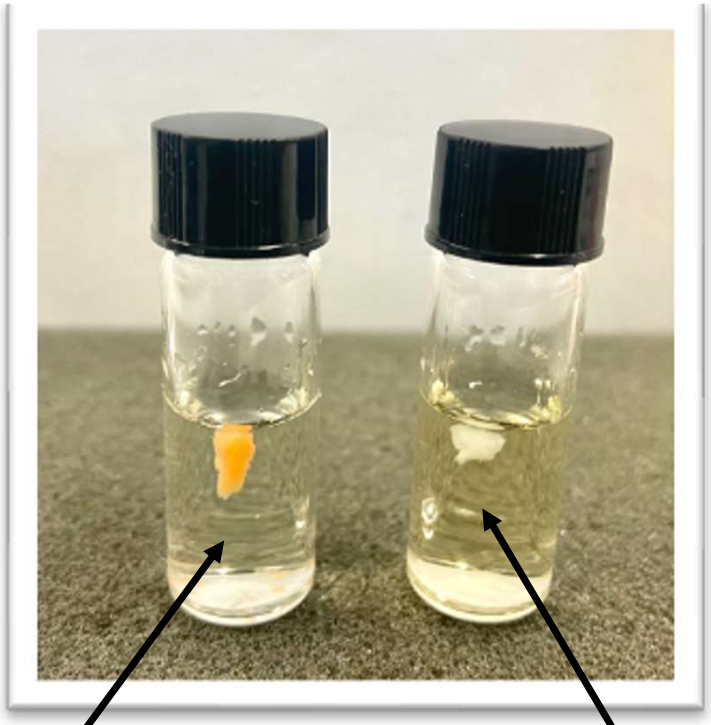
3 6 HEMA 7 8

SEM AND POROSIMETRIC DISTRIBUTION



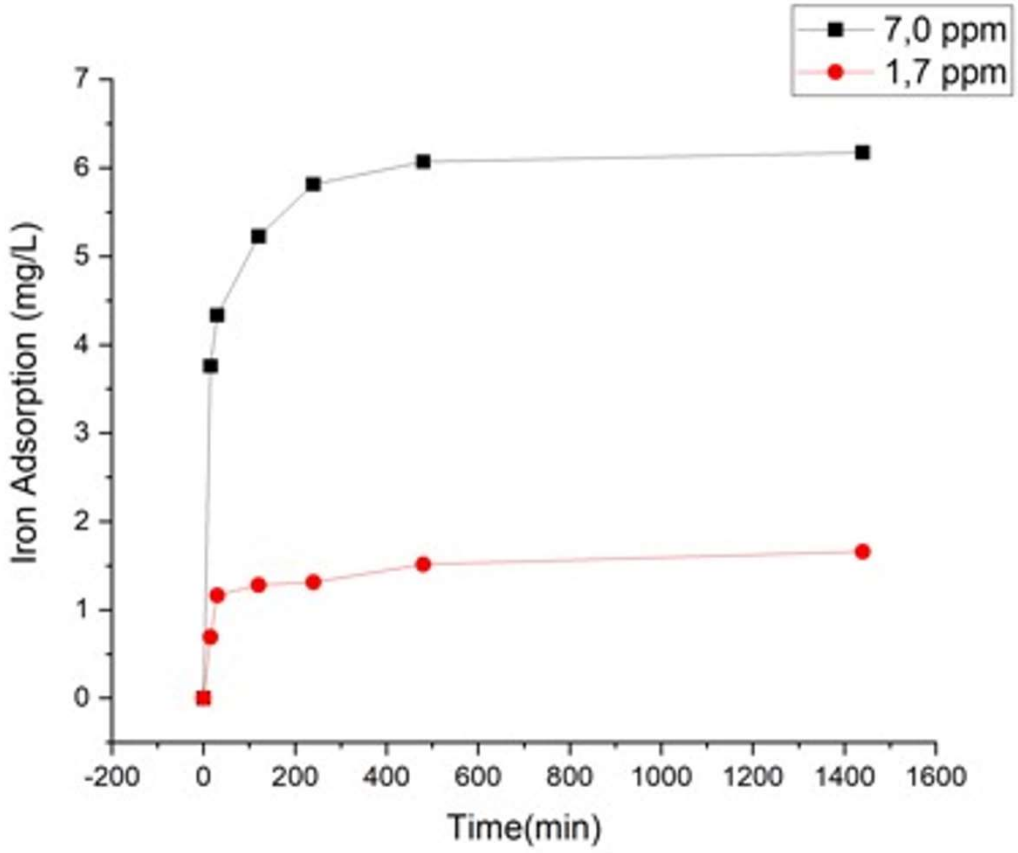


IRON CAPTURE

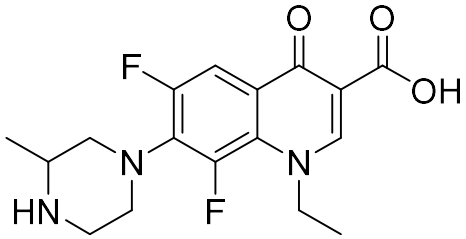


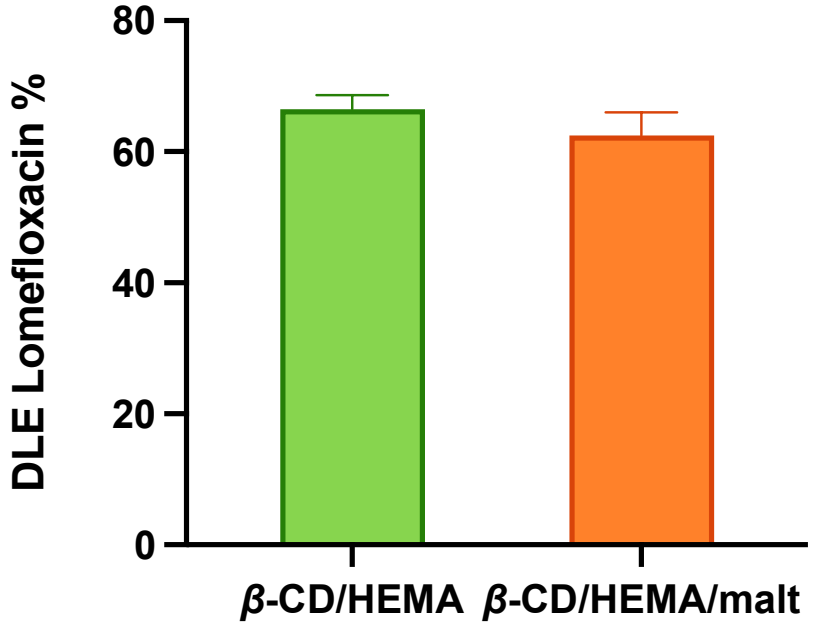
β-CD/HEMA/Malt

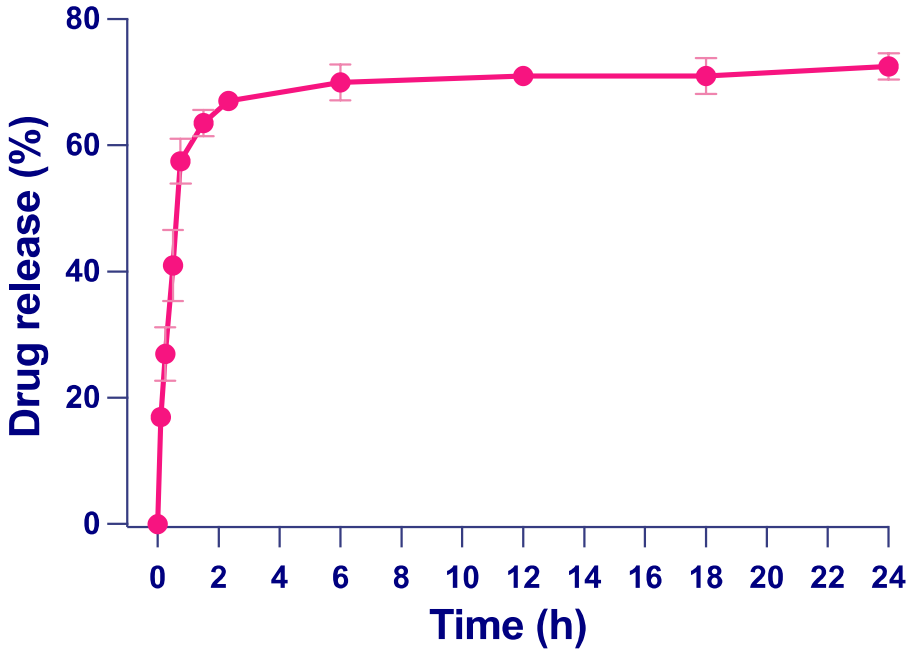
β-CD/HEMA



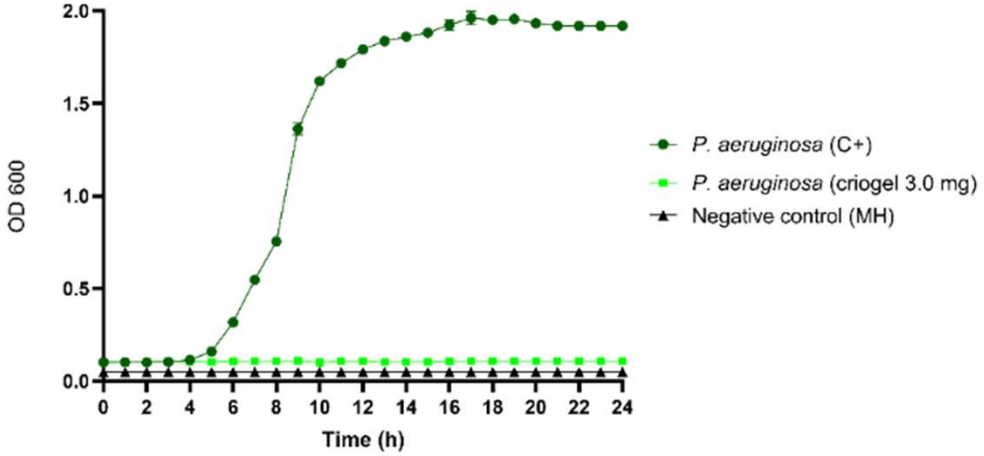
DRUG LOADING

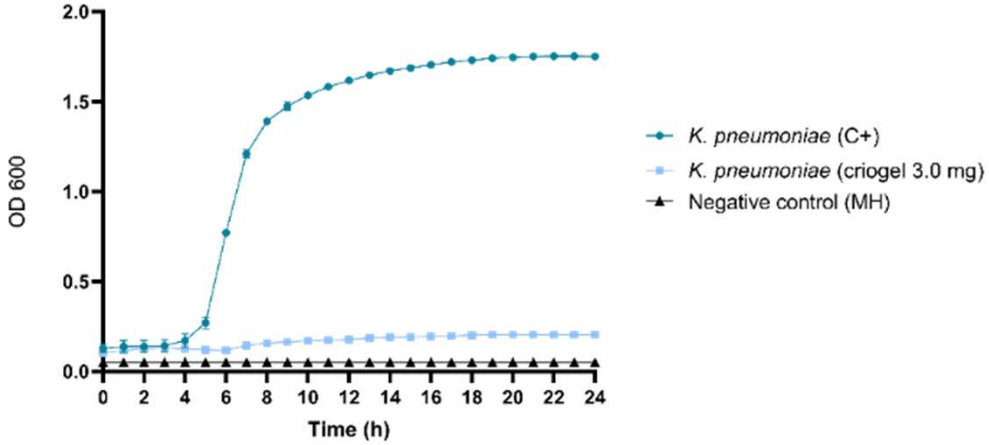


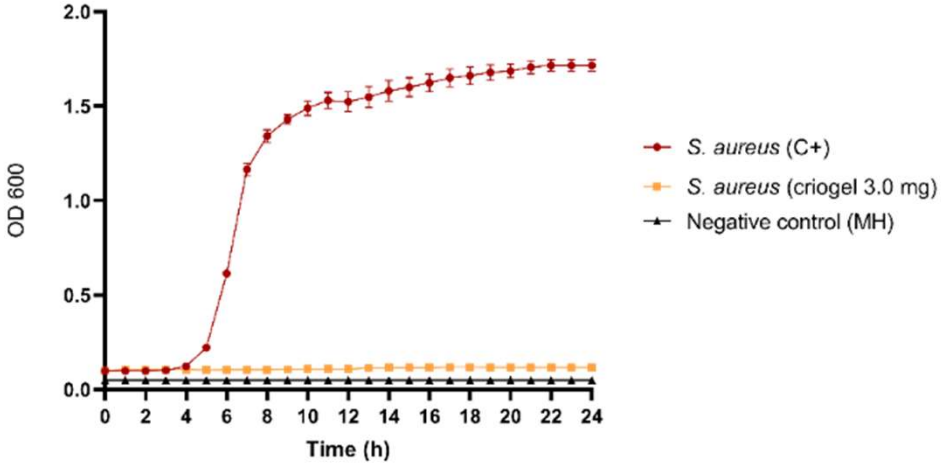




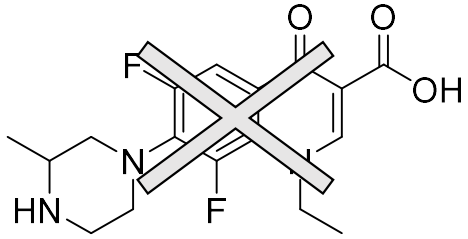
ANTIBACTERIAL ACTIVITY





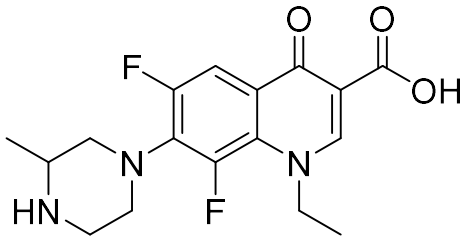


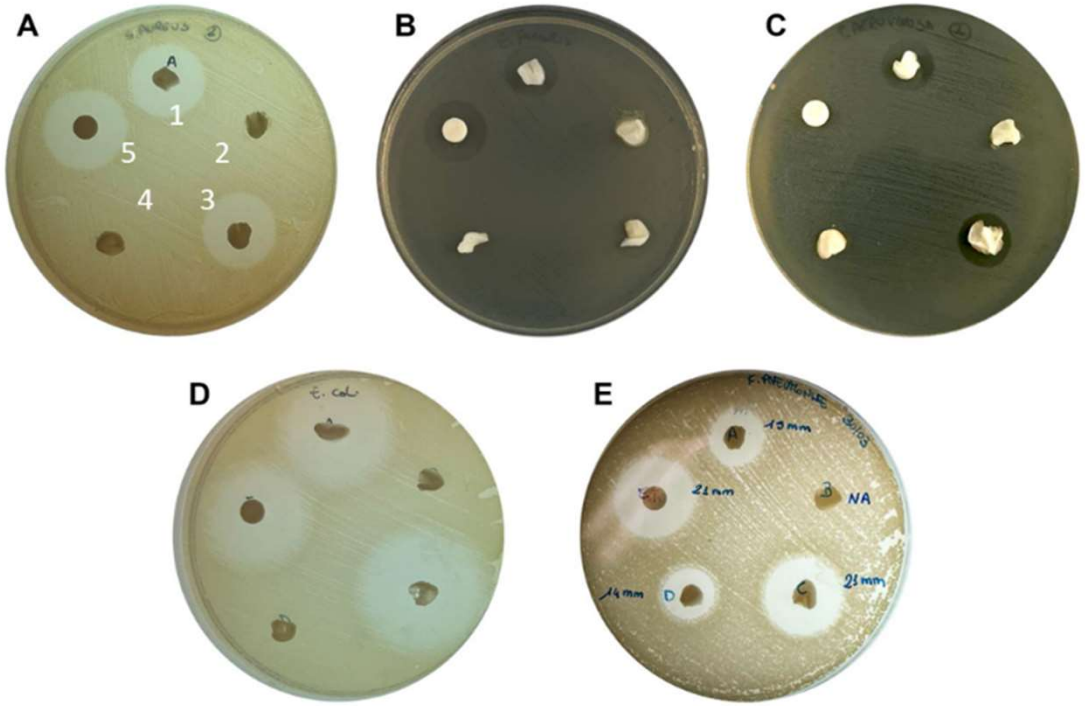
WITHOUT



ANTIBACTERIAL ACTIVITY

WITH





A) *S. aureus*

B) *E. faecalis*

C) *P. aeruginosa*

D) *E. coli*

E) *K. pneumoniae*

1) β-CD/HEMA + Lomefloxacin

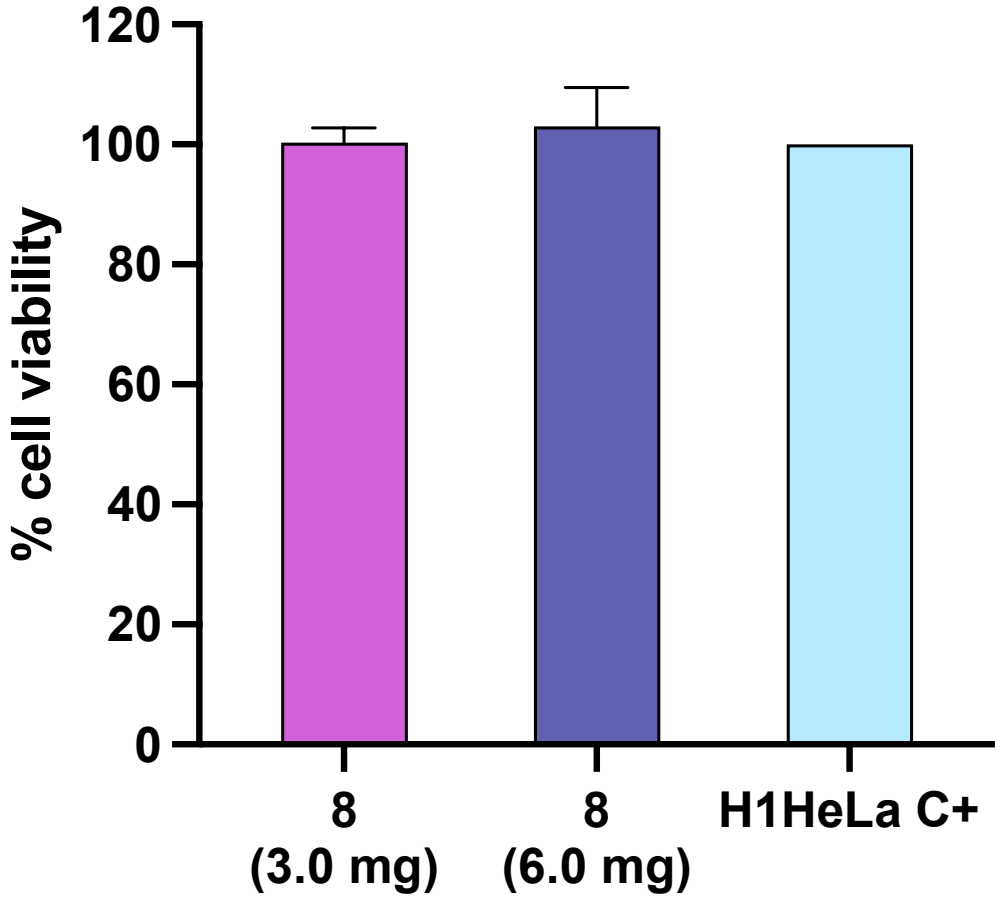
2) β-CD/HEMA

3) β-CD/HEMA/Malt + Lomefloxacin

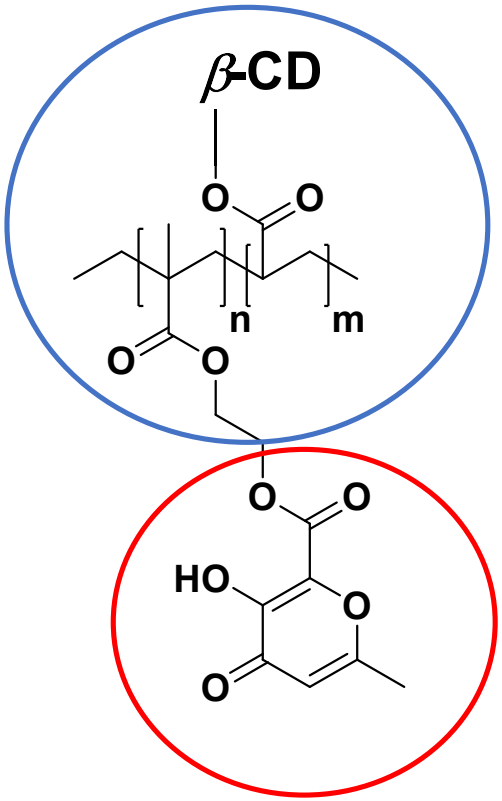
4) β-CD/HEMA/Malt

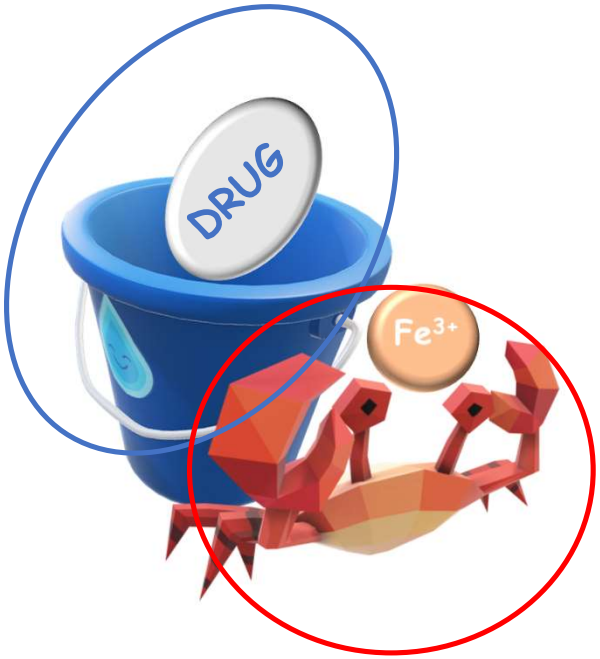
5) Lomefloxacin

CYTOTOXICITY



CONCLUSIONS





- A drug delivery system based on β-cyclodextrin-maltol derivative was designed
- The material has optimal drug loading efficiency and iron chelation capabilities
- Dual-acting antibacterial nanomaterial with lomefloxacin and iron depletion properties
- No toxicity issue was reported in a human cell line

THANKS FOR YOUR TIME

ACKNOWLEDGEMENTS

Prof. Antonio Rescifina
Dr. Giuseppe Floresta
Dr.ssa Chiara Zagni
Dr.ssa Sabrina Carola Carroccio
Dr. Sandro Dattilo
Prof. Pio Maria Furneri
Dr.ssa Virginia Fuochi
Dr. Salvatore Furnari

The research leading to these results has received funding from the European Union—NextGenerationEU under PNRR—M4C2-I1.3 Project "HEAL ITALIA".