

Supplementary information

Development of a microfluidic device to enrich and detect zearalenone in food using quantum dot-embedded molecularly imprinted polymers

Marti Z. Hua ^a, Shenmiao Li ^a, M.S. Roopesh ^b, Xiaonan Lu ^{*a}

^a Department of Food Science and Agricultural Chemistry, McGill University Macdonald Campus, 21111 Lakeshore Road, Sainte-Anne-de-Bellevue, Quebec, H9X 3V9, Canada

^b Department of Agricultural, Food, and Nutrition Science, University of Alberta, Edmonton, AB T6G 2R3, Canada

* Corresponding author. xiaonan.lu@mcgill.ca; phone: +1 514-398-7921

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Protocol for fabricating wafer master

SU-8 2050 was spin-coated (5 s at 500 rpm, 30 s at 3000 rpm) onto the wafer, immediately followed by pre-exposure baking (3 min at 65°C, 7 min at 95°C, 3 min at 65°C). After cooling to room temperature, the resist-coated wafer was exposed to UV light at 365 nm (Hg i-line, 210 mJ/cm² in 3 equal portions) through the photomask with the designed pattern, followed by post-exposure baking (3.5 min at 65°C, 7 min at 95°C, 3 min at 65°C). After cooling to room temperature, the resist was immersed in SU-8 developer with gentle agitation for about 6 min or until the microstructure was fully revealed, followed by rinsing with the developer and isopropanol. The wafer was then dried by nitrogen blowing, followed by hard baking in the vacuum oven at 150°C for 10 min and cooling to room temperature. The wafer master was treated with tridecafluoro-1,1,2,2-tetrahydrooctyl-1-trichlorosilane vapour in a vacuum desiccator for 30-60 min.

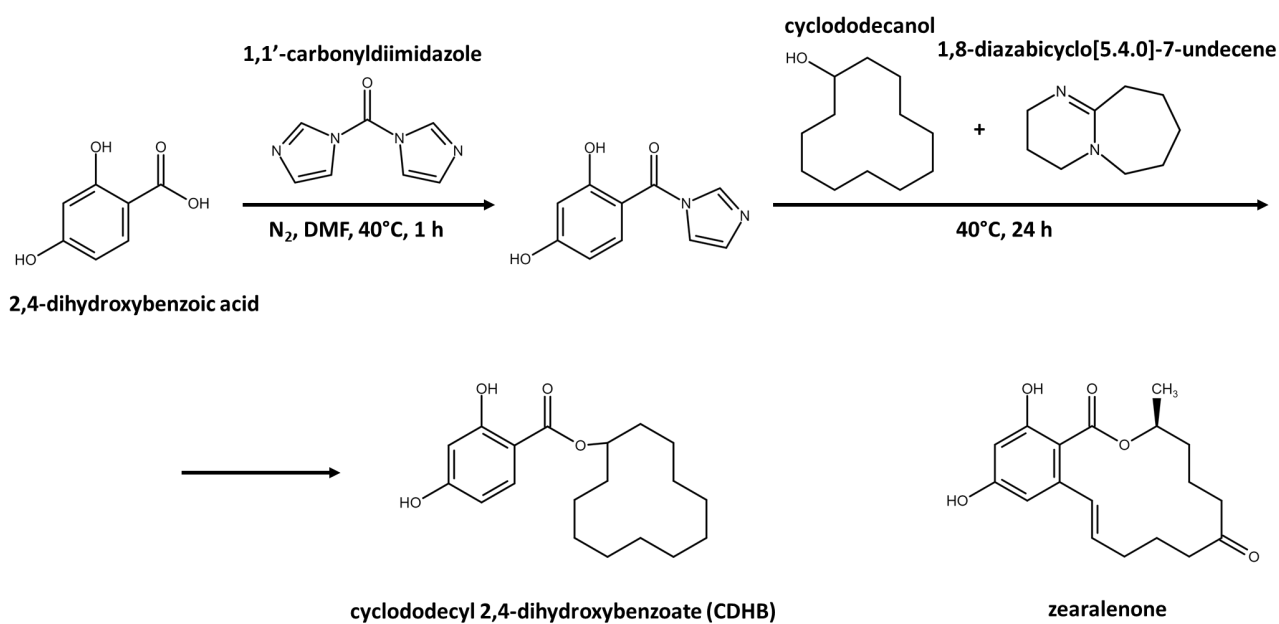


Fig. S1 Synthesis of cyclododecyl 2,4-dihydroxybenzoate (CDHB).

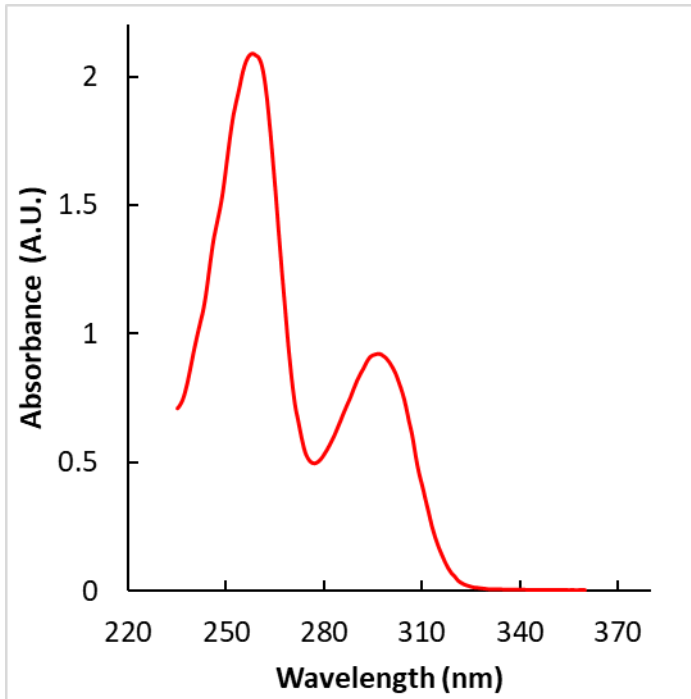


Fig. S2 UV spectrum of CDHB.

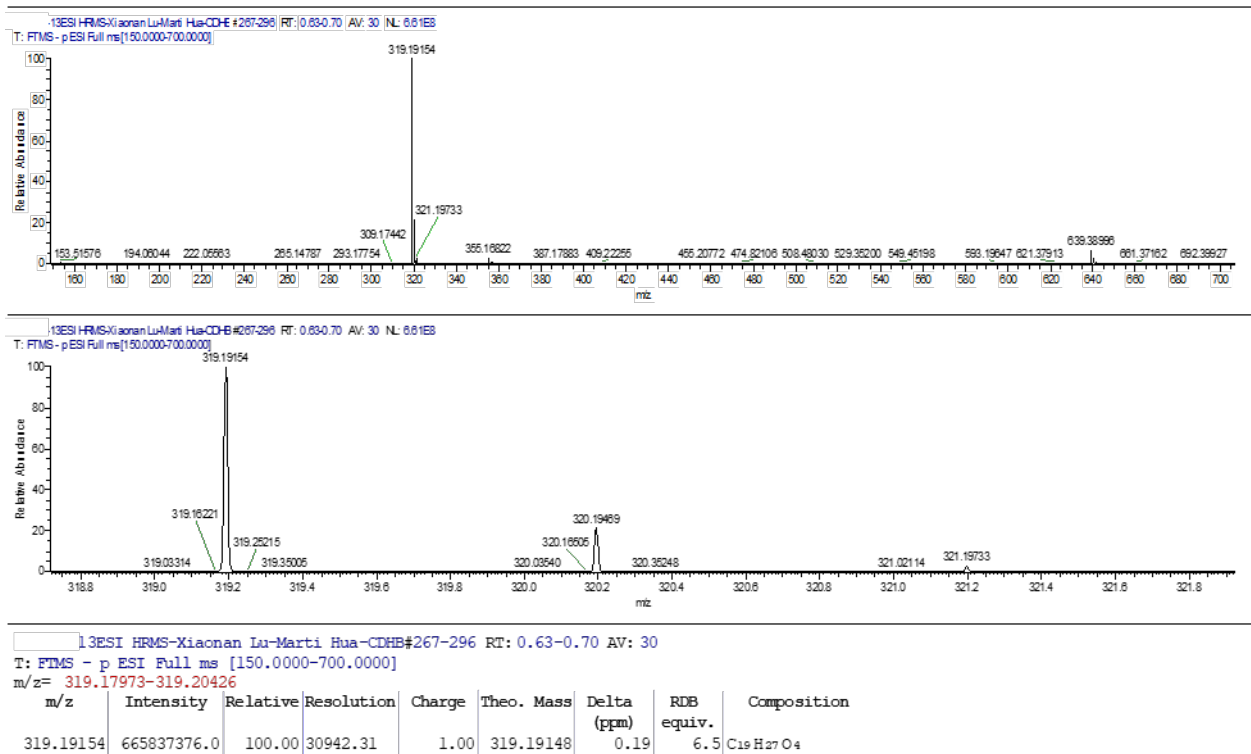


Fig. S3 Mass spectrum of CDHB.

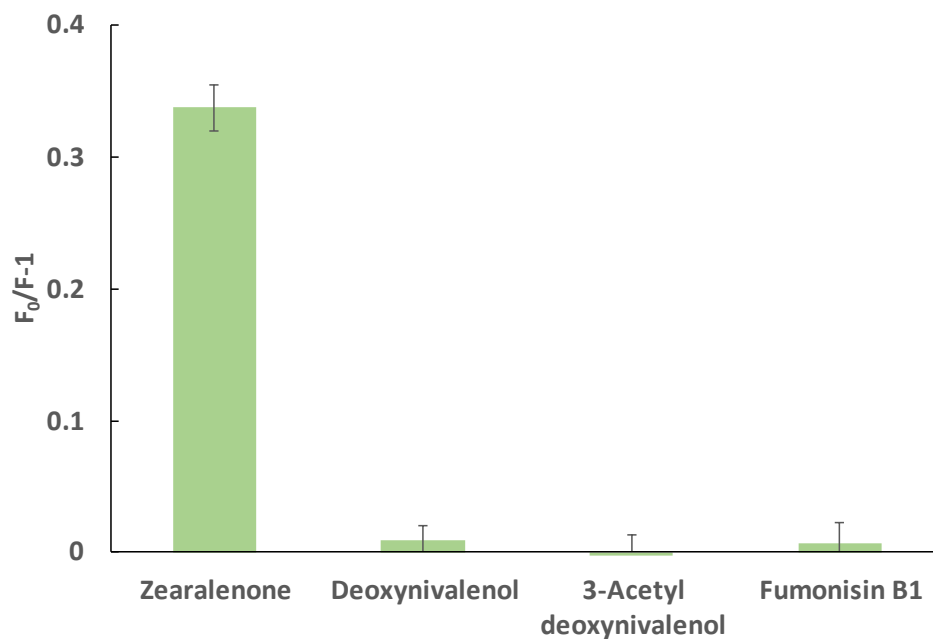


Fig. S4 Cross-reactivity test of of QD@MIP in presence of 10 $\mu\text{g/mL}$ standard solutions of zearalenone and closely related mycotoxins (i.e., deoxynivalenol , 3-acetyl deoxynivalenol, and fumonisin B₁).

Video S1_annular_start.mp4

Annular flow generation in the merging channel and stabilization in the serpentine channel, demonstrated using dye solution in 90% acetonitrile.

Video S2_phase_separate.mp4

Liquid/gas phase separation after enrichment.