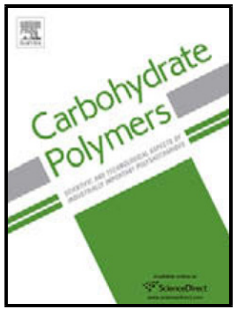

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Chitosan as a substrate for simultaneous surface imprinting of salicylic acid and cadmium

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Highlights

- Biopolymer chitosan as natural substrate with multifunctionality for surface imprinting.
- Faster simultaneous removal of salicylic acid and cadmium within 40 minutes.
- Higher removal efficiency for salicylic acid (45.77 mg/g) and cadmium (53.42 mg/g).
- Grafted chitosan, an ecofriendly substitute for surface imprinting.

Abstract

The present work demonstrates functionalized chitosan as an ecofriendly substitute to the conventional costly substrates and monomers for simultaneous surface imprinting of salicylic acid (SA) and cadmium (Cd). Dual surface imprinted acrylamide functionalized chitosan based polymer (AGDMIP), with higher numbers of imprinted sites for SA and Cd was synthesized using acrylamide grafted chitosan, epichlorohydrin as crosslinker, Cd as template and 4 hydroxy benzoic acid (4HBA) as mimic template (supported by computational modeling). FTIR, SEM, XRD, BET surface area and TEM analysis confirmed successful preparation, mesoporous nature and surface imprinting of AGDMIP. The adsorption data could be fitted into Langmuir isotherm model with the maximum adsorption capacity of 45.77 mg g^{-1} (SA) and 53.42 mg g^{-1} (Cd). Temkin and Intraparticle diffusion models confirmed the chemical nature and presence of imprint sites within AGDMIP respectively. AGDMIP could be reused for six cycles and exhibited good removal efficiency in real samples.