Synthesis and adsorption isotherms of gallic acid imprinted polymers by dispersion polymerization using supercritical fluid technology

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Molecularly imprinted polymers (MIPs) were synthesized by dispersion polymerization in supercritical fluid carbon dioxide (CO2). MIPs were prepared with methyl methacrylate (MMA) as a monomer, methacrylic acid (MAA) as a functional monomer, gallic acid (GA)) as a template, ethylene glycol dimethacrylate (EGDMA) as a crosslinker, and methyl alcohol as a porogen. The binding characteristics of MIPs for GA were evaluated using equilibrium binding experiments. The adsorption ability in aqueous solution of the MIPs was investigated by HPLC analysis, measuring the adsorbed amounts for template and its structural analogues, the selectivity factor (α), and the imprinting-induced promotion of binding (IPB). The results of the evaluation analysis revealed that prepared MIPs have high separation abilities and selectivity. The molecular recognition properties with polymerization methods were also investigated. The results revealed that the MIPs prepared with dispersion polymerization in supercritical fluid CO2 was more efficient to selectively separate and detect for the template than other methods.