

Abstract

Project Code: MRG6180049

Project Title: A new magnetic composite sorbent of polyaniline/graphene oxide/C18-coated $\text{SiO}_2@\text{Fe}_3\text{O}_4$ alginate bead for the extraction and determination of fluoroquinolones

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Abstract:

A doubly porous microcomposite polyaniline/graphene oxide/octadecyl-bonded silica magnetite (PANI/GOx/C18- $\text{SiO}_2\text{-Fe}_3\text{O}_4$) alginate hydrogel adsorbent was developed and employed to extract fluoroquinolones from food samples. Octadecyl-bonded $\text{SiO}_2\text{-Fe}_3\text{O}_4$ nanoparticles and graphene oxide were entrapped in a doubly porous alginate hydrogel and then coated with a polyaniline thin film. The combination of octadecyl, graphene oxide and polyaniline produced a highly extraction efficiency of fluoroquinolones due to hydrogen bonding, $\pi\text{-}\pi$ and hydrophobic interactions. The Fe_3O_4 facilitated rapid and convenient for the separation of the adsorbent from sample solutions. The double porosity of the alginate hydrogel enhanced the surface area of the polyaniline coating and improved the dispersibility of the adsorbent in aqueous samples. The developed PANI/GOx/C18- $\text{SiO}_2\text{-Fe}_3\text{O}_4$ alginate hydrogel was utilized to extract fluoroquinolones from honey, milk and egg samples. Extraction recoveries ranged from 80 to 98 %. The limits of detection obtained were between 0.001 and 0.010 $\mu\text{g L}^{-1}$ with RSD lower than 9.0 %. The convenient, cost-effective, reusable, developed adsorbent was simple to prepare, easy to use, and exhibited high extraction efficiency.

Keywords: Polyaniline; graphene oxide; octadecyl; hydrogel; fluoroquinolones; adsorbent