عنوان مقاله:

Allium based green route synthesized silver nanoparticles for removal of polycyclic aromatic hydrocarbons

محل انتشار:

نشریه آسیایی شیمی سبز, دوره 5, شماره 2 (سال: 1400)

تعداد صفحات اصل مقاله: 13

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خلاصه مقاله:

This paper presents removal of some polycyclic aromatic hydrocarbons (PAHs) by silver nanoparticles (AgNPs) which were synthesised by garlic based green route method. Allivum sativum (Garlic) extract was used for the synthesis of silver nanoparticles Ag(P) as a green route process while synthetic chemical method was adopted for preparation of silver nanoparticles Ag(W). The synthesis of AgNPs was studied as a function of variation in volume of garlic extract, temperature and time. Solution of pyrene, anthracene and phenanthrene was prepared in n-hexane, and their removal efficiencies were studied. PAHs were removed successfully with optimal efficiency of more than ۸۰% with the affinity order of removal, which followed Phenanthrene > Pyrene > Anthracene. The adsorption of PAHs on AgNPs is attributed to the occurrence of hydrophobic interactions. Ag (P) nanoparticles synthesized were found relatively better adsorbent than Ag (W), for removal of PAHs. It may be ascribed owing to the presence of more functional groups in the garlic extract participating in binding of PAH to the surface. The adsorption property of the AgNPs synthesized by both ways was studied and comparative results were obtained based on adsorption efficiency of PAHs. Further, FTIR and XRD were used to characterize the properties of garlic extract with binding and interaction taking place between AgNPs and PAHs. UV-Vis confirmed the formation of Ag(P) and Ag(W) by biological method and chemical wet co-precipitation method, respectively. Ag(P)can be applied over a wide range of temperature, due to stability of .compounds present in Allivum sativum at high temperatures

کلمات کلیدی:

PAHs, AgNPs, Green method, Wet chemical method, Garlic extract etc