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**Solid phase extraction and simultaneous determination of alkylphenols and bisphenol a using magnetic chitosan graphene oxide as nanosorbent**

Jasmin Shah, Tasmia and Muhammad Rasul Jan

Institute of Chemical Sciences - University of Peshawar, Pakistan

Magnetic chitosan graphene oxide composite was successfully prepared and used as an adsorbent for the simultaneous removal and extraction of bisphenol A (BPA) and two alkylphenols 4 tertiary butyl phenol (4tBP) and 4 tertiary octyl phenol (4tOP) using high performance liquid chromatography with UV detector. The composition and morphology of the composite was studied through Fourier Transformed Infrared Spectroscopy, Scanning Electron Microscopy, Energy Dispersive X-ray and X-ray diffraction analysis. Several factors such as pH of solution, adsorption time, temperature, kinetics and isotherms were studied. The adsorption capacity calculated for BPA was 28.98, for 4tBP was 33.22 and 4tOP was 24.31 at room temperature and pH 5. The adsorption process best fitted to pseudo second order kinetics and Langmuir adsorption isotherm. Thermodynamic study suggested exothermic and spontaneous adsorption process. Methanol and water were used in 1:1 as an extraction solvent. The % extraction recoveries for BPA, 4tOP and 4tBP were calculated with relative standard deviations. The % extraction recoveries were  $92.56 \pm 3.10$ ,  $95.81 \pm 3.65$  and  $95.23 \pm 4.02$  for BPA, 4tBP and 4tOP respectively. The green aspect of the method was also explained calculating the eco scale environmental factor. The proposed method was successfully applied to spiked samples of Al-Kosar plastic industry wastewater from Hayatabad, Khyber Pakhtunkhwa and water sample from river Kabul.