

A Facile Nanocomposite of Graphene Oxide Reinforced Chitosan/Poly-Nitroaniline Polymer as a Highly Efficient Adsorbent for Extracting Polycyclic Aromatic Hydrocarbons from Tea Samples

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Abstract : Tea is a popular beverage drunk by millions of people throughout the globe. Tea has considerable health advantages, including antioxidant, antibacterial, antiviral, chemopreventive, and anticarcinogenic properties. As a result of environmental pollution (atmospheric deposition) and the production process, tealeaves may also include a variety of dangerous substances, such as polycyclic aromatic hydrocarbons (PAHs). In this study, graphene oxide reinforced chitosan/poly-nitroaniline polymer was prepared to develop a sensitive and reliable solid phase extraction method (SPE) for extraction of PAH7 in tea samples, followed by high-performance liquid chromatography- fluorescence detection. The prepared adsorbent was validated in terms of linearity, the limit of detection, the limit of quantification, recovery (%), accuracy (%), and precision (%) for the determination of the PAH7 (benzo[a]pyrene, benzo[a]anthracene, benzo[b]fluoranthene, chrysene, benzo[b]fluoranthene, Dibenzo[a,h]anthracene and Benzo[g,h,i]perylene) in tea samples. The concentration was determined in two types of tea commercially available in Saudi Arabia, including black tea and green tea. The maximum mean of Σ 7PAHs in black tea samples was 68.23 ± 0.02 ug kg⁻¹ and 26.68 ± 0.01 ug kg⁻¹ in green tea samples. The minimum mean of Σ 7PAHs in black tea samples was 37.93 ± 0.01 ug kg⁻¹ and 15.26 ± 0.01 ug kg⁻¹ in green tea samples. The mean value of benzo[a]pyrene in black tea samples ranged from 6.85 to 12.17 ug kg⁻¹, where two samples exceeded the standard level (10 ug kg⁻¹) established by the European Union (UE), while in green tea ranged from 1.78 to 2.81 ug kg⁻¹. Low levels of Σ 7PAHs in green tea samples were detected in comparison with black tea samples.

Keywords : polycyclic aromatic hydrocarbons, CS, PNA and GO, black/green tea, solid phase extraction, Saudi Arabia

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