

عنوان مقاله:

A Review on the Toxicity and Properties of Organochlorine Pesticides, and Their Adsorption/Removal Studies from Aqueous Media Using Graphene-Based Sorbents

محل انتشار:

فصلنامه مروری شیمی، دوره 6، شماره 2 (سال: 1403)

تعداد صفحات اصل مقاله: 67

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خلاصه مقاله:

Organochlorine pesticides (OCPs) have been extensively used in agriculture to boost crop yields, creating a significant and enduring global contaminant with adverse effects on the environment and human well-being. These pesticides are characterized by their bioaccumulative and persistent nature, capable of long-distance dispersion. To address this challenge, efforts are ongoing to develop advanced technologies for effectively removing OCPs from the environment, thereby mitigating their impact through appropriate treatment methods in soil and other environmental matrices. Specifically, extensive research has been conducted on the utilization of nanomaterials, including TiO₂, Fe₂O₃, graphene, and graphene oxide, as sorbents in sample preparation and degradation techniques. Graphene (G) and graphene oxide (GO) exhibit unique combination of outstanding characteristics derived from carbon materials (such as exceptional physical, chemical properties, mechanical, and electronic features), deep eutectic solvents (DES) (acting as a functionalization agent), and nanomaterials (including an ultrahigh surface area, abundant functional groups, and a nanometer-scale structure). This review focuses on the adsorption and degradation of OCPS and their metabolites using the remarkable attributes of a mixed graphene-based sorbent, deep eutectic solvents (DES) and MNPs. The combination of these materials, with features such as an expansive surface area ($2630 \text{ m}^2 \text{ g}^{-1}$), hydrophilicity, inherent adsorption sites on both sides for molecules, hydrophobicity, double-sided polyaromatic scaffold, adaptable surface modification, hydrogen-bonding, and extensive π -electron structure, positions them as excellent advanced adsorbents and efficient photocatalysts for Magnetic Solid Phase Extraction (MSPE)

and Solid Phase Extraction (SPE). These characteristics make them suitable for extracting OCPs from different environmental matrices such as food, environment water, medicine, and biological samples

کلمات کلیدی:

Magnetic graphene oxide, Functionalization, Deep eutectic solvent, Solid phase extraction, Physicochemical properties, Sample preparation, Magnetic nanoparticles (MNPs)

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