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Removal of organic pollutants from water using organic adsorbent technique (host-guest inclusion technology)

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This study attempted to use an adsorption process to remove selected organic pollutants from wastewater. Dinitrodiphenyldiquinoline derivative 1 (DNDDPQ) was synthesized and used as a host compound to determine the optimum conditions for the removal of four types of organic pollutants (guest compounds) from selected municipal treated wastewater in Jordan. The target organic pollutants investigated in this study were sixteen environmental priority carcinogenic polycyclic aromatic hydrocarbon (PAHs), polychlorinated benzene (PCB101, PCB 52, PCB118, PCB138 and PCB180), Phenols (2,4,6-trichlorophenol, 4-nitrophenol and pentachlorophenol) and hexachlorobenzene (HCB). Removal efficiency was done through running adsorption experiments which were carried out at initial concentration of 1 mg/l of each of the target organic pollutants compounds at ambient temperature ($26\pm 2^\circ\text{C}$) and pH 7.5. The experimental results indicate that synthesized DNDDPQ was capable to remove target organic pollutant with different degrees. For PAHs, the removal efficiency ranged from 83.9% to 100% for different types of PAHs; for phenols, the removal efficiency ranged from 3.0% for 2,4,6 trichlorophenol up to 89.8% for pentachlorophenol; for HCB, the removal efficiency was 89.8%; for PCBs, the removal efficiency ranged from 66.9% for PCB180 up to 100% for PCB101, PCB138 and PCB52. During the first 2 h, the adsorption rate increased rapidly. After that time, however, there was a minor decrease.

Biography

Solhe Alshahateet is an Associate Professor and has completed his PhD at the age of 33 years from the University of New South Wales (Australia, 2002) and postdoctoral studies from the Institute of Chemical and Engineering Sciences (Singapore, 2003-2005). He is a faculty staff member at Mutah University, Jordan since 2007 and the former chairman of Chemistry Department at Mutah University (Jordan, 2009-2010). He has published more than 55 papers in reputed international journals, attended more than 30 international conferences, has been serving as a referee for more than 20 of reputed international Journals, and has been serving as an editorial board member of 6 reputed international Journals.

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