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POTENTIAL OF CATIONIC SURFACTANT MODIFIED SILICA GEL IN REMOVAL OF ORGANOPHOSPHATE PESTICIDE - MONOCROTOPHOS FROM AQUEOUS SOLUTION

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ABSTRACT

The organophosphate insecticides are highly toxic by all routes of exposure. Repeated daily high level exposure may gradually lead to poisoning. Recycle & reuse of waste materials by using adsorption & adsolubilization would be the best option to remove pollutants from the surrounding environment at low initial cost & it is less energy consuming too. In the present study, cationic surfactant-(CS) Dodecyl Trim ethyl Ammonium Chloride-(DTAC) modified Silica Gel was used to remove Monocrotophos. Silica Gel was used to remove DTAC from aqueous solution. From the batch study pH6, contact time 30min, adsorbent dosage 30gm/L & high initial adsorb ate concentration 7500mg/L were found optimum experimental conditions for maximum 99.7%removal of DTAC by Silica Gel from aqueous solution. The Silica Gel, thus exhausted after removal of DTAC, is known as Cationic Surfactant Modified Silica Gel (CSMSG) & was further used to remove Monocrotophos from aqueous solution. From the batch study; pH4, contact time 20min & adsorbent dosage 8gm/L were found optimum experimental conditions for maximum 72.6% removal of Monocrotophos by CSMSG from aqueous solution. Temperature had no effect on %removal of Monocrotophos & almost 72.3% removal was observed at all the temperature ranges. Removal of Monocrotophos by CSMSG followed Pseudo Second Order Kinetic Model (Calculated q_e (2.7211mg/gm) & experimental q_e (2.72mg/gm) are in good agreement & R^2=1.0. From the adsorption isotherm study, R^2 obtained were in good agreement with Langmuir (R^2=0.83), Freundlich (R^2=0.90), Temkin (R^2=0.96) & BET (R^2=1). Maximum 68.4% removal of Organophosphate insecticide was observed for actual pesticide industry effluent sample.

KEYWORDS: Adsolubilization, Adsorption, CSMSG, Dodecyl Trimethyl Ammonium Chloride, Monocrotphos, Silica Gel

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