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Kinetic and thermodynamic profile of solifenacin succinate sorption from wastewater by humic acid-coated TiO_2 nanoparticles: An approach towards Green Chemistry

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Solifenacin succinate, a pharmaceutical used in industry is an organic contaminant that has the potential to create environmental toxicity and pollution problems and cause health risks for humans as well as biota. Natural organic matters, such as humic acid, HA in aquatic environments can increase the stability of nanoparticles. In this work, solifenacin succinate in wastewater was removed by a biosorption method using HA-coated TiO_2 nanoparticles. The FTIR, EDX and FESEM studies were used to characterize the fabricated nanosorbents. Mathematical adsorption and kinetics models representing the biosorption processes were formulated, supporting the Langmuir isotherm and pseudo-second order rate equation for the adsorption of aqueous solifenacin succinate using batch mode experiments. All parameters influencing the removal efficiency such as: Adsorbent dose, medium pH, initial adsorbate concentration and temperature were considered for optimizing the experimental conditions. Thermodynamic study was carried out to describe the feasibility, thermic and entropic behaviors of the investigated biosorption process. The results showed that the method developed here is very effective for the removal of solifenacin succinate from an aqueous environment.

Biography

Medhat A Shaker has completed his PhD at the age of 31 years from Alexandria University (Egypt) in collaboration with Northeastern University (USA). He is Associate Professor of Physical Chemistry at Damanhour University (Permanent, Egypt) and at University of Jeddah (Current, Saudi Arabia). He has published more than 25 papers in reputed journals and has been serving as a reviewer for a number of highly impacted peer-reviewed journals.

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