

12th International Conference on**ENVIRONMENTAL TOXICOLOGY AND ECOLOGICAL RISK ASSESSMENT**

October 19-20, 2017 | Atlanta, USA

Preparation, characterization and application of chitosan based organic-inorganic hybrid biocomposites for the removal of nitrate from water**Wondalem Misganaw Golie and Sreedevi Upadhyayula**
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Water represents the very essence of life and adequate supply of safe drinking water is one of the major prerequisite to sustain human population in the world. However, water pollution is remaining an appalling global challenge and the leading worldwide cause of diseases deaths. Anthropologic activities including industrialization and agricultural practices contribute immeasurably to the pollution of the environment and pose a threat to the global water supply. Among various inorganic pollutants, nitrate is possibly one of the most prevalent chemical pollutants in water resources and has become a worldwide crucial apprehension. Decades of chemically assisted agriculture have significantly increased environmental concentrations of nitrate which is a major component of many fertilizers. Intake of water with elevated nitrate concentrations can lead to health problems, such as methemoglobinemia, spontaneous abortions and cancer. Among the unit operations involving water treatment, adsorption process is attractive since it is high efficient, eco-friendly and economically feasible. In this work, chitosan based organic-inorganic hybrid biocomposites, such as chitosan/bentonite, chitosan/titanium oxide, and chitosan/alumina (ChBT, ChTi, and ChAl respectively) were prepared and characterized. Stability of ChBT, ChTi, and ChAl increased with increase in crosslinker and inorganic dosage. Batch adsorption studies were conducted and the operating parameters were optimized and the amounts of nitrate adsorbed on ChBT, ChTi, and ChAl were 35.68, 43.62 and 45.38 mg/g respectively. Adsorption capacities increased with the increase in temperature from 283 K to 313 K and decreased above 313 K. Also, the amounts of nitrate adsorbed on the three adsorbents were found to decrease at higher crosslinker dosage. Among the three adsorbents, ChAl has shown highest stability and performance in all operating conditions.

Biography

Wondalem Misganaw Golie has completed his BTech in 2007, in Chemical Engineering and MTech in 2010. Currently, he is a PhD Research Scholar in the Department of Chemical Engineering at Indian Institute of Technology, Delhi, India.

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