Ind Chem 2018, Volume 4
DOI: 10.4172/2469-9764-C1-009

Passive biosorption of heavy metal ions to plant-derived materials: Investigations of responsible chemical interactions

Gary D Rayson
New Mexico State University, USA

Waste water remediation using biosorption of toxic heavy metal ions by plant materials provides many desirable characteristics. Selective removal of heavy metal ion pollutants in the presence of benign metal ions offers significant advantage for biogenic sorbents relative to commercially synthesized materials. Unfortunately, implementation of these materials for waste water treatment has been limited by their inherent chemical complexity. Gain an understanding of the responsible fundamental chemical interactions has been the focus of our research for several years. We initially selected for these studies, materials derived from the plant Datura innoxia. Because of the chemical complexity of this material, the application of multiple, orthogonal probes were required to study metal ion biosorption to these materials. We have utilized an arsenal of techniques involving luminescence spectroscopy with extraction of thermodynamic parameters governing these interactions. Carboxylate moieties were initially identified as primarily responsible for metal ions sorption. These chemical interactions involved both formation of surface complexes and the involvement of electrostatic attraction to the negatively charge biomaterial. In later work, these studies were expanded to include variations in tissue types from both the same and different plant species. The impact of these findings on the potential of biosorbents for contaminated water treatment will be discussed.