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Improving the adsorptive properties of biomaterials for the removal of heavy metals

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Author's research group has emphasized in the use of lignocellulosic materials such as spent tea leaves for the elimination or inorganic and organic pollutants from solutions. Very positive results have been observed by using different spent teabags. This work addresses the incorporation of oxidized and sulfur-based functional groups such as thiolation, sulfonation and carboxylation onto the surface of the adsorbents to maximize their adsorption capacities. Tea leaf wastes were pre-treated by Soxhlet extraction prior their chemical modification. Adsorption experiments were conducted in batch conditions at room temperature to study the removal of copper, zinc and cobalt metals ions from solutions at neutral pH. Preliminary results indicate that, in average, carboxylation is the most efficient chemical modification, followed by sulfonation. Surprisingly, thiolation had a negative effect of the adsorption of all metals using the three adsorbents. Native and chemically-modified samples were characterized by scanning electron microscopy to explore changed in the surface of the samples, whereas infrared spectroscopy was used to monitor the success of the reaction. Chemical procedures were also carried out to determine the increase in acidic groups on the surface of the adsorbents. More experiments are currently being carried to determine the optimum reaction conditions for the chemical modification of the adsorbents.

Biography

Abel E Navarro received his PhD degree in Biomolecular Chemistry at New York University. Now, as a junior Faculty at BMCC, he is developing new bioremediation alternatives for the elimination of pollutants from wastewaters as biodegradable and recyclable materials that can compete with the currently available techniques. He has a publication record of more than 35 articles in specialized and peer-reviews journals, he is Associate Editor in different journals and has participated and chaired session in several conferences. The authors would like to thank CSTEP and the Science Department at BMCC for the financial support. He is recipient of the BMCC Faculty Development Grant and BMCC Presidential Scholar.

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