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Bioremediation of pollutants from pharmaceutical residual waters with marine algae and derivatives

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The growth of pharmaceutical industries and the constant development of more potent and selective drugs has created a major concern about the proper disposal of these substances. Antibiotics, analgesic and other drugstore products have been listed as top priority pollutants by the US-EPA and other international agencies. On the other hand, biodegradable adsorbents are being developed for the treatment of contaminated waters due to their low cost and efficiency in the removal of organic and inorganic pollutants. This research proposes the use of different types of Puerto Rican marine algae and hydrogel beads of alginate and chitosan for the bioremoval of antibiotics: Enrofloxacin, Amoxicillin, Penicillin G and other drugs such as caffeine. Batch experiments were conducted to determine the experimental conditions at which the adsorption of these compounds are maximized. Parameters such as pH, salinity, adsorbent dose, initial drug concentration, and the presence of interfering substances were studied at room temperature. Results indicate that raw brown algae *Sargassum* sp. is the best adsorbent under the working conditions and can be easily applied to real waste-waters. Conversely, caffeine only showed a decent adsorption with hydrogel beads, reporting a preference for chitosan hydrogel beads. Finally, adsorbents were characterized by chemical and instrumental techniques to explore the adsorption mechanism. These results provide further insight into the application of marine algae and derivatives as potential adsorbents for pharmaceutical products, as an inexpensive and eco-friendly alternative.

Biography

Abel E Navarro received his PhD degree in Biomolecular Chemistry at New York University. Now, as a Junior Faculty Member at BMCC, he is developing new bioremediation alternatives for the elimination of pollutants from wastewaters as biodegradable and recyclable materials that can compete with currently available techniques. He has a publication record of more than 50 articles in specialized and peer-reviewed journals and is Member of several Editorial Boards. He would like to thank BMCC and PNICP (project ECIP-1-P-042-14) for the financial support. This project was also sponsored by UPRRP Center for Renewable Energy and Sustainability and the HSI-STEM grant from the US Department of Education.

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