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Tackling eutrophication with naturally-occurring materials in batch experiments

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Eutrophication is the undesired growth of organisms in a confined water body. The most important compound responsible for this phenomenon is phosphate. Phosphates are mainly discharged into water resources from agriculture and fertilizer industries. This study evaluates the potential of raw spent peppermint tea (PM), spent green tea (GT), powdered purple corn cob (PC) and powdered yellow corn cob (YC) as adsorbents of phosphate from aqueous solutions. Batch experiments at room conditions were carried out as a function of pH, adsorbent dose, initial concentration of phosphate and presence of salts and heavy metals. Maximum adsorption capacity was observed at pH 10 with a minimum mass of 50 and 75 mg for YC and PC, respectively. Equilibrium data were fitted to the most important isotherm theories, obtaining a maximum adsorption capacity of 34 and 42 mg/g for YC and PC, respectively under the Sips, Redlich-Peterson, Temkin and Langmuir mathematical theories. Salts and heavy metal experiments confirmed a strong electrostatic adsorption mechanism for PC and a mixed electrostatics/size affinity for YC. The use of raw PC and YC opens up new alternatives of inexpensive and environment-friendly adsorbents for phosphate.

Biography

Abel E. Navarro received his PhD degree in Biomolecular Chemistry at New York University. Now, as a junior Faculty at BMCC, Prof. Navarro is developing new bioremediation alternatives for the elimination of organic and inorganic pollutants from wastewaters in batch and continuous-flow experiments. His main target is the development and chemical modification of natural materials that are cost-effective and comparable to the currently available decontaminating techniques. Navarro has a publication record of more than 30 papers in specialized and peer-reviewed journals and has participated in several conferences. He also serves as Associate editor and reviewer in many journals across the world.

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