Linnaeus ECO-TECH 2022
Kalmar, Sweden, November 21-23, 2022

LUFFA CYLINDRICA AS ADSORBENT FOR REMOVAL OF ENDOCRINE DISRUPTORS FROM AQUEOUS SOLUTION: PRELIMINARY KINETIC STUDY

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Abstract
The partial or complete removal of persistent organic pollutants during conventional water treatment for human supply, urban sewage and industrial effluents raises concern about the adverse effects that these substances can trigger in ecosystems, as well as the risks to human health, especially regarding possible effects of endocrine disruption posed by these compounds. Thus, it is essential the improvement of treatment systems, focusing on the removal of these contaminants through the development and application of efficient and feasible alternative techniques from the environmental and economic points of view. Sorption processes with natural porous materials have been increasingly applied in studies of organic contaminants removal. In the present investigation, the kinetic behavior of the vegetal sponge *Luffa cylindrica* was evaluated for the sorption of two endocrine disruptors: Bisphenol A (BPA) and 17-α ethynylestradiol (EE2) in ultrapure water. The kinetic studies were submitted to two conditions of pH (4 and 7) with adsorbant concentration of 50 μg L^{-1}, contact time of 240 min and temperature of 25°C and applied to five kinetic models: pseudo first-order model, pseudo second-order model (PSO), Weber and Morris, Elovich and Bangham models. The pH 4 promoted better performance in obtaining promising kinetic curves for both analytes tested. The experimental data obtained followed the predicted by the PSO model for BPA and EE2, with R^2 = 0.9983 and 0.9981, respectively. The equilibrium times achieved by the kinetic experiment of the biomaterial were 95 min for both BPA and EE2. The adsorption mechanism assumes that the rate-limiting step is chemisorption. In this condition, the adsorption rate is dependent on the adsorption capacity not on concentration of adsorbate. *Luffa cylindrica* proved to be a promising biomass to be used in conjunction with water treatment systems requiring a 2-hour process, as well as being suitable for use in the preparation of environmental samples in extraction techniques.

Keywords: Adsorption, *Luffa cylindrica*, Bisphenol A, 17-α ethynylestradiol, Kinetic

ISBN: 978-91-89460-85-0