



Adsorption isotherm and kinetics of nonylphenol by chemically modified fish scales of *Rastrelliger neglectus* as low- cost adsorbents

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The adsorption of nonylphenol (NP), an endocrine disrupting chemicals, was investigated by chemically modified fish scales of *Rastrelliger neglectus* (CHFSS). Thermally pretreated fish scales were treated with 20% v/v HCl, followed by deproteinization with 0.01 M NaOH in order to produce the significant organic fraction in fish scales. The chemically modified fish scales (CHFSS) were characterized using Fourier transform infrared spectroscopy (FTIR). Compared with fish scales without modification, CHFSS improved the adsorption capacity for nonylphenol. The adsorbent efficiency depended on contact time and adsorbent dosage. The adsorption process was found to follow pseudo-second-order kinetic model with high correlation coefficient (R^2). The equilibrium adsorption showed that the Langmuir isotherm provided the best fit to the experimental data with a maximum adsorption capacity of $0.276 \text{ mg}\cdot\text{g}^{-1}$. Nonylphenol adsorption ability was related to the fish scale components. The aim of the study was to investigate that the organic fraction plays an important role for adsorption of nonylphenol, causing bioaccumulation in fish. Knowing this information is very interesting for understanding one of the contamination pathways for toxic chemicals in living organisms.

Keywords: Fish scales; Nonylphenol; Adsorption isotherm; Kinetics