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Comparison for adsorption of tetracycline and cefradine using biochar derived from seaweed *Sargassum* sp.

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ABSTRACT

Surface properties of biochars derived from seaweed *Sargassum* sp. were observed as obvious difference to those from agricultural wastes. In this study, the adsorptive removal of two types of antibiotics, tetracycline (TC) and cefradine (CF), on the biochar were compared and discussed herein. The rod-like tissues of the raw seaweed swelled to be spindle-like at pyrolytic temperature above 400°C. The carbon content was increased from 22.9% of the raw seaweed to 37.2% of the biocharpyrolyzed at 600°C (BC600), while the oxygen content was just increased slightly from 24.7% to 27.8%. The uptake of both TC and CF on the biochar was found to be pH-dependent. The maximum adsorption capacities of TC and CF calculated from the Langmuir model were 128.1 and 61.7 mg/g, respectively, while more CF molecules were adsorbed on biochar at a low adsorbate concentration. Both the Coulombic interaction and π–π electron-donor-acceptor interaction between seaweed biochar and CF/TC molecules played the predominant roles during the adsorption process. The experimental data was well fitted by the pseudo-second-order kinetics model, indicating a possible chemisorption process to some extent. Isotherm result implied that both surface adsorption and partitioning contributed to the uptake of TC and CF onto BC600.

Keywords: Adsorption; Seaweed biochar; Tetracycline; Cefradine; Mechanism

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