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REMOVAL OF AMOXICILLIN AND AMPICILLIN FROM AQUEOUS SOLUTION BY USING *Bacillus cereus* AND GRANULAR ACTIVATED CARBON (GAC)

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Antibiotics, such as ampicillin (AMP) and amoxicillin (AMX), are impossible to remove even by sewage treatment. Their continuous introduction to the environment poses serious ecological risks. In the present study, removal of AMP and AMX from antibiotic contaminated water was evaluated by using standard particle size (0.5 mm) of granular activated carbon (GAC) [bamboo (*Bambusa* sp.), coconut shells (*Cocos nucifera*)], along with introduction of the bacterium *Bacillus cereus* which was previously recorded as apotent degrader of AMP and AMX. Five grams of GAC (bamboo/ coconut) was added into 100 mL of deionized water which was spiked by the antibiotic at a final concentration of 100 µg mL^{-1}. The effect of bacteria on degradation of antibiotic was evaluated by adding 1.0 mL of overnight grown, starved, equalized (A_{590nm}= 0.35) bacterial suspension to GAC. Triplicate experimental and control setups were incubated at 28 °C with shaking at 200 rpm until equilibrium was reached. One mL sub samples were removed at 24 h interval for a period of 8 days and subjected to centrifugation at 2500 rpm for 10 min followed by freeze drying. Antibiotics in samples were analyzed using high performance liquid chromatography (HPLC). The coconut based GAC removed 78% of AMP and reached the equilibrium after 4 days of incubation, whereas AMX removal percentage was 95% and reached equilibrium after 2 days. Bamboo GAC completely removed AMP and AMX at 3 days and 2 days, respectively. Addition of *B. cereus* to the GAC showed enhanced removal percentage of antibiotics. The complete removal of AMX (bamboo, 1 day; coconut, 5 days) and AMP (bamboo, 2 days; coconut, 7 days) were detected when the system was treated with *B. cereus*. Therefore, in the present study bamboo with bacterial inoculation was identified as the most efficient and a low cost solution for the removal of antibiotics in ß- lactam (AMX,AMP) group from wastewater.

Keywords: GAC bamboo, GAC coconut, ampicillin, amoxicillin, *B. cereus*

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