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Biodegradation of Natural Estrogens by Biofilms from Biological Activated Carbon: Effect of Temperature

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ABSTRACT

In order to obtain information on the biodegradation potential of biofilms involved in the removal of natural estrogens by biological activated carbon (BAC) columns, batch degradation of estrone (E1) and 17*β*-estradiol (E2) at temperature of 5℃, 20℃ and 35℃ by biofilms from four BAC columns (packed with activated carbon of particle size ranging from 0.5 - 0.59 mm and 1.0 - 1.19 mm into two bed depths) was studied. The results indicated that E2 was degraded faster by than E1 at all three temperatures and with the increasing of temperature, the amount of E1 converted from E2 increased. By fitting observed concentration data with a first-order rate expression, the bio-mass based degradation rate constants (*k*VSS) for E1 and E2 under all experimental conditions were estimated and linear relationship between ln*k*VSS and 1/T (T = absolute temperature) was demonstrated, resulting that with the increasing of the experimental temperature, degradation rate of biofilms for both E1 and E2 increased, and the increasing rate for E2 was higher than that for E1.

KEYWORDS

Estrogens; Biofilms; Temperature; Biodegradation; BAC Columns

Cite this paper

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