

Removal of *Escherichia coli* from biological effluents using natural and artificial mineral aggregates

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Abstract

Ability for disinfecting sterile biological effluents inoculated with *Escherichia coli* ATCC 25922 at concentrations of 10^5 CFU/ml, using a natural mineral aggregate (NMA) and artificial mineral aggregates (AMA's) consisting of individual oxides as Fe_2O_3 , Cu_2O y Ag_2O and combined oxides as Fe_2O_3 - Cu_2O , Fe_2O_3 - Ag_2O , Cu_2O - Ag_2O , Fe_2O_3 - Cu_2O - Ag_2O , contained in alginate beads, was compared. The results indicate that Ag_2O and Fe_2O_3 - Ag_2O , Cu_2O - Ag_2O combinations, as well as NMA, inactivated 100% of *E. coli* in 30 min, whereas the oxides mixture, Fe_2O_3 - Cu_2O - Ag_2O , took 13 min. It was observed that redox potential values were closely related to the disinfection level achieved. The advantage resulting from using alginate beads was that these allow the formation of AMA, which has higher disinfectant ability relative to NMA.

Keywords: disinfection, biological effluent, Fe_2O_3 , Cu_2O and Ag_2O , alginate beads, *Escherichia coli*, natural mineral aggregate, artificial mineral aggregate