01.008 - USING TiO2-BIOCHARCOAL FOR PHOTODISINFECTION IN WATER CONTAMINATED WITH ESCHERICHIA COLI. Ferro, D. M.; Kotani, P. O.; Pavarin, L.; Affonso, R.; Ortiz, N.. Centro de Química e Meio Ambiente, Instituto de Pesquisas Energéticas e Nucleares, São Paulo; Centro de Biotecnologia, Instituto de Pesquisas Energéticas e Nucleares, São Paulo.

Ferro, D. M. ,

Centro de Química e Meio Ambiente e Centro de Biotecnologia - IPEN

Introdução:

Along the years water availability reduced as the population increased, polluted hydric bodies became a very alarming problem. Due to the water availability and quality decay cientists developed disinfection procesess as Advanced Oxidation Process (AOP). The use of a catalyst with photocatalytic activity can enhance hydroxyl radicals (OH?) production for disinfection and pollutants degradation. In this present work the TiO2-Biocharcoal is used to promote inactivation of Escherichia coli on water; experiments proved that this disinfection system is sucessfull, indicating that this can be a good alternative to existing water treatments.

Objetivos:

Evaluate the use of TiO2-Biocharcoal in the photodisinfection process in water contaminated by Escherichia coli.

Métodos:

TiO2 synthesis using sol-gel process with titanium isopropoxide and Biocharcoal powder as a biotemplate, after the acid hydrolisys the material suffered a drying process that lasted overnight at a 100°C. The photodisinfection test occurred with the Escherichia coli strain DH5a grown in the laboratory and 0.05 g of TiO2-Biocharcoal; both were added to a suspension in the experimental reactor. The total reaction lasted for 60 minutes in the solar chamber with all parameters controlled. The collected suspension aliquots started in the minute 0 before the reaction, the others in the minutes 15, 30, 45 and 60 of agitation and light exposure. The Petri plated aliquots were on LB Agar and after 16 hours of incubation the counting of the emerged colonies was made by the software (OpenCFU). For bacterial counts and kinetic calculations 6 samples were selected for this work.

Resultados:

The Scanning Electron Microscopy (SEM) micrograph presented the TiO2-Biocharcoal enhanced surface area and microstructure obtained by biotemplate addition in the synthesis of the catalyst, also, the X-Ray Difratometry (XRD) indicated that the crystalline structure of the material correspond with the anatase form which is the most suitable structure for photocatalysis. The bacterial

inactivation percentage was above 90% for 1 hour of solar radiation exposure. Kinetics models indicated better correspondence with the Hom model.

Conclusão:

The inactivation of the Escherichia coli strain DH5a was sucessfull with the adition of 0.05 g of TiO2-Biocharcoal in the sample; this was confirmed by the photodisinfection kinetics studies. The use of solar energy to promote disinfection is a sustainable alternative and generates less toxic products than treatments based on the use of chlorine, representing an option for remote areas that do not have infrastructure and access to conventional water treatments.

Apoio Financeiro:

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