

## **Water removal of oxytetracycline using titanium dioxide/solar photodecomposition and biocarbon adsorption**

**G.M. Gonçalves; G.N.S. Lima; M.V. Macedo; N. Ortiz\*.**

Centre of Environmental Chemistry – CQMA  
Institute of Nuclear and Energy Research – IPEN  
Av. Lineu Prestes, 2242 – USP São Paulo - Brazil

\* nortiz@ipen.br

Oxytetracycline (OTC) is a broad-spectrum antibiotic with efficacy against infections, high solubility in water and used both in veterinary and human medicine, primarily in poultry and livestock, but also for human consumption. Nowadays Brazil is the higher protein producer in the world, and the agribusiness is the strongest economy sector in the country. The OTC use is increasing in veterinary medicine and also its detection in surface water resources and sewage treatment effluents. The conventional water treatment processes have to improve to enhance the pharmaceuticals removal efficiency. The occurrence of OTC in the natural environment can affect the selection of genetic variants of resistant microorganisms, inducing a risk to the ecosystem and human health. The experiments started with the dilution of standard oxytetracycline solution. They solutions were preheating before the addition of  $\text{TiO}_2$  and kept in a solar radiation chamber during 120 minutes. The addition of micronized biocarbon (diameter < 500 mesh) in all collected suspension aliquots followed by shaking, and centrifugation at 1500 rpm for 15 minutes allows the supernatants OCT measurements at UV – Visible Spectrophotometer Cary 13 at  $\lambda = 268 \text{ nm}$  and  $373 \text{ nm}$ . The absorbance values were converted to antibiotics concentration using an analytical curve prepared with standard antibiotics solutions. After the processes optimization, the OCT removal percentage reached 95% with pseudo-second-order kinetics and better isotherm agreement with Langmuir  $R^2 = 0.689$  and Redlich-Peterson with  $R^2 = 0.738$ .