

HETEROGENEOUS PHOTOCATALYSIS DEGRADATION OF WASTED DRUGS IN WATER MATRIX BY COMBINED UV/VIS/MICROWAVE

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In surface waters we can find increasing levels of drugs due to the not proper disposal, to the not full metabolism from human and animal organisms and to the unsuitability of the Sewage Treatment Plants to remove these pollutants.

EU has managed some research projects (ERAPharm, AquaStress, Rempharmawater, Eravmis, Poseidon) finalised to evaluate this new form of pollution and to remove it.

The main results of these projects point out that advanced oxidation processes and the catalysed photodegradation are the most promising, among the catalysts anatase TiO₂ being shown the best one on irradiating with UV light. Irradiation occurs by the near-sun spectrum and UV spectra centred at 254 nm. It must be observed anyway that photodegradation does not always mean mineralisation so that in some cases more toxic compounds than the original ones can be formed; a toxicity test being consequently needed to ensure that a decrease of the toxicity level is obtained and so that degradation is helpful.

In this work a new photodegradation process is proposed, the innovation being represented by the microwave assistance. Target molecules are some common drugs.

This assistance was realised by means of a laboratory extraction-reaction microwave-oven, modified by us to obtain pulse modulation and temperature control.

Using pulse modulation it is possible to obtain interaction of UV-Vis and microwave without thermal effects.

The results show that the microwave assistance results in a more efficient process, up to 200%, able to reach a 95 % degree of removal for most of the tested pharmacological principles.