

## Photochemical treatment for water potabilization. Influence of wavelength and hydrogen peroxide concentration on the reduction of trihalomethanes

Sergio Navalon<sup>a</sup>, Mercedes Alvaro<sup>a</sup>, Hermenegildo Garcia<sup>a\*</sup>, Lorenzo Monforte<sup>b</sup>

<sup>a</sup>Department of Chemistry, Universidad Politecnica de Valencia, Camino de Vera S/N, Valencia, Spain

Tel.: +34 96 387 7807; Fax: +34 96 387 78 09; email: hgarcia@qim.upv.es; malvaro@qim.upv.es

<sup>b</sup>Aguas de Valencia S.A., C/ Dels Pedrapiquers (Polígono Vara de Quart), Valencia, Spain

email: lmonforte@aguasdevalencia; sernaol@doctor.upv.es

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### ABSTRACT

Pre-chlorination, a common practice consisting of addition of a large chlorine dosage at the entrance of the water treatment plant, is responsible for the formation of a large percentage of the final trihalomethane (THM) content. In order to reduce the THM formation potential of potable waters, it is of interest to develop alternative potabilization treatments that could replace pre-chlorination. In this work we report the results obtained for the natural waters of Turias's River (Valencia, eastern Spain) with a photochemical treatment using a 500 L continuous flow photoreactor adapted in a pilot plant. Under optimized conditions (100 L/h, twelve 36 W lamps 185 nm, 44 ppm of hydrogen peroxide), reduction efficiencies of 41% THM formation potential and 49% of total organic carbon were accomplished. These remarkable results contrast with those obtained under analogous conditions using the same plant but with 254 nm lamps. In the latter case, although the reductions in total organic carbon were also substantial (40%), the relative decrease in THM formation potential of the treated and untreated water was significantly lower (11%). A reasonable explanation based on the depth of light penetration is given to rationalize the lower THM potential reduction of the 254 nm lamps compared to 185 nm lamps.

**Keywords:** Advanced oxidation process; Photochemical treatment; Potabilization treatment; Trihalomethane reduction

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\* Corresponding author.