



It is a growing concern about the presence of emerging contaminants in different types of water. Persistent organic pollutants (POPs) have been identified as an increasing problem in our drinking water supplies. Such substances can enter the water supply from various sources and are not effectively removed by conventional water treatment processes.

Importance

Therefore there is a need for new technology and processes that can remove harmful compounds and POPs at low concentrations.

Approach

This study presents the use of a V-UV/UV/TiO₂ reactor (M300 water purifier®) for the removal of sulfamethoxazole and atrazine from natural water. The efficiency of the different processes (photolysis, Vacuum UV (V-UV) and photocatalysis) within the photoreactor was investigated using par-chlorobenzoic acid (pCBA) which is a good probe for hydroxyl radicals. The effect of pH, dissolved organic carbon (DOC) and total inorganic carbon (TIC) was also studied.

Result

V-UV was found to be the most efficient process for pCBA degradation within this unit. No photocatalytic degradation was observed. The water quality largely affected the efficiency of the system. Indeed, both DOC and TIC lowered the hydroxyl radical concentration in the system, but DOC did it to a larger extent. Atrazine and sulfamethoxazole, were successfully degraded, and as for pCBA, V-UV was the most efficient process. Sulfamethoxazole displayed a better removal by photocatalysis than atrazine and pCBA. In addition, there was a larger contribution of photolysis during the degradation of sulfamethoxazole than of atrazine. The UV254 nm absorbance of the water affected the photolysis of sulfamethoxazole which has a high molar extinction coefficient and quantum yield at 254 nm, while the DOC is mainly competing with the pollutants for the hydroxyl radicals.

More information

This study has been published in Water Science and Technology: Water Supply, Vol. 9, No 6, pp 653-660, 2009, under the title: "Persitent organic pollutants (POPs) degradation in natural waters using a V-UV/UV/TiO₂ reactor". For further information contact:

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