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DEGRADATION OF BISPHENOL A AND PYRENE FROM HIGHWAY RETENTION BASIN WATER USING ULTRASOUND ENHANCED BY UV IRRADIATION

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Abstract

Due to the so-called road run-off, many various contaminants including Bisphenol A (BPA) and Pyrene (PYR) could enter the environment and retention basins. It was also suggested in the literature that their removal by using conventional treatment methods could be problematic, and modern techniques should be developed. In this study, the first attempt to remove BPA and PYR by using ultrasonication as a single process and with UV irradiation assistance was performed. The results showed that after 30 min of sonication, the degradation rate of BPA reached 92% while PYR was completely removed, however, after 1 min of the treatment degradation rate of BPA was significantly higher than PYR. In the study effect of pulsed ultrasound was also evaluated and it was found that its effectiveness in micropollutants removal could be higher than ultrasonication in continuous mode. Research revealed that the maximum removal rate of BPA and PYR was obtained during the ultrasonication process combined with UV irradiation-30 min of treatment resulted in 95% of BPA degradation. However, toxicity assessment showed that with an increase in the treatment time, an increase of toxic effects occurs. This phenomenon might be related to degradation of by-products formation which were identified in the study.

Keywords: Retention basin water, Ultrasound, UV irradiation, Water treatment.