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OPTIMIZATION OF BP-3 ULTRASOUND DEGRADATION IN A MULTIFREQUENCY REACTOR USING RESPONSE SURFACE METHODOLOGY**Lina Patricia Vega Garzon^a, Ingrid Natalia Gomez Miranda^a, Gustavo A. Peñuela^a**

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ABSTRACT

Response Surface Methodology was used for optimizing operating variables for a multi-frequency ultrasound reactor using BP-3 as a model compound. The response variable was the Triclosan degradation percent after 10 sonication minutes. Frequency at levels from 574, 856 and 1134 kHz were used. Power density, pulse time (PT), silent time (ST) and PT/ST ratio effects were also analyzed. 2^2 and 2^3 experimental designs were used for screening purposes and a central composite design was used for optimization. An optimum value of 79.2% was obtained for a frequency of 574 kHz, a power density of 200 W/L, and a PT/ST ratio of 10. Significant variables were frequency and power level, the first having an optimum value after which degradation decreases while power density level had a strong positive effect on the whole operational range. PT, ST, and PT/ST ratio were not significant variables although it was shown that pulsed mode ultrasound has better degradation rates than continuous mode ultrasound; the effect less significant at higher power levels.

Keywords: Benzophenone 3, Advanced Oxidation Processes, Sonochemistry, Response Surface Methodology, Pulsed Mode Ultrasound.

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