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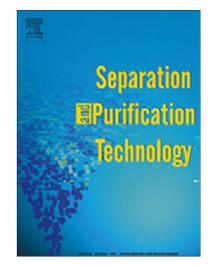
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## CCEPTED MANUSCRIPT

Decomposition of chloroform and succinic acid by ozonation in a suction-cavitation

system: Effects of gas flow

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**ABSTRACT** 

The conductivity of aqueous solutions containing 1 mM chloroform increases upon the chloroform

decomposition that is induced by hydrodynamic cavitation in the suction-cavitation system. However, the

rate of increase in conductivity (RIC) drops significantly, from 1.314 µS cm<sup>-1</sup> min<sup>-1</sup> without gas flow to 0.552

μS cm<sup>-1</sup> min<sup>-1</sup> with 25 mL min<sup>-1</sup> of air flow. The RIC decreases further with increasing air flow, until pseudo-

zero growth is reached at 200 mL min<sup>-1</sup> air flow. Introducing O<sub>3</sub> at 33 mL min<sup>-1</sup> gas flow (effective

cavitation) improves RIC, from 0.4193 to 0.5509 µS cm<sup>-1</sup> min<sup>-1</sup>, but the enhanced rate (31.4%) is lower than

at 200 mL min<sup>-1</sup> of gas flow (little effective cavitation). The concentrations of dissolved O<sub>2</sub>, O<sub>3</sub> and H<sub>2</sub>O<sub>2</sub>,

that is formed on-site, increase with increasing gas flow and orifice plate hole diameter. Succinic acid (0.42

mM) is not oxidized by O<sub>3</sub> or H<sub>2</sub>O<sub>2</sub> alone, but is rapidly degraded by a combination of O<sub>3</sub>/H<sub>2</sub>O<sub>2</sub> in the

suction-cavitation system. The degradation rate of zero-order kinetics increases from 2.604 to 4.788 µM min

as orifice diameter increases from 5 to 8 mm. Increasing O<sub>3</sub> gas flow and temperature favour SA

degradation. Increasing H<sub>2</sub>O<sub>2</sub> concentration is more effective in producing OH radicals and promoting the

oxidation of succinic acid than increasing O<sub>3</sub> input amount.

Keywords: Chloroform; Succinic acid; Decomposition; Ozonation; Hydrodynamic cavitation.

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