TOC reduction using Fenton and sono-Fenton process as membrane distillation pretreatment

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ABSTRACT

Reduction of total organic carbon was focused in seawater with humic acid (HA) by one of the most important methods of advanced oxidation process. Among the advanced oxidation processes, Fenton processes are cost effective and use green oxidizing agent hydrogen peroxide, which is safer than other oxidizing agents, while sono-Fenton has shown some enhanced hydroxyl ion generation that results in faster oxidization of organic matter. Concentration of chemicals was varied as 2–4 mL L^{-1} of H_2O_2 along with 0.2–0.4 g L^{-1} of ferric sulfate as a catalyst considering ratio of ferric to H_2O_2 as 1:10, which is optimized one found in previous research. Results showed that sono-Fenton is more effective than Fenton only in case of HA as well as in case of seawater with HA. Fenton produces large sludge while sono-Fenton did not show higher amount of sludge in this case. This is because of synergistic effects of ultrasonic waves, which have also effect on water molecules as well as boost up power of hydrogen peroxide oxidative species.

Keywords: Fenton; Sono-Fenton; Membrane distillation; Pretreatment; Humic acid

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