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Degradation of diethanolamine by Fenton's reagent combined with biological post-treatment

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ABSTRACT

Effectiveness of the Fenton's reagent for partial degradation of diethanolamine (DEA) prior to biological treatment is investigated. The effects of the major process parameters on the time evolution of COD, an indicator of the extent of degradation, were measured. The DEA concentration ranged from 800 to 16,000 ppm, in consideration of the COD of real effluents of natural gas processing plants. The initial reaction rate was a strong function of the feed amine concentration. About 70–80% of the ultimate COD removal could be achieved within 3 min. The pH of the medium was varied over 1–4; the best results were obtained at pH 3. The effectiveness of a hybrid scheme of advanced oxidation followed by biodegradation was explored. Activated sludge from a local wastewater treatment pond was used. Fast COD removal of the partially degraded DEA was achieved within a day. Biodegradation of pure DEA was much slower, apparently because of the acclimatization time of the microbes.

Keywords: Diethanolamine; Advanced oxidation; Fenton's reagent; Biodegradation

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