

APPLICATION OF FENTON PROCESS FOR COD AND PHOSPHORUS REMOVAL OF CATTLE MANURE EFFLUENTS

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Abstract

Advanced oxidation processes (AOPs) are series of new, novel technologies in wastewater treatment. Such processes are able to treat high organic loading rate and toxic wastewaters by means of chemical oxidation. Fenton process, as an important subunit of AOPs, is a kind of newly enhanced methods that is used in wastewater treatment plants (WWTP). The reaction consists of at least two essential chemical compounds: H_2O_2 as an oxidant and $FeSO_4$ as catalyst which are used in oxidation process. For ease of operation (running at room temperature and atmospheric pressure), it does not required long retention time and cost-effectiveness of the chemicals are some of the advantages that are reported in literatures. Results of number of experimental data in different fields of studies such as textile, cosmetic, dye, olive-oil mill and pharmaceutical wastewater proved that it would be capable method in recalcitrant compounds removal like specific antibiotics. It is also able to decrease high organic and inorganic contaminants like phosphorus, heavy metals or particular dyes. In present study, the feasibility of Fenton reaction on COD and phosphorus removal of livestock wastewater is investigated. A COD removal of 84% was obtained at the optimum conditions such as H_2O_2/COD and H_2O_2/Fe^{2+} ratio of 0.067 and 1.23, respectively. In addition, total phosphorus removal was calculated 99%. The results approved that Fenton process can be used as an effective pre- or post-treatment stage or even utilized as a single treatment process.

Keywords

Advanced oxidation processes, Fenton, Chemical oxygen demand, Scavenge; Hydroxyl radical, Cattle manure effluent