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COLOR AND COD REMOVAL FROM POULTRY LITTER LEACHATE USING AN OZONATION PROCESS

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Abstract

Effectiveness of ozone oxidation reaction for removal of color and chemical oxygen demand (COD) from poultry litter leachate was investigated. The poultry litter leachate (PLL) was prepared using a locally fabricated triple bed arrangement. The leachate was ozonated at its original pH for different periods in order to examine the effect of ozone dose on color and COD reduction. After 54 minutes of ozonation of PPL at its original pH 7.86, 73% of color and 50% of COD were reduced. The effect of initial pH was studied by adjusting pH of the leachate at 5, 7 and 9. Ozonation at an initial pH 7 removed 77% of color and 58% of COD after 54 minutes of ozonation. Statistical analysis revealed that decolorization of the leachate was independent of initial pH while COD reduction was a function of an initial pH value. An acidic pH of 5 decarbonated the leachate and molecular ozone reaction mechanism resulted in the higher removal efficiency. On the other hand, a basic pH of 9 was confronted with high alkalinity and increased self decomposition resulted in the loss of oxidant. The process was optimized at 18 minutes of ozonation time with a sequential pH adjustment.

Key words: alkalinity, color, COD, ozonation, poultry litter leachate

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