



PATHOGENS DEGRADATION FROM MUNICIPAL WASTEWATERS BY DIFFERENT OZONE DOSIFICATION STRATEGIES

Evelyn Zamudio*; Luis G. Torres*; Isaac Chaírez*

* Unidad Profesional Interdisciplinaria de Biotecnología. Instituto Politécnico Nacional
Av. Acueducto s.n. Colonia Barrio la Laguna Ticomán. México 07340 D.F. México.

Email: nyleve1004@hotmail.com

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Introduction. The wastewater in Mexico is highly contaminated with microorganisms (1). These wastewaters used to irrigate consuming vegetables represents a high risk to the human health. Ozone has proven to be one of the most effective disinfectants and is widely used to inactivate pathogens in drinking water (2). During ozonation, reactions are favored depending on the pH value (3).

In this study, the effect of contact time ozone and the change in the pH over the reduction of pathogens and organic matter in municipal wastewater (MWW) was analyzed. As result of this study, we obtained removals of 82% (turbidity), 72% (COD), 100% for total and faecal coliforms and 82% of helminth eggs.

Methods. *Ozonation.* WW ozonation was carried out using an ozone flow of 0.5 L/min and a concentration of 6, 15 and 30 mg/L; pH values of 4, 7 and 11. At seven different times (0, 5, 10, 15, 20, 25 and 30 min).

Analytical methods. The decrease of physicochemical parameters such as turbidity and chemical oxygen demand (COD) (4), pathogen organisms such as total coliforms (TC), fecal coliforms (FC) (5) and Helminth eggs (6) were measured. The UV-Vis spectrum was performed, of 200 to 700 nm in length follow the organic matter decomposition.

Results. The best DQO removal (72%) was obtained when pH was fixed to 7 and the ozonation time was 30 min. Turbidity was decreased 82% under the same reaction conditions. Higher pH values (11) was not showing a superior effect on the DQO and turbidity removal because the nature of the wastewaters.

TC and FC were completely removed from the treated water under all the different operating conditions. This confirm the relative effectiveness of ozone to disinfectate the wastewaters used in this study.

On the other hand, a faster chemical decomposition was observed when pH was fixed to 4 and 11. Interestingly, it seems to be no significant effect of ozone dose under the

after mentioned conditions. The HE removal was 82% in average for all the studied cases. UV/VIS analysis showed a general reduction of organic matter after ozonation. Indeed, some characteristic regions of the spectrum showed an important decrease of absorbance. A simple kinetic study was performed to show how fast the elimination of organic matter is. This study was done assuming a second order reaction. The kinetic parameters were used to characterize the ozonation efficiency for municipal wastewater treatment as well as its disinfection.

Conclusions. The better COD and Turbidity removals were obtained at pH 7, and a total removal in the pathogens at pH 4 and 11. Basic and acid pH showed positive influence for the microbiological parameters analyzed in this study.

Ozonation time was not the key factor to obtain the highest COD removal. The UV/VIS study confirmed the organic matter reduction and the elimination of specific organic groups.

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