

Narisa Jitwongwai 2014: Use of Combustion Exhaust Gas for Disinfection of Wastewater Treatment Plant Effluent. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Patchraporn Rerkrai, D.Eng. 86 pages.

High pressure CO<sub>2</sub> disinfection was found to effectively inactivate many types of pathogens. Supercritical CO<sub>2</sub> was developed for water disinfection. The objectives of this study are to investigate the inactivation effectiveness on fecal coliform by using CO<sub>2</sub> produced from fuel combustion at various pressures in the range of 0.1-0.4 mega-pascals (MPa) with varying contact time from 5 to 25 minutes, and to compare the results with similar study using ambient air at the same pressure and detention time. In order to ensure the validity for effectiveness of the CO<sub>2</sub> produced from fuel combustion, the inactivation effectiveness on heterotrophic bacteria was investigated. The obtained results reveal that inactivation of microorganisms caused by high-pressure air is significantly lower than the inactivation caused by high-pressure exhaust gas at every operating pressure. It is believed that CO<sub>2</sub> in the exhaust gas plays an important role on the inactivation performance because CO<sub>2</sub> has much higher solubility compared with oxygen in the ambient air. Thus, the exhaust gas at sufficiently high pressure can be used to inactivate microorganisms in wastewater effluent.

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