The implementation of a developed microbubble generator on the aerobic wastewater treatment

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Abstrak

An experimental study to examine the capabilities of the microbubble generator (MBG) on aerobic wastewater treatment was carried out under laboratory and industrial conditions. The tested MBG types were porous pipe & orifice and an MBG with a spherical body and drilled holes. In the laboratory-testing condition, an MBG was placed at a depth of 40 cm from the water surface. Three different pressure transducers were installed around the body of the MBG in order to analyze the inlet water pressure, the air-suction pressure, and the pressure at the outlet of the MBG. Next, the bubble diameter was measured by capturing the bubble pictures using a digital camera and analyzed using a developed image-processing technique. In order to simulate the application of the microbubble generator in the industrial field, a feasibility test of the MBG in aerobic wastewater treatment was performed. The results show the increase in MBG quantity with a higher ability to increase the oxygen, and that it is necessary to arrange the placement of each MBG in configuration to minimize bubble coalescence. Furthermore, by using a bio-ball as the porous media for microorganism attachment in aerobic wastewater treatment, the feasibility test showed promising results. Carbon on demand (COD) could be reduced to around 354 mg/l. The value of dissolved Oxygen (DO) was larger than 2 mg/L. The Ph level remained at 6, and temperature remained no more than 35ºC, which meet the requirements of aerobic wastewater treatment.