

Supaporn Phanwilai 2011: Effects of Audio Wave on Growth Rate of Gram-Positive and Gram-Negative Bacteria. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Assistant Professor Monthon Thanuttamavong, Ph.D. 170 pages.

This research aimed to study the effects of continuous rhythm audio wave frequency on the growth rate of gram-positive (*Bacillus thuringiensis*) and gram-negative (*Pseudomonas fluorescens*) bacteria. The experiment was conducted using bacterial inoculates in nutrient agar (NA) and nutrient broth (NB) from standardized bacterial suspensions of known concentrations. The samples, consisting of 50 treatment groups/gram bacteria and 25 control groups/gram-bacteria, were incubated for 4 hours in noise proof boxes. Sound treatment was provided to the treatment group but not for the control group. Treatment consists of four different audio frequencies (500 Hz, 1 kHz, 5 kHz and 10 kHz) and three sound strengths [60 dB(C), 80 dB(C) and 100 dB(C)].

Experimental results showed that specific growth rate and specific substrate utilization of *B. thuringiensis* increased when subjected to either continuous or rhythm sound treatment. Maximum increase of 27.01% was obtained at rhythm sound of 80 dB(C) strength and 500 Hz sound frequency. *P. fluorescens*, on the other hand, reacted negatively to a continuous sound treatment and to an increasing sound strength [100 dB(C)] but showed more positive than negative responses to rhythm sound. Best response was obtained when rhythm sound of 80dB(C) strength was generated at 1 kHz frequency. Maximum specific growth rate and specific substrate utilization increase was at 3.28%.

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Thesis Advisor's signature