

The effect of ultrasound frequency on the harmful algal species: pyrodinium Bahamense var. Compressum and margalefidinium polykrikoides

ABSTRACT

Harmful algal blooms (habs) in Sabah, particularly *Pyrodinium bahamense* var. *compressum* (Pbc) and *Margalefidinium polykrikoides* (*M. polykrikoides*), have been the subject of research due to their deleterious effects on the aquaculture industry and human health. Several methods have been established to mitigate the habs' cell, including using ultrasound. This study was conducted to identify the effect of different frequencies of ultrasound on the removal rate of habs species. The harmful dinoflagellate, Pbc and *M. polykrikoides* were cultivated in f/2 media. The established culture was then exposed to ultrasound with various frequencies consisting of 20kHz, 40kHz, 512kHz, 816 kHz and 1100 kHz. Results showed that, upon increasing the frequency, the habs' cell removal rate was highly targeted, associated with an increase in both habs species. At the lowest frequency (20kHz), the cell removal rate was $18 \pm 3\%$ for *M. polykrikoides* and $20 \pm 2\%$ for Pbc. Whereas, at the highest frequency (1100 kHz), the rate of cell removal was up to $96 \pm 2\%$ for *M. polykrikoides* cells and $86 \pm 3\%$ for Pbc. In addition, the cell removal rate for *M. polykrikoides* was significantly higher ($P < 0.05$) compared to Pbc cells. It was observed that the rate of cell removal is affected by the size of harmful algae cells. Findings from this study can be utilized as a starting point for eliminating future harmful algae blooms in Sabah, Malaysia