Study on the removal of algae from lake water and its attendant water quality changes using ultrasound

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\textbf{ABSTRACT}

The use of ultrasound for removing algae under different conditions, in particular under the optimal ultrasonic parameters, and the changes of the sample water quality indicators have been investigated. The results indicate that ultrasonic irradiation could efficiently remove the algae taken from Taihu Lake. Under 20 kHz with 30 W ultrasonic power and 360 s ultrasonic irradiation, the algae removal efficiency reached up to 96\% when a low-concentration algae solution was considered. Also, the water quality indicators of the sample were significantly improved after ultrasound treatment, especially for the low-concentration algae solution. The highest removal efficiency of the chlorophyll a (Chl-a), microcystins, total nitrogen, total phosphorus, and chemic oxygen demand at the optimal condition was determined as 26.2, 96, 86, 63, and 60.9\% in comparison with the control samples without ultrasound (no US), respectively, and the final value of which were 0.2, 0.01, 0.6, 0.065, and 15.7 mg/L, respectively. The results suggest that ultrasonic irradiation can not only provide an effective method for algae removal but also have a significant improvement for the quality of water.

\textit{Keywords:} Ultrasound; Algae removal; Water quality

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