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Cyanobacterial bloom control by ultrasonic irradiation at 20 kHz and 1.7 MHz.

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Ultrasonic irradiations at high frequency of 1.7 MHz and low frequency of 20 kHz were tested to prevent cyanobacteria *Spirulina platensis* from bloom. The inhibition effectiveness at 1.7 MHz was much greater than that at 20 kHz. The cyanobacteria biomass was reduced by 63% after 5 min ultrasonic irradiation at 1.7 MHz, whereas three days were needed for the tested cyanobacteria to recover its original density. However, longer exposure time did not significantly enhance the inhibition. It was observed after ultrasonic irradiation that the gas vesicles in cells collapsed, which may result in cyanobacterial precipitation and photosynthetic inhibition. The concentration of chlorophyll a (Chla) was reduced and its biosynthesis was delayed in a 4-day continuous culture. The fluorescence spectra at 77K of phycobilisome (PBS) and absorption spectra of intact cells *in vivo* showed that light energy transfer in PBS was inhibited and phycocyanin (PC) was damaged much more acutely compared with Chla. These results indicated that 5 min ultrasonic irradiation at 1.7 MHz every third day might be an effective and economic operation mode for practical application.