

SONICATION

A technology to address water quality issues
Research Factsheet COHA7-D



What is sonication?

Sonication is also called ultrasonic irradiation. It involves using high frequency ultrasonic waves that, in water, result in the generation of bubbles that burst (from cavitation) releasing energy and intense local heat. When millions of these small bubbles implode, the cells walls and membranes of cyanobacteria and algae floating in the water are damaged, and ultimately, can 'clear' a pond. The power, frequency and duration of exposure are important factors in determining how well a sonication unit will perform.

When is sonication useful?

Most studies indicate that sonication is most effective against cyanobacteria, or 'blue-green' blooms. These bacteria have gas vacuoles, and are particularly sensitive to the imploding bubbles generated by the units. The units have also been shown to be effective against filamentous green algae that can cause clogging of irrigation lines. The units may be useful in cisterns or storage tanks as well.

Not all sonication units are created equally. In-pond treatments often have lower power and lower frequency options compared to bench-scale 'theoretical' models. It's important to make sure the chosen unit is adequate for the size of pond. Note that these units are safe for storage ponds and for fish and have very low maintenance!



Ultrasonic Single Transducer (60Watt) from Ultramins.

For more information, contact jwest@phytoserv.com.



A sonication unit in a treatment pond.



Cyanobacterial bloom along the shoreline.

What are the drawbacks?

Farms with mixed blooms (less cyanobacteria and filamentous green algae) may not have success with sonication for management of these blooms. Further, long term management of water quality needs to be addressed with other tools - the broken cells of the bacteria and algae will settle to the bottom, and residual nutrients will be available for future blooms. Cyanobacteria also have vegetative spores or resting stages that can survive in the sediment that are not affected by sonication. These can generate new blooms when conditions are right.

The units will need to run continuously to have a more 'permanent' impact on visible water quality.

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