

BROMINIZATION VS. CHLORINATION

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Chlorination has long been the accepted and proven method of controlling pathogens in irrigation water in nursery situations. In 1987 I was approached with a relatively new and possibly broader-spectrum method of control, bromination. I had heard it had been used in jacuzzis and swimming pools as a germicide in the water to stop "Legionnaires Disease." This peaked my curiosity as to what it could do for my plant material. The purpose of this paper is to compare bromine in solid form with chlorine gas for use in irrigation water to control pathogens.

PROCEDURES AND PRECAUTIONS

What is brominization? Brominization is the introduction of strong bromine solution into irrigation water to maintain a level of free bromine from 5 to 10 ppm. This is accomplished by diverting a small amount of irrigation water into a vessel containing bromine tablets, then reintroducing the strong bromine solution into the system at a rate that provides a level of 5 to 10 ppm of active bromine after it has cleaned up your irrigation water. Bromine is measured as free bromine using a simple titration kit. Bromine levels are regulated by controlling flow of a strong bromine solution into the irrigation system. Temperature of the irrigation water is the major factor that will affect the concentration of the strong solution. With a constant irrigation water temperature, strong solution levels should remain constant and not require compensation. This makes the demand of the irrigation water, or the amount of bromine necessary to clean it up, the primary factor that will require adjusting strong-solution flow rates to maintain 5 to 10 ppm free bromine.

Advantages of bromination. Bromine has a broader spectrum of activity than chlorine with activity against algae, bacteria, fungi, and viruses. Research shows very little phytotoxicity even on sensitive bedding and foliage plants at rates as high as 100 ppm. Bromine is less persistent in the environment than chlorine, therefore, it is less likely to contaminate runoff. Installation and operation of brominators is very easy and inexpensive compared to chlorinators. Maintaining the brominator is very safe. Adding bromine tablets to the tank requires far less training and safety equipment than changing chlorine gas bottles and must be done far less often than with a liquid chlorine injection system. Danger of

a spill with solid bromine and cleanup afterwards are also far less likely.

Precautions for bromine usage. Bromine is compatible with fertilizers; however, it must be added to the system separately from fertilizers—particularly, those containing ammonia. It is my experience that bromine applied at recommended rates does tie up or scrub fertilizer but in such minute quantities when injected upstream that plant quality is not adversely affected. Injection of bromine must be stopped during chemigation through sprinkler systems, in accordance with its label.

Summary of work in progress. Upon being introduced to bromine I was immediately interested in its bactericidal properties and have begun working with it on *Prunus laurocerasus* 'Otto Luyken', a popular plant that is plagued with *Xanthomonas prunii*, which forms an unsightly shothole effect on the foliage in the warm and humid environment at Carolina Nurseries. I have also put a tap-off on my brominator to supply a strong bromine solution that may be effective as a sterilant for cutting tools.

REFERENCES

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CARL WHITCOMB: What about the exposure time needed for bromine to be effective?

BOB AUSTIN: Bromine seems to require less time than does chlorine.