

Dosing Level and Contact Time with Aqua-Hort Nutrition water

Aqua-Hort Dosing Levels

The Copper-ion dosing level for Aqua-Hort water varies with the type and severity of disease problems, type and health of plant, and watering strategy, climate and carefulness in growing. So the right dosing level varies from nursery to nursery. Basically, copper ion levels are adjusted with each watering, because the disease problem stems from the pot and the plant, not from the water, which only can carries the spores. Infested plants release active spores continuously.

Some nursery stock growers have applied Aqua-Hort copper ions with intervals, for example: three times a week for ten minutes with a high dose.

The experiences of the past have taught the Aqua-Hort staff much about application levels. The table which follows reflects those findings. There are basically two methods for arriving at the right dosing in a crop.

1: Start low, observe the crop and gradually increase the dosing until the disease is subdued and the crop is healthy.

2: Start high, observe the crop and gradually decrease the dosing until the problem does not reappear and the crop is still healthy.

Table 1: Standard Aqua-Hort Dosing Levels (ppm)

Group	Dosing with recirculation	Dosing without recirculation
Ornamental Potplants	1,5	2,0
Young plants	1,5	3,0
Cut Flowers	1,5	2,5
Nursery Stock	1,5	3,0
Vegetables	0,3	1,5
Storage water with fertilizer	1,0	2,5
Storage water without fertilizer	0,5	1,5

Fungus is normally dosed lower than bacteria.

Plants irrigated from above are normally dosed lower than with sub-irrigation or drip.

For pot orchids with long intervals between the waterings from above and the problem of bacterial spots, the recommended concentration is 2,5-3 ppm.

For outdoor crops grown in areas with rainy periods, dosing at intervals still recommended to allow for a supply of free copper ions to kill spores released in the meantime.

Aqua-Hort causes improved root growth. For those who apply the system for that purpose, or as an insurance against potential disease attacks, the right dosing level must be found through observation of the roots. Typically it will be between 1 and 2 ppm.

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Contact Time with Aqua-Hort water

The contact time for Zoospores of Pythium and Pythophthora is very short. Laboratory tests show that the spores are inactive and dead after a few minutes.

For bacteria, the contact time is longer. The following table shows show the contact times as measured in the trials. They vary from one to several hours.

Contact Time with Aqua-Hort water: Percentage spores alive

		1 hour	2 hours	4 hours	24 hours
Pythophthora²	1 ppm	0%	0%	0%	0%
Pythium²	1 ppm	0%	0%	0%	0%
Algea³	2,5ppm	100%	75%	50%	0%
Xanthomonas¹	2 ppm	115%	0%	4%	0%
	4 ppm	104%	0%	1%	0%
Agrobacterium¹	2 ppm	98%	52%	24%	0%
	4 ppm	46%	11%	0%	0%
Clavibacter¹	2 ppm	46%	9%	2%	0%
	4 ppm	35%	1%	2%	0%
Ralstonia¹	2 ppm	3%	0%	0%	0%
	4 ppm	4%	0%	0%	0%
Erwinia¹	2 ppm	4%	0%	0%	0%
	4 ppm	3%	0%	0%	0%

Sources: 1) Prof. Wohanka, Geisenheim, 2) Lene Petersen DEG

3) Goldsmith Seeds/Lars Marohn

These findings are from laboratory tests. In the actual growing situation, the contact time is continuous when Aqua-Hort is operated with each watering, which is normally the case.

The portion of free copper ions decreases with time after the watering. With a renewed watering it is increased again.

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