



“ With the installation of the copper ionizer the plants are flourishing at all levels of production and my tray ’ s are now full of lettuces ”

Peter Mallone, Owner, Shepherd Bush

Customer Profile

Shepherds Bush grows a number of lettuce varieties hydroponically under plastic. The owner, Peter Mallone, was semi-retired and bought the business a few years ago dreaming of a relaxed life style far away from the Auckland City pressure cooker. He supplies to a large number of supermarkets and local restaurants.

The operation has the potential to produce 22,500 lettuces every 4-6 weeks.

The water is sourced from a bore, stored in a 25,000L water tank, treated with ozone and then supplied to two nutrient tanks. Pumps feed the nutrient solution to one side of the lettuce trays. Through gravity the nutrient solution flows down to the other side and then back to the nutrient tanks where it is circulated over and over again.



Business Situation

Peter has found it difficult to meet clients orders due to the crop losses which are mainly caused by plant diseases. Microbial tests indicated that Pythium was the main cause of his problems.

He installed an ozone system to treat his source water. In addition he has tried a number of chemical treatments such as Hydrogen Peroxide and Copper Sulphates. None produced consistent results and so Peter kept looking for a better solution to improve the crop yield and to satisfy client demand for his lettuces.

The Solution

For some time it has been known that a controlled dose of copper ions can make a significant contribution to the control of fungus attacks, especially Pythium and Phytophthora.

A controlled dose of copper ions has hitherto been extremely difficult. Copper ions applied chemically, as with salts, form very quickly complex chemical bindings and then lose their lethal effect on zoospores. The ioniser injects free copper ions (Cu++) via an electrolytic process and the dose rate can be accurately controlled.

Novozone offered Peter a trial run with the Aqua-Hort Mini copper ioniser. The ioniser was installed after the nutrient dosing equipment and injects copper ions into the nutrient solution.

The maximum flow rate for this model is 5 m3/h.

The machine is fully automatic, once the copper dose rate is set the machine compensates for any EC and flow variations. The copper concentration is displayed on a LCD display.

A chemical test kit is supplied with the machine and used to check the dose rate.



Solution Overview

Customer Name:

Shepherds Bush

Owner: Peter Mallone

Customer Profile:

Shepherds Bush grows a wide variety of lettuce hydroponically. They supply the local supermarkets and hospitality industry with high quality products.

Location:

Kaeo, Northland, New Zealand

Industry:

Horticulture

Business Situation:

As a result of persistent crop losses caused by water borne diseases Peter Mallone failed to achieve a good crop yield and struggled to supply customer orders.

A number of methods were tried to kill the pathogens. They included Hydrogen Peroxide, Copper Sulphate and Trichoderma. None of these produced satisfactory results.

Solution:

Peter Mallone contacted Novozone for a cost effective solution.

The Aqua-Hort copper ioniser was installed. Over a 6 months period the system proved to control the pathogens in his nutrient water and vastly improve the crop yield.



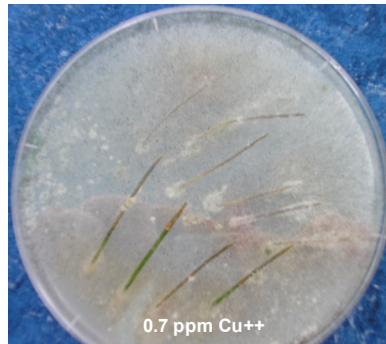
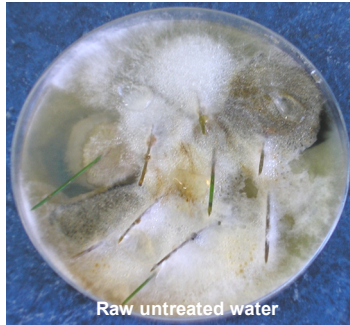


The Microbial Tests

In order to determine the efficacy of the copper ioniser a microbial test was conducted by Millennium Diagnostics Ltd. The tests were conducted over a few months.

It involves adding specially prepared pine needles to the nutrient solution. The needles act as a bait to attract the pathogens, which are then grown in agar under laboratory conditions and examined. A number of tests were done with different copper dose rates and the results summarised as follows:

The **raw water** supply was heavily contaminated with *Pythium* spp, *Fusarium oxysporum*, *Fusarium solani* and *Rhizoctonia* spp.



The **0.2 ppm** treated water samples had a fundamental change in the phyto pathogenic fungi profile with the 0.2ppm dominated by saprophytic *Paecilomyces* spp with a single colony of *Pythium* growing.

The **0.7 ppm** treated water sample yielded *Rhizopus stolonifer* which is a specialist in post harvest disease and *Penicillium* which again specialises in post harvest rots. These two fungal species are ubiquitous and the water sample was most likely contaminated in situ by dust.

Stephen Ford, Technical Director of Millennium Diagnostics Ltd believes that the NFT water that has been treated by the Copper Ioniser has been significantly improved for use as an irrigation supply for Horticultural Crops

Benefits

For Shepherds Bush the most difficult growing times have been in early summer as the temperature under the plastic rises rapidly. In the past crop losses have then been significant and have made it hard for Peter to fill orders.

With the addition of the copper ionizer the plants are flourishing at all levels of production and the trays are now full of lettuces. The increase in crop yield is adding significant dollars to his business.

As can be seen from the pictures, the roots are healthy, well developed and support a strong head.



An additional benefit is the clean nutrient recirculating system. Clogging up of the feed tubes, which can starve a tray of water, is a thing of the past

Very important for Peter was that the yearly cost of the Aqua-Hort ionizer, including depreciation and spare electrodes is about 1% of revenue



Product:

Aqua-Hort Copper Ioniser
Model Mini, 5 m3/h, 3.5 Amp

Benefits:

- Prevents fungus attack
- Prevents bacteria attack
- Kills *Pythium* and *Phytophthora*

These zoospores are killed by the free Cu ions due to their thin cell walls. This is not possible by adding normal Cu chemicals

Ramorum, *Clavibacteria*,
Xanthomonas, *Agrobacteria*

- Whiter & stronger roots

The plants get stronger and better roots making them more healthy

- Better plants

It has been observed that the uptake of calcium and manganese is increased

- Cost of investment

Typical yearly running costs including depreciation and replacement electrodes are 1-5% of revenue

- Environmentally friendly

No harsh chemicals are used in the Aqua-Hort. No need to store dangerous chemicals on site

- Treats the run-off water

Run-off water can be safely stored and treated for re-use

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