

## Salinity - Growers Information

### Overview

In situations where the irrigation water is high in dissolved salt a combination of scaling, corrosion and salinity issues occur, which either cause blockages to the irrigation systems or stress to the plants or both.

The Hydrosmart treatment renders the minerals and chemicals contained in the water non-reactive, causing them to revert to tiny particles that do not present any operational problems.

The breakdown of the large complex crystals removes chlorides from the root zone of the plants and facilitates the uptake of calcium, magnesium and potassium, essential for healthy plant growth.

The result is no salt toxicity problems and a progressive improvement in soil structures.

Commercial growers in many branches of agriculture are not only growing healthy plants in water with salinity levels exceeding those that are normally considered toxic, but in many cases are producing the best crops in the region.



A 200mm system installed at Table Grape Growers Australia at their vineyards in Menindee NSW. Salinity ranges from 2400-3300EC with a pH up to 9.3

### The Problem

#### Salts build up in the soil

The main problem with Salinity is that the salt in the irrigation water builds up through successive irrigations, (the salt stays and the water goes), until there is an excessive amount of chlorides (sodium chloride in this case), at the root zone.

#### Nutrients blocked

Firstly the larger a molecular structure the more free bonds it will have and the more reactive it will be. Secondly the big molecules have a large gravitational attraction for each other and any passing micro nutrients.

The results are;

- They join together, eventually becoming so big that they **cannot physically pass into the root capillaries**.
- They **grab the nutrients** before they reach the roots.

## **Calcium rejection**

There is a further problem in that sodium chloride presents the same electron or bonding pole as calcium, (chloride ions and calcium ions) and these like poles repel each other so that the sodium chloride effectively rejects all the calcium that is trying to get into the plant.

## **The plants starve**

For most plants this is slow death.

If a plant cannot take up calcium, (which is its staple diet), it cannot take up potassium which is essential for healthy cell growth and impacts directly on plant health and its ability to resist disease.

If the plant cannot take up calcium and potassium it won't take up manganese, one of the building blocks of Chlorophyll, which drives photosynthesis and determines the plants ability to convert sunlight into energy and mobilize the sugars etc.

## **The Solution**

### **How Hydrosmart works**

The technology uses computer generated resonance frequencies to effectively neutralise the electron bonding mechanism by which all chemical reactions and crystal building takes place. This process changes minerals contained in the water supply into tiny sub 4 micron, non-reactive particles. Complex molecular structures such as sodium chloride and calcium bi-carbonate are broken down into tiny, less complex particles.

### **Breaks down minerals in the soil**

The treatment not only breaks down the minerals in the water supply but will progressively break down the large mineral crystal structures in any soil that is in prolonged contact with the treated water.

### **Continuing soil health**

These tiny particles have much fewer bonds available to react with and so take a long time to build back into large reactive crystals. Every time you irrigate with Hydrosmart water the frequencies will break minerals down again and so the soil health continually improves from season to season.

Growers using Hydrosmart treated water are reporting significant improvements to overall soil health with salinity levels in the soil under the drippers decreasing. Soil samples tested by SWEP, a commercial accredited laboratory, measured a 40% drop in soil TSS and EC levels in a single growing season on one property. Growers report their soil has never been healthier and is now populated by worms prompting the return of bird life that has been absent from these properties for many years.

### **Makes nutrients available**

The root capillaries are cleared allowing the nutrients to flow freely in as the large crystalline structures blocking them collapse to tiny sub 4 micron particles.

By breaking down large crystalline structures such as sodium chloride, calcium carbonate and bi-carbonate, the oxides of iron, etc. many of the micronutrients that were bound up by their gravitational attraction, and their chemical reactivity are released back into the soil and become available for plant uptake.

### **Bite sized nutrients**

In the process, the resonance in the treated water supply has broken down all the minerals into sub 4 micron, bite sized particles and changed many of them into bio-available simplex elements such as the calcium, potassium and manganese that the plant has been starved of. Efficient photosynthesis resumes and sugars are mobilized at optimum levels allowing the plants to resume healthy new growth.

## **They easily travel through the plant**

Not only can the plant function again, it is now also presented with the elements that it needs in a tiny particle size that can easily be trans-located through the xylem and distributed to the new growth. In tests carried out by Suntec laboratories in New Zealand, Hydrosmart was proven to have a dramatic effect on tip burn in Hydroponic lettuce and this they suggest is caused by the minerals being “prevented from forming crystalline structures within the xylem allowing the plant to transpire more effectively”.

## **Enhanced plant growth**

Two years of independent scientific research has proved that there is a significant improvement in plant growth and a corresponding reduction in growing problems on plants, irrigated with Hydrosmart treated water. This occurs whether the water is slightly mineralized right up to distinctly saline and is largely due to the minerals in the treated flow being changed into a form readily available to the plant.

With the extra supply of nutrients from the break down of the minerals and their tiny size which allows them to be easily transported throughout the plant, many growing problems like tip burn are being eliminated and there is an increase in the plant’s resistance to disease and insect damage.

Not only are the plants healthier but the overall harvest is improved both in terms of fruit quality and tonnage with significant improvements in fresh weight, taste, colour and shelf life.

## **Trials and feedback**

The data from scientific trials and feedback from commercial growers shows these consistent results.

- Reduced juice chloride levels in grapes and tomato trials.
- Improved Brix and Baume levels.
- Significant reduction in the bitter taste component of Hydroponic lettuce.
- Reduced soil chloride and EC levels.
- Worms making a visible return to the soil.
- More friable (easily crumbled) soil structure.

All of these point to a reduction in chlorides in the soil

## **Conclusion**

Hydrosmart treatment can support healthy plant growth in high salinity water without creating the longer term problem of increasing soil salinity that normally accompanies irrigation with high salinity water.

## **Prevents corrosive damage to equipment**

Sodium chloride is a major accelerator of the corrosive process attacking pipes, pumps, valves and any other equipment in contact with the saline water.

Corrosion is due to chemical reactivity between metals and aggressive chemical compounds in the water supply. Once the water is treated the Hydrosmart resonance frequencies inhibit chemical interactions (e.g. the oxidization of iron), and corrosion ceases.

## **Removes scale**

This inhibition of chemical reactivity stops scale forming, while the bonds of any existing scale crystals collapse and the scale falls apart.

Drippers become unblocked and all pipes, pumps, valves and spray nozzles are rendered scale free.