# WATER TREATMENT TECHNOLOGY AT PARAISO ORGANICS INC., SALINAS, CA.

The 3 inch unit was installed on April 23, 2013 and the area covered is approximately 2.3 acres. Soil samples were taken two days after installation. Strawberries [Sweet Anne variety] were the crop being evaluated.

The program was designed to monitor the following issues per advice:

1. Production yield.
2. Nutrient levels
3. Water reduction
4. Soil conditioning+
5. Root mass
6. Insect infestations
7. Sugar of fruit [brix]
8. Size of fruit.
9. Disease incidence
10. Drip tape condition

The orange unit is the water activator unit called Water Technology unit, the lower pipe is the inlet of water and the right elbow and down pipe is the water feeding to the fields.

Ideally the ceramic units should be installed at the beginning of soil preparation to have the activated water start reacting with the soil and freeing up soil elements, and with reduced water surface tension allow better water penetration.


Test Site

Field observations during the first 7 weeks: Please see attached soil sample report.
The nitrogen levels generally increased with the use of ceramic water treatment. All other elements increased including sodium and chlorides; however, the increase of calcium and sulfate offset the increase of the sodium and chloride in the ceramic device.

The brix is being evaluated but results flocculate form block to block. To date both blocks have gotten the same amounts of fertilizer [organic]. Starting this week June 10, 2013, I have instructed the irrigator to reduce fertilizer amounts in the ceramic block by 25%.

Production will be documented on a biweekly basis for the next month.

Soil Sample: August 2, 2013
"WATER TECHNOLOGY"-Ceramic unit:
The irrigator has reduced the amount of nitrogen fertilizer by 50% and production is up slightly. In addition, the ceramic block is only being irrigated 2/3 times, in other words only Mondays and Wednesdays, whereas the non-ceramic and rest of the field is irrigated 3 days a week.
The Nitrogen levels of Ammonia, Nitrate and total N are still up considering that the fertilizer input for the ceramic unit block is cut by 50%. The Phosphorous and Potassium levels were the same. The Calcium, Magnesium and sulfate were more than the non-ceramic block. The sodium and chloride levels are starting to drop. (keep in mind that Tainio's salt digesting microbes were applied at the beginning of the year,

however the microbes do work better in the range of a 6.5 PH., more on PH). The minor nutrients of Zinc, Iron, Manganese and Boron were lower in the Ceramic vs non ceramic block but were in an acceptable range so as to not be detrimental.

The CEC, cation exchange capacity, is the ability of the roots to absorb the positive ions for nutrition. The higher the value is better. The ESP or exchangeable sodium percentage is lower which is good as sodium chloride is salt and the more sodium that is replaced the roots will not be stressed as those in the non-ceramic block. The PH is higher in this sample.

The only issue we have is that there is a disease that is killing the plants in both blocks, so the production is being reduced on both blocks.

September 4, 2013:
See notes for August 2, the fertilizer and water rates are still being observed as from June 25, 2013.
Here again the nitrogen levels were higher in the ceramic block over the non-ceramic block. The Phosphorous, Potassium, Calcium, Magnesium, Sulfate, essential elements necessary for plant health are all higher than that of the non-ceramic block.

The sodium and chloride, detrimental to healthy plants, are down. The Ece, or electrical conductivity, shows the cations (calcium, potassium) are up. The minor elements, at this stage of growth, are not significant to plant health. The CEC being up is good, as cation exchange capacity references the positively charged elements in the soil and the ESP being down is as the PH is about 6.8. (Remember the comment on August 2 about PH. Tainio's microbes work best in a PH of 6.5 and all nutrients are available to plants at a PH of 6.5).

October 8, 2013:
Soil samples for non-ceramic and ceramic blocks follow the same pattern as the September sample, the nitrogen and other major nutrients are up, and the salt (sodium and chlorine) are down.

November 1, 2013: Results from Nov 1 were reversed – the ceramic nutrients were down since we are not irrigating 1/week nor fertilizing except 1/month.

Conclusions:

In my nearly 25 years as a consulting agronomist (CV attached) I have never seen one product that affects so many areas of the growing process. The conclusions are a demonstration of its benefits to soil development, reduction of chemical input, improved plant health, higher yields, more efficient water use and, therefore, lower costs and higher ROI.

In an era of shrinking margins, rising water and fertilizer costs and increased sensitivity to wise stewardship of those resources, this product addresses most concerns in a cost effective and environmentally beneficial manner.

Continued government restrictions on use of fertilizers, herbicides, insecticides and pesticides will require innovative technologies to maintain or increase yields, limit damage to soil and plants and consequent impact to aquifers and watershed due to runoff. I believe the benefits of activated water will allow farmers to comply with necessary environmental and human health concerns while maintaining, or increasing, financial margins.

Based on demonstrated results the cost of a water activation unit can be justified by savings in reduced applied nutrients and water use in less than one year. The unit container is guaranteed to last for ten years and the ore beads two years. The life of the beads is determined by the degree of water agitation, flow and possible corrosive content in the water. Should they require it, beads can be replaced for approximately 20% of the unit cost.

There are other benefits, yet to be quantified. I believe plants grown and cleaned with activated water will have a longer shelf life. Improved soil quality will carry over to alternate crops and continue to build year over year. The benefits of reducing irrigations requirements will grow year over year.

Comments below only include observations on strawberries; however, I believe the benefits will transfer to other crops to greater or lesser degrees.

1. Production Yield: The yield increase of the treated area was just under 15% when compared to the untreated area. The difference seemed to increase during the season. We did not begin to apply the activated water until early April, I believe had the water been applied prior to planting the benefit to the plants would have manifested sooner and the resulting yield increase more substantial as the season progressed. The increased yield is accomplished without additional cost and accrues to the bottom line less than the added harvesting labor cost.

2. Soil Nutrient Levels: despite lowering fertilizer input to 50% compared to the untreated area all the beneficial nutrients in the soil were higher than the untreated control area. I believe fertilizer input can be reduced by up to 75% should the activated water be used prior to planting and throughout the season.

3. Soil Conditioning: after the activated water was applied to the soil it developed a more loam-like appearance. Water drained better, reducing standing water and damage to fruit. Test results indicate the salt is driven below the root zone while the roots can access existing soil nutrients and efficiently absorb applied nutrients.

4. Water Reduction: Irrigation was reduced from three days a week to two (33% reduction) with no reduction in yield or plant quality. I believe we can reduce water by up to 50% without any adverse effects on the plant fruit.

5. Root Mass: Root mass on non-ceramic plot was slightly bigger, however the ceramic plant had more buds at the crown (that accounted for more yield)

6. Fruit Sugar (brix): The brix fluctuated but in the earlier season it was higher in the ceramic plot.

7. Fruit Size: Hard to determine did not evaluate

8. Insect Infestation: Healthy plants are more insect and disease tolerant and require less applied nutrients. I believe the concentrated Balance7 alkali product in combination with activated water is beneficial for killing thrips, aphids and mites and eliminating mildew. Unfortunately, our unit installed on the electrostatic sprayer failed and were unable to obtain valid data to support my intuition.

9. Disease incidence [powdery mildew]: As with the insect infestation our trials were limited to individual plants, but the activated water combined with the alkali concentrate effectively eliminated mildew.

10. Drip Tape Condition: I anticipated the drip tape in the test area would have less mineral or soil buildup and the holes would be clearer. Early November I cut sections in treated and untreated areas with inconclusive results. This test will continue next year to determine if the result would be more demonstrative with a full season of use.

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Lorenzo London
November 10, 2013