**Project:**  Impact of Aqua-PhyD water conditioner on recycled irrigation water quality

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**Summary:**

A study was designed to evaluate the water quality claims made for the Aqua-PhyD water conditioner, specifically the company brochure's claim that "Reclaimed water is perfect for the AQUA-PHYD system. It will significantly reduce the salts and chlorides found in reclaimed, run-off, and recycled water".

Analytical tests were conducted on water before and after passing through the Aqua-PhyD water conditioner that had been installed between the irrigation lake and irrigation heads on a California golf course.  The results indicate that the Aqua-PhyD water conditioner did not alter any parameters of irrigation water chemical composition, including salts and chlorides, as evaluated using standard analytical chemical methods.

Aqua-PhyD's literature also claims beneficial effects on soils as well. The impact of the Aqua-PhyD water conditioner on soil quality was not evaluated in this study.

**Materials and Methods:**

In June, 2007, three samples were collected at different times from the irrigation lake representing the non-treated irrigation water and three samples were collected from the irrigation system using a quick coupler to represent the Aqua-PhyD treated irrigation water.  New commercial drinking water bottles were emptied and rinsed before filling with the test waters.  For the Aqua-PhyD samples, a quick coupler was allowed to run for more than a minute prior to sampling.  Water samples from the irrigation lake were collected by dipping the water bottle into the lake.  Water analyses were conducted by Brookside Laboratories, New Knoxville Ohio.  Statistical analyses were conducted using Systat version 10.2 for Windows.  The results are reported in Table 1.

**Results:**

Table 1. Key Water quality factors before and after treatment with the Aqua-PhyD water conditioner. The values below represent the average for three non-treated (Lake) and three Aqua-PhyD treated (Irrigation Head) samples.  Values are significantly different if the P value (probability that the difference is due to chance) is less than 0.05.  There were no significant differences in any water quality parameter measured.

| Parameter | Lake Non-treated | Irrigation Head Aqua-PhyD treated | P[1] |
|---|---|---|---|
| pH | 7.4 | 7.4 | 0.948 |
| Electrical conductivity (dS/m) | 0.51 | 0.52 | 0.326 |
| Total Dissolved Salts (TDS ppm) | 325 | 334 | 0.339 |
| Sodium adsorption ration (SAR) | 3.6 | 3.6 | 0.959 |
| Calcium (Ca ppm) | 17 | 17 | 0941 |
| Magnesium (Mg ppm) | 7.4 | 7.6 | 0.847 |
| Potassium (K ppm) | 9.2 | 9.9 | 0.326 |
| Sodium (Na ppm) | 75 | 72 | 0.503 |
| Iron (Fe ppm) | 0.32 | 0.10 | 0.106 |
| Bicarbonate (HCO3 ppm) | 134 | 149 | 0.728 |
| Chloride (Cl ppm) | 63 | 66 | 0.516 |
| Sulfate (SO4 ppm) | 58 | 50 | 0.810 |
| Boron (B ppm) | 0.22 | 0.23 | 0.862 |
| Manganese (Mn ppm) | 0.03 | 0.03 | 0.968 |
| Copper (Cu ppm) | 0.00 | 0.00 | NV[2] |
| Zinc (Zn ppm) | 0.03 | 0.04 | 0.899 |

[1]P = Fisher's Protected LSD probability that the treated and non-treated values are the same. Values for P that are less than 0.05 indicate that there is a significant difference between the lake and irrigation head samples.  Values for P that are above 0.05 indicate there is no significant difference between the lake and irrigation head samples.

[2]NV = No variation detected. No "P" value could be calculated for copper because the starting level of this constituent was zero.