



Salt Management Plan

Reducing TDS / Nutrient contamination in Groundwater

In regard to the S.W.R.C.B. proposed Recycled Water Policy, we encourage the Board to give serious consideration to the fact that the addition of Calcium Sulfate Dihydrate (Gypsum) during the wastewater treatment process improves the chemistry of recycled water used for irrigation, and would specifically aid in the reduction of potential excess TDS (Total Dissolved Solids) and Nutrient contamination of groundwater in areas where recycled water is used for agricultural and/or landscape irrigation.

Introduction

Equipment and processes are now available that can optimize the quality of treated wastewater for irrigation use by injecting solution grade gypsum directly at the treatment plant. Amending such water with dissolved gypsum can notably reduce the negative effects of excess sodium and bicarbonates commonly found in recycled water. In summary:

Better manage groundwater basins threatened by salts

Gypsum will flocculate the soil and improve water penetration of applied water and rain. This alone will help eliminate the overuse of recycled water through more efficient water hydrology, resulting in less water applied for both irrigating and leaching, and less salt accumulation due to evaporation of standing water on the surface. Less applied water (i.e., better water efficiency) reduces total salts applied to the soil, and therefore systematically reduces the TDS potential for contamination of underground water basins.

Calcium sulfate also reacts with sodium in the water and soil, converting it to sodium sulfate, a much more soluble form. Therefore, together with the improved soil penetration also provided by calcium sulfate, it takes far less applied water to leach toxic sodium down below the root zone of crops and turf.

Calcium sulfate reacts with carbonates and bicarbonates in the water and soil as well, converting it to calcium carbonate which is water insoluble, non-toxic to plants, and will be mostly filtered out as the water passes through the soil profile, helping further reduce TDS levels in underground water.

(Note: Although Calcium sulfate is a salt itself and will initially increase the EC of recycled water, it is a beneficial and in fact a critically necessary salt in most every agricultural/landscape application. Further, through cation exchange, most of the calcium will be bound in the soil or be adsorbed by plants, and thus will not add to the TDS levels of underground aquifers.)

Improve nutrient management

Calcium sulfate stimulates root growth and magnifies the plant's ability to absorb other nutrients in the soil, thereby leaving less remaining in the soil, and further reducing the total potential for excess nutrients migrating down into underground water sources.

Plants are made up of microscopic cells formed with calcium as the essential nutrient, and calcium is also critical in the development of many fruits and vegetables. For example, without sufficient calcium, tomatoes have blossom end rot, potatoes have hollow heart, celery has bitter pit, etc. It also helps prevent myriad diseases that can lead to substantial losses in agricultural applications.

Calcium Sulfate at once; Neutralizes toxic carbonates/bicarbonates, converts Sodium to a much more soluble form which can be leached using less water, improves soil penetration—which improves water efficiency and expands the root zone, and adds calcium as a critical micronutrient.

Improve public acceptance and perception

By improving the chemistry of recycled water used for irrigation, turf will be more resilient and green, diseases will be minimized and crops will be healthier and often enjoy notably higher yields. These outward and visible improvements help provide a more positive image in association with recycled water, improving the value and acceptance for use as irrigation water.

Cost considerations

The cost of a single gypsum injection installation at the treatment facility can often be totally offset by: 1) An increase in water selling price, justified by the fact that the water chemistry is greatly enhanced with the addition of calcium; 2) Reduced site costs. The end user (Grower, Golf Course, etc.) will spend less money trying to amend the soil and water at their application site; 3) Reduced overall costs. Better water will create better soil conditions and healthier crops/turf. Less money will be needed for fertilizers and amendments, costs and losses due to disease/poor health will be reduced, and labor costs will be lower.

Conclusion

The vast majority of Growers and Turf Managers in California are already well aware of the many benefits of adding gypsum to their irrigation water, especially when using recycled water. However, the beneficial use has been limited by the fact that each individual end user must be willing and able to purchase and maintain specialized injection equipment, and then deal with the logistics of handling powdered gypsum and the labor involved in continuously loading gypsum injection machines.

With fully-automated technology now available that totally eliminates all handling issues and allows gypsum to be injected upstream at the treatment plant as part of the water treatment process, enhancing recycled water quality is simplified and can be easily retrofitted to virtually any treatment plant facility. By improving water chemistry directly at the treatment facility, ALL downstream horticultural and agronomic applications, including sports fields, parks, medians, etc., benefit from the enhanced water quality of calcium-enriched irrigation water.

And, the State benefits from the long-term advantages of producing higher quality recycled water wherever it is applied, thus helping highlight the positive side of using recycled water for irrigation, while at the same time minimizing the potential for groundwater contamination

At least two municipal wastewater treatment plants in California (Daly City and Carmel) have already upgraded to onsite solution gypsum injection with excellent results. Solution Grade Gypsum is 100%-natural, all organic, completely safe to handle, and adds no color or odor to the water.

While Title 22 quality criteria are set forth to protect public health, they have not previously properly addressed water chemistry considerations that determine the suitability of treated wastewater for agricultural and landscape irrigation. We believe that this is a great opportunity to evaluate the significant benefits for all Parties when the effluent recycled water chemistry is improved with the addition of calcium sulfate dihydrate (gypsum) in the treatment process.

Respectfully submitted for consideration,



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