Excess soil salinity and drought often go hand in hand. When rain and surface irrigation water become scarce, growers must sometimes resort to using water from less optimal sources, which tend to be higher in mineral salts. With consistent use of high saline water, salt builds up in the soil, especially in soils with poor drainage due to compaction or high water tables.

Salt can degrade the soil's structure. Healthy soil clumps, providing pore spaces that hold water, much like a sponge.

A high concentration of salt causes deflocculation (breaks down the clumps) and reduces the soil's capacity to store water. When the deflocculated soil becomes wet and then dries out it forms a hard crust, inhibiting soil respiration and contributing further to its downward spiral. According to Dr. Jerry Hatfield, Laboratory Director at USDA Agricultural Research Service, as little as a 1/32-inch crust will inhibit soil respiration[1].

Plant roots absorb soil water through osmosis, where water flows from a lower salt concentration in the soil to a higher salt concentration in the plant root cells. When the soil's salt concentration is higher than the plant root's cells, water uptake becomes restricted, causing the plant to dehydrate even in the presence of available water. Excessive salt may also hinder the absorption of other essential plant nutrients like calcium and magnesium, causing nutrient imbalance.

Spectrum DS™ contains salt-remediating microbes to reduce stresses associated with high salt (C.E.C.) in the soil and plant. This allows more balanced cation availability to the plant and encourages healthy growth. Maximizing photosynthetic potential leads to higher exudates, microbial growth, soil synthesis, and aggregate formation; all leading to greater water holding capacity and osmotic balance.

Example of Typical Protocol Recommendation for High Salt Soils, to be used in conjunction with your fertility program:

Type of Soil	Time of Treatment	Product to Apply	Application Rate
Conventional High Salt Soil	Spring	Spectrum DS™ Pepzyme G™ Soluble Humate Powder	50 gr/ac 12.5 oz/ac 454 gr/ac
	Midsummer and Fall	Spectrum DS™ Pepzyme G™ Soluble Humate Powder	25 gr/ac 6 oz/ac 227 gr/ac
Organic High Salt Soil	Spring	Spectrum DS™ NutraNeed™ Fish	50 gr/ac 12/5 oz/ac 1 gal/ac
	Midsummer and Fall	Spectrum DS™ NutraNeed™ Fish	25 gr/ac 6 oz/ac 1 gal/ac

1. Hatfield, Jerry. Tainio BioAg Symposium. Spokane, WA. 05 Feb. 2015. Lecture.

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BEST PRACTICES AND BASIC USAGE RECOMMENDATIONS:

- To avoid plugging: If agitation systems are not mechanical, premix products before adding to tank. 50-mesh screen is recommended.
- Apply foliar sprays in early morning or evening when temperature is below 80˚F.
- Do not combine microbial products with antibiotics or materials that contain chlorides, bromine, fluorine, or elemental copper. Use in separate applications at least 2 days apart.
- These products are meant to be used together as a package application and are designed to work in conjunction with each other.
- Some growers have reported cutting back on their nitrogen inputs by 40% while using these products after achieving mineral balance.
- During times and stages of high plant stress (pest pressure, disease, etc.) the recommended rates can be doubled, but do NOT exceed a 2X increase as it may result in leaf burn.
- Non-chlorinated or R/O water is best with a pH between 6.0-6.4 if possible. Water over 105°F. can cause shock and harm to beneficial microbes and enzymes.
- Continuous agitation is recommended to keep materials suspended, vortex well and often when mixing and during use.
- Microbial products should be used within 24 hours after adding water.
- Always perform a jar test to ensure that there is no precipitant formation before the first application of any product or combination of products.
- Thoroughly clean and neutralize all tanks, lines, containers and sprayers prior to mixing products, especially after use of any toxic chemicals.

This protocol is intended as support for your fertility program and not as a replacement. It is designed for simplicity and compatibility with almost any fertilizer program. Our specific recommendations to you may vary depending on your unique situation.