A "NEW" CHEMISTRY TO REDUCE SODICITY IN BRINE-IMPACTED SOILS

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Reducing sodicity in brine-impacted soil requires a source of soluble calcium. Commonly gypsum is used as an amendment for this purpose. However, the gypsum must first dissolve in water to be effective. Gypsum's low solubility means that large amounts of precious water are required to achieve the intended benefit. In addition to the problem of significant water usage, the low solubility results in gypsum being effective only within the depth it is incorporated into the soil. Elevated concentrations of gypsum in soil have also been shown to increase the mobility of certain plant nutrients resulting in their leaching from the soil. These characteristics combine to make its use for brine spill remediation environmentally unsustainable.

In soils that contain calcium carbonate plant roots produce soluble calcium through the release of organic acids with react with calcium carbonate releasing calcium ion in the soil solution. This effect can be mimicked by using organic acids as an amendment to treat soil sodicity. If calcium carbonate does not occur naturally in the soil calcium carbonate can be added along with the organic acids as an additional amendment. Organic acids are more than 500 times more soluble than gypsum; therefore, these acids penetrate deeper in the soil profile than gypsum. Further organic acids stimulate microbial growth in the soil which immobilizes nutrients preventing their leaching from the soil during remediation and building soil nutrient pools. Results of laboratory and field tests of using organic acids to reduce soil sodicity and stimulate plant growth will be presented.

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