Testing Seed Viability after Imbibition of Produced Water Treated with Enzyme Additive to Bioremediate Residual Toxins

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As water scarcity and the extraction of oil collide, Produced Water (PW) has become a vital asset to commercial and organic farmers. Questions surrounding the uptake of residual toxins present in (PW) have raised concern over its viability as an alternative water source. I've been testing a unique Enzyme Additive Bioremediation agent (EA), for the past 3 years. Hypothesis 2017 seeks to identify the toxic uptake during seed imbibition/germination and eliminate these toxins through the use of (EA) ultimately promoting higher yields and healthier plants. I designed & tested protocol for five different seed Viability & Vigor tests using (EA)+(PW): Electrical Conductivity (EC), Imbibition Weight Differentials, Triphenyl Tetrazolium Chloride Indicators (TZ), Fluorescence OIW Identification, Root/Radical Emergence Measurements. I selected Phaseolus lunatus (Bean) for its global importance in providing essential protein in the diets of malnourished populations through its ability to form associations with bacteria that 'fix-nitrogen' from the air, Lactuca sativa var. capitata (Lettuce), the standard species recommended for toxicology testing by the US E.P.A. and Raphanus sativus (Radish) as a rapid germinating seed comparable to the toxicity sensitivity of lettuce. Experimental results proved positive for toxic uptake during imbibition of (PW) and measurable differences in seed vitality/vigor. These toxins were effectively remediated by the use of (EA) promoting greater viability/vigor.

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