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RESPONSE OF QUINOA PLANTS TO PROCESSES OF SOIL RECLAMATION IN SALINE-SODIC, USING COMBINED AMENDMENTS

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Soil degradation resulting from salinity and sodicity is a major environmental constraint with severe negative effects on soil fertility and agricultural productivity in arid and semiarid regions of the world. Saline sodic soil are degraded due to their simultaneous effect of salinity and sodicity, which deteriorates soil physical structure by clay swelling and dispersion due to high concentrations of Na⁺ in the soil solution or at the exchange phase, forming dispersed. In addition to physicochemical effects, biological properties such as the microbial respiration and biomass are deteriorated. In our experiment, we evaluated the effects of individual and synergic of biochar, humic substances and gypsum application on chemical and biological properties of saline sodic soil and growth of two quinoa genotypes. Treatments included biochar (B) 22 t ha⁻¹, humic substances (HS) 5 kg ha⁻¹, gypsum (G) 47.7 t ha⁻¹. Eight treatments T0 = control, T1 = B, T2 = G, T3 = HS, T4 = B+G, T5 = B+HS, T6 = HS+ G, T7 = B+HS+G were established. The combined treatment B+HS+G increased root biomass in AZ - 51 and AZ - 103 quinoa genotypes 206 and 176% respectively, while

plants grown on amendment soils increase significant stomata conductance, chlorophyll index and seeds yield. Furthermore, electrical conductivity (EC_e), sodium adsorption ratio (SAR) and exchangeable sodium percentage (ESP) decreased significantly in all treated soils, the ESP in gypsum treatment (decreased 11 folds) and B+G, B+HS, B+HS+G (decreased 9–15 folds) respect to control. Likewise, soil microbial biomass increased 112–322% on B+HS+G treatment. Combined amendment improved chemical and biological properties of soil, reducing the negative effects of saline sodic soil on the performance of quinoa plants.

Biography

Mauricio Schoebitz Cid completed his PhD from Nantes University, France and Postdoctoral studies from Consejo Superior de Investigaciones Científicas, Murcia, España–(CEBAS–CSIC). He worked as a Professor of Soil Science and Natural Resources at Concepción University. He has published more than 15 papers, book chapters and patents.

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