Effects of salt stress on growth, antioxidant enzyme activity and some other physiological parameters in jojoba [Simmondsia chinensis (Link) Schneider] plant

Fahmy Hassan, Esmat Ali

Abstract:

Reports show that salinity is a major problem that negatively affects agricultural activities all over the world. Although the importance of jojoba as a new industrial crop is known, but information concerning the relation between salt stress and physiological parameters such as antioxidant enzyme activity as well as membrane damage in jojoba has not been reported yet. This study was carried out to investigate the effect of different salinity concentrations i.e. 0, 4, 6, 8, 10 and 12 dSm-1 NaCl on plant growth, leaf measurements, antioxidant enzyme activity and some biochemical and mineral accumulation of jojoba (Simmondsia chinensis (Link) Schneider) plant grown in saline-alkaline soil. Salinity treatments significantly decreased plant height, number of both branches and leaves compared to the control. Salinity stress significantly reduced leaf area, stomatal density, relative water content (RWC), leaf chlorophyll content, N+, PO4-3, K+, Ca+2 and Mg+2, compared to control. Meanwhile, sodium, chloride and total soluble sugars were significantly increased with increasing salinity concentration and the homeostasis of minerals was disturbed. The Na+:K+ ratio was increased with increasing salinity level. Membrane permeability, proline accumulation and antioxidant enzymes activities (SOD, CAT and POD) were increased in salt stressed plants. The increment of both antioxidant enzyme activities and proline accumulation may suggest that they are involving as a part of the defense against salt stress in jojoba plant.

Keywords:

salinity, jojoba, growth parameters, antioxidant enzymes, membrane damage, proline, nutrient status.

Published In:

Australian Journal of Crop Science, 8(12), 1615-1624