قسم النبات
كلية العلوم
جامعة الفيوم

البحث رقم (2)

Title:	Exogenous Myo-Inositol Alleviates Salt Stress by Enhancing Antioxidants and Membrane Stability via the Upregulation of Stress Responsive Genes in Chenopodium quinoa L.
عنوان البحث:	دور الميو-إينوسيتول الخارجي في التقليل من إجهاد الملوحة عن طريق تعزيز مضادات الأكسدة واستقرار الغشاء البلازمي من خلال التحفيز التعبيري للجينات المستجيبة للإجهاد في نبات *Chenopodium quinoa*
اسم المجلة ومعلومات النشر (السنة، العدد، الصفحات):	**Plants** **10(11), 2416 (2021)** https://doi.org/10.3390/plants10112416

Research Article (2)

Background

Myo-inositol has gained a central position in plants due to its vital role in physiology and biochemistry.

Results

This experimental work assessed the effects of salinity stress and foliar application of myo-inositol (MYO) on growth, chlorophyll content, photosynthesis, antioxidant system, osmolyte accumulation, and gene expression in quinoa (*Chenopodium quinoa* L. var. Giza1). Our results show that salinity stress significantly decreased growth parameters such as plant height, fresh and dry weights of shoot and root, leaf area, number of leaves, chlorophyll content, net photosynthesis, stomatal conductance, transpiration, and Fv/Fm, with a more pronounced effect at higher NaCl concentrations. However, the exogenous application of MYO increased the growth and photosynthesis traits and alleviated the stress to a considerable extent. Salinity also significantly reduced the water potential and water use efficiency in plants under saline regime; however, exogenous application of myo-inositol coped with this issue. MYO significantly reduced the accumulation of hydrogen peroxide, superoxide, reduced lipid peroxidation, and electrolyte leakage concomitant with an increase in the membrane stability index. Exogenous application of MYO up-regulated the antioxidant enzymes' activities and the contents of ascorbate and glutathione, contributing to membrane stability and reduced oxidative damage. The damaging effects of salinity stress on quinoa were further mitigated by increased accumulation of osmolytes such as proline, glycine betaine, free amino acids, and soluble sugars in MYO-treated seedlings. The expression pattern of OSM34, NHX1, SOS1A, SOS1B, BADH, TIP2, NSY, and SDR genes increased significantly due to the application of MYO under both stressed and non-stressed conditions.

Conclusions

Our results support the conclusion that exogenous MYO alleviates salt stress by involving antioxidants, enhancing plant growth attributes and membrane stability, and reducing oxidative damage to plants.