Physiological and metabolic responses of two oil-producing plants to salt and alkaline stresses

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Abstract:

In arid and semiarid regions, salinity is among the most important abiotic factors limiting growth of crop plants and yield. The current study was carried out to evaluate some metabolic and physiological responses of two oil producing plants (sunflower and jojoba) grown under osmotic and toxic phases of NaCl and Na2CO3 salts. The two applied salts at the two selected phases markedly decreased salt tolerance index, photosynthetic pigments, anthocyanin pigment, soluble proteins and sodium accumulation factor of shoots and roots of jojoba and sunflower plants. This reduction was significant at the second phase of the applied salts. On the other hand, Na+ concentration and Na+/K+ ratio in shoots and roots of the test plants was increased by increasing NaCl or Na2CO3 level. Moreover, the leakage of K+ and Na+ from leaves of the stressed plants was also increased. Furthermore, NaCl and Na2CO3 supply stimulated glucose, fructose, proline and other free amino acids accumulation in shoots of jojoba and sunflower plants. Sunflower exhibited higher sensitivity to the applied salts compared with jojoba plant.

Keywords:

alkalinity, jojoba, salinity, sunflower.

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