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Document Title : *Response of Senna italica Mill. to salinity*

إستجابة نبات العشرق للملوحة

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Abstract : The effect of different levels of sodium chloride 0, 10, 20, 50, 100, 150, 200 mM. On growth of Senna italica Mill were examined Percentage of seed germination was slightly increased under the treatments of 10 - 50 mM., while decreased under higher levels of salinity. As compared to the control in the dark or under light, but it was always higher under dark. Leaves content of chlorophyll a, and b, and Carotenes was decreased with the increase of salinity and plant age comparing to the control. However, a slight increase in carotenes content was observed at salinity of 10 - 50 mM. High levels of salinity (100 – 200 mM) caused a significant reduction in stem length, leaf area and shoot fresh weight especially at late stage of growth, comparing to the control. Lower concentrations of NaCl ,however, had either no significant effect or caused a slight increase in some growth criteria. Root length increased as salinity increased at all harvests, as compared to the control. Water contents, of shoots and roots were reduced as salinity increased, this was observed even at late stage of growth. The content of organic matter of the plant leaves, stems and roots were also reduced with the increase of salinity and age comparing to the control. Growth rate of shoot and root decreased at late stage of growth at high levels of salinity. The shoot to root ratio, was increased with plant age at salinity of 10 and 20 mM, maintained similar at 50 and 100 mM and decreased at 150 and 200 mM. The plant internal levels of the essential elements were remarkably affected by salinity. Nitrogen contents of leaves and roots slightly increased at salinity of 10 mM, while decreased with the increased salinity, comparing to the control. In stems, in contrast, nitrogen level decreased at treatments of 10 – 50 mM while increased at higher salinity at the early stage of growth but then decreased as plant aged. Phosphorus contents of leaves and stems were not significantly affected by the different treatments. In roots. Sodium accumulation in leaves, stems, and roots were remarkably enhanced by salinity. By the fourth harvest sodium level attained (8 – 10), (9 – 11) and (8 – 10) folds in leaves, stems, and roots respectively as compared to the control. Potassium and magnesium contents of leaves, stems, and roots increased at salinity of 10 and 20 mM but decreased at higher levels of salinity and as plant aged, comparing to the control. Calcium accumulation in leaves was enhanced under salinity of 10 – 50 mM in most harvests as salinity increased while in stems and roots it decreased under the different treatments in most harvests. Iron content of leaves was reduced by salinity especially at levels higher than 100 mM. while it increased in roots after the first harvest under salinity of 10 – 100 mM comparing to the control. Zinc content decreased in leaves as salinity increased and plant aged while increased in roots and was not significantly affected in stems, as compared to the control. Copper level in leaves and stems was not significantly affected by treatments, while in roots it's level was increased by salinity. Chlorides accumulated in leaves, stems, and roots as salinity increased. By the fourth harvest Their levels attained 5.4 folds in leaves, 5.6 folds in stems and 11.7 folds in roots as compared to the control. The ratio of sodium to potassium and sodium to calcium increased with salinity. The ratio of sodium to chloride has decreased at salinity higher than 20 mM. Prolin level remarkably increased in the shoots and roots as salinity increased. It's level was always higher in roots than that in shoots. Finally. Senna italica could tolerate salinity at levels of 10 – 50 mM. Higher levels, however, suppressed the growth but they were not lethal ,However, the plant accumulated sodium, chlorides, and prolin at high levels as a physiological mechanism to tolerate salinity, and at the morphological level, roots length was enhanced.

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