

EFFECT OF CHLORIDE AND SULPHATE DOMINATED SALINITY ON MINERALS CONSTITUENTS OF SENNA (*CASSIA ANGUSTIFOLIA* VAHL.)

Suman Bala*, U.K. Varshney and Anita Kumari

Department of Botany and Plant Physiology, CCS HAU, Hisar

Email: sumanmalika14@gmail.com

Received-03.02.2018, Revised-18.02.2018

Abstract: The present experiment was conducted to study the effect of chloride and sulphate dominated salinity on mineral constituents in leaves of Senna at pod maturity stage, a pot factorial experiment based on randomized complete design with three replicates was conducted in screen house. Four varying EC levels viz. control (without salt), 4, 8 and 12 dSm⁻¹ of each salinity types along with nutrients supplemented in sand filled polythene bags. The study revealed that accumulation of sodium in leaves was recorded with the increase of salinity and it was more under sulphate dominated salinity treatment. Potassium on the hand declined with the increment of salinity and the decline was relatively higher under sulphate dominated salinity. Chloride and sulphate in leaves accumulation was found in chloride dominated salinity and sulphate dominated salinity respectively with the increase of salinity levels. The minerals estimated in leaves at the pod maturity stage an increase of their salts in the growing medium. Potassium on the other hand declined due to exchange with sodium.

Keywords: Chloride, Sulphate, Minerals, Senna

REFERENCES

- Ashraf, M. and Orooj, A. (2006). Salt stress effect on growth, ion accumulation and seed oil concentration in an arid zone traditional medicinal plant ajwain (*Trachyspermum ammi* L Sprague). J. of Arid Environmen, 64: 209-220.
- Bala, S., Duhan, S., Kumari, P. and Manoharlal (2016). Yield attributes and biochemical constituents of medicinal plant Senna (*Cassia angustifolia* Vahl.) as affected by salinity. The Bioscan, 11(2): 737-740.
- Bybordi, A. (2010). Influence of NO₃:NH₄ ratios and silicon on growth, nitrate reductase activity and fatty acid composition of canola under saline conditions. African J. of Agricultural Research, 5: 1984-1992.
- Cerda, A., Caro, M., Farnandez, F. G. and Guillen, M. G. (1979). Germination, vegetative growth and mineral composition of pea plants in saline conditions. Soil Fertil, 44: 34-43.
- Chesin and Yien (1950). Turbidimetric determination of available sulphur. Soil Sci. Am. Proc, 15: 149-151.
- Datta, K. S., Kumar, A., Verma, S. K. and Angrish, R. (1995). Differentiation of chloride and sulphate salinity on the basis of the ionic distribution in genetically diverse cultivars of wheat. J. Plant Nutr. 18: 2199-2212.
- Erdal, I., Urkmen, O. and Yildiz, M. (2000). The development of hyaline fidelities (*Cucumis sativus* L.) grown under salt stress and the effect of potassium formation on changes in some nutrients. J. Agri. Sci., 10(1): 25-29.
- Francois, L. E., Denovan, T. J. and Maos, E.V. (1990). Salinity effects on emergence, vegetative growth and seed yield of guar. Agron. J, 82: 587-592.
- Georgiev, M. and Spasenovski, M. (1977). Effect of soil salting with NaCl and Na₂SO₄ or dry matter production and mineral content of the peas 'M provansaler'. Field Crop Abstr, 33: 7188.
- Hoagland, D. R. and Arnon, D. I. (1950). Water culture method for growing plants without soil. Univ. Calif. Agric. Stat. Circular. 347, 1-39.
- Hussain, K., Majeed, A., Nisar, M. F., Nawaz, K., Bhatti, K. H. and Afghan, S. (2009). Growth and ionic adjustments of chasku (*Cassia angustifolia* vahl.) under NaCl salt stress. American-Eurasian J. Agric and Environ. Sc, 6: 557-560.
- Jaleel, C. A., Sankar, B., Sridharan, R. and Panneerselvam, R. (2008). Soil salinity alters growth, chlorophyll content and secondary metabolites accumulation in *Catharanthus roseus*. Turk J Bot, 32: 79-83.
- Kanta, Rani (2000). Osmotic and ionic effects on germination, seedling growth and metabolite of Isabgol (*Plantago ovata* Forsk.). M.Sc Thesis, CCS Haryana Agricultural University, Hisar, India.
- Kara, S. M. and Keser, S. (2001) Effect of salinity on plant growth and mineral constituents of maize (*Zea mays*). Indian J. Agric. Sci, 73 : 371-374.
- Khan, M. H. and Panda, S. K. (2008). Alterations in root lipid peroxidation and antioxidative responses in two rice cultivars under NaCl- salinity stress. Acta Physiol. Plant,30: 91-89.
- Khan, M. H., Singha, L. B. and Panda, S. K. (2002). Changes in antioxidant levels in *Oriza sativa* L. Roots subjected to NaCl-salinity stress. Acta Physiol. Plant,24:145-148.
- Kukreja, S., Nandwal, A.S., Kumar, N., Sharma, S.K., Sharma, S.K., Unvi, V.K. and Sharma, P.K. (2005). Plant water status, H₂O₂ scavenging enzymes, ethylene evolution and membrane integrity of *Cicer arietinum* roots as affected by salinity. Biol. Plant, 49: 305-308.
- Meiri, A., Kamburoff, J. and Poljakoff-Mayber, A. (1971). Responses of bean plants to sodium

*Corresponding Author

chloride and sodium sulphate salinization. *Ann. Bot.* (London), 35: 837-847.

Munns, R. (2002). Comparative physiology of salt and water stress. *Plant Cell Environ*, 25: 239-250.

Nehru, V. (2003). Physiological responses of Isabgol (*Plantago ovata* Forsk.) genotypes to salt stress. M.Sc. Thesis, CCS Haryana Agricultural University, Hisar, India.

Queslati, S., Bouraoui, N. K., Attia, H., Rabhi, M., Ksouri, R. and Lachael, M. (2010). Physiological and antioxidant responses of *Mentha pulegium* (Pennyroyal) to salt stress. *Acta Physiol Plant*. 32:289-296.

Sharma, S. K. and Kumar, S. (1972). Effect of salinity on Na, K and Cl content in different organs of chickpea and the basis of ion expression. *Biol. Plant*. 34: 311-317.

Siddiqui, S. (1980). Studies on the effects of salinization and desalinization of the media on growth, nodulation, nitrogen fixation and metabolism of pea. M.Sc. Thesis, CCS Haryana Agricultural University, Hisar, India.

Surajkala (2010). Studies on salinity tolerance in clusterbean [*Cyamopsis tetragonoloba* (L.) Taub.] genotypes. M.Sc. Thesis, CCS Haryana Agricultural University, Hisar, India.

Tantawy, A. S., Mawgoud, A. M. R. A., Nemr, M. A. E. and Chamoun, Y. G. (2009). Alleviation of salinity effects on tomato plants by application of amino acids and growth regulators. *European J. of Scientific research*, 30: 484-494.

Yilmaz, E., Tuna, A. L. and Burun, B. (2011). Tolerance strategies developed by plants to the effects of salt stress, *Celal Bayar University*, 7(1): 47-66.