



Faculty of Agriculture

Effect of some plant extracts foliar application on growth and productivity of lettuce (*Lactuca sativa* L.) plants

By

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B.Sc. Agric. Sci. (Horticulture) Fac. Agric., Fayoum Univ., 2012

M.Sc. Agric. Sci. (Horticulture) Fac. Agric., Fayoum Univ., 2018

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Abstract

Two greenhouse experiments were conducted during 2019/2020 and 2020/2021 at the Agriculture Test Station, Faculty of Agriculture, Fayoum University, Egypt, to study the effect of plant growth promoters on morphological characteristics, membrane permeability, leaf photosynthetic pigments content, leaf N, P, K, Ca and Na contents, inorganic and organic osmotica substances contents, productivity and quality of lettuce plants (*Lactuca sativa* L) to elucidate their potential to reduce the harmful effect of soil salinity ($EC = 7.00 \pm 0.20 \text{ dS m}^{-1}$). Treatments comprised of twelve plant growth promoters; palm pollen grains extract (100 and 200 mgL^{-1}), corn grain extract (100 and 200 mgL^{-1}), soybean seed extract (100 and 200 mgL^{-1}), mannitol (1500 and 3000 mgL^{-1}), sorbitol (1500 and 3000 mgL^{-1}) and calcium phosphate (800 and 1000 $\text{Ca}_3(\text{PO}_4)_2 \text{ mgL}^{-1}$), as well as, tap water. The all treatments were applied as foliar application to run-off, three times; 25, 40 and 55 days after transplanting. The experimental layout was a randomized complete blocks design with five replications. All the foliar application of the twelve treatments (plant extracts, mannitol, sorbitol and calcium phosphate) were superior and significantly recorded higher mean values of morphological characteristics, membrane permeability, leaf chlorophyll a, a+b, carotenoids, SPAD chlorophyll contents, leaf N, P, K and Ca contents, inorganic and organic osmotica substances contents as well as decreased of leaf Na comparing to control. This enhanced the plant physio-biochemical components, which reflected on improve productivity and quality of lettuce plants (cv. Big Bell) under saline soil stress conditions of Fayoum Governorate and other similar regions. Generally, foliar application of soybean seed extract at concentration of 200 mg L^{-1} or palm pollen grains extract at concentration of 100 mg L^{-1} were superior and significantly recorded higher mean values of data recorded comparing to other treatments.

Key Words: Lettuce (*Lactuca sativa* L.), Plant extracts, Mannitol, Sorbitol, Calcium phosphate, Morphological characters, RWC, MIS, Leaf photosynthetic pigments, Inorganic and organic osmotica substances, Yield and Quality.