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GERMINATION OF MORINGA OLEIFERA LAM. SEEDS UNDER SALINITY CONDITIONS IN THE PRESENCE OF MAGNETIC IRON

**Hamdy E.B. Moustafa, Gehan H. Abdel-
Fattah and Sayed M Shahin**

*Botanic Gards. Res. Dept., Hort. Res. Inst., ARC,
Giza, Egypt.*

ABSTRACT

A pot experiment was undertaken in the open field at the nursery of Orman Botanic Garden, Giza, Egypt during 2015 and 2016 seasons to examine the effect of NaCl salinity of the soil mixture (sand + clay, 1: 1 by volume) at the levels of 0, 2000, 4000 and 8000 ppm, without or with magnetic iron (Fe_3O_4) at the rate of 2 g/pot (10 seeds in each) on germination characteristics of Horseradish tree (*Moringa oleifera* Lam.) seeds and the quality of the produced seedlings.

The results of this experiment have shown that germination % was descendingly decreased with increasing NaCl concentration to reach 37.5 % at 4000 ppm salinity treatment with highly significant differences compared to control in the two seasons. The seeds subjected to 8000 ppm saline treatment failed to germinate in both seasons. However, amending the soil mixture with 2 g/pot Fe_3O_4 elevated germination % to 100 % for seeds sown in either soil mixture free from salinity (control) or that salinized with 2000 ppm of NaCl salt in the two seasons. The seeds sown in soil mixture salinized with 4000 and 8000 ppm salinity levels, Fe_3O_4 rose their germination % to 50 % in the first season and to 62.5 and 50 % for both in the second one, respectively. The least No. of days to either maximum germination % (G.V.) or 50 % germination (MGR) was attained in the two seasons by control treatment, either in the absence or presence of Fe_3O_4 . Magnetic iron reduced only the means of G.V. and MGR when applied to 2000 ppm salinized soil mixture. The means of germination rate index (GRI), as a real indicator for accelerating germination was significantly decreased in response to the various treatments employed in this study. Similar observations were also obtained regarding the means of vigour index (V.I.), seed viability (S.V.), epicotyl length, seedling length, No. leaves/seedling, root length, No. roots/seedling, top growth and roots fresh and dry weights, as well as the leaf content of chlorophyll a, b, carotenoids, total soluble sugars and total indoles, as the means of these measurements were gradually decreased as the salinity level was increased, but were greatly improved by the application of Fe_3O_4 (2 g/pot) irrespective of salinity level. The opposite was the right concerning total phenols content, which was progressively increased with increasing salinity level either in the absence or presence of Fe_3O_4 . However, applying Fe_3O_4 markedly reduced the increasing rate of phenols by various levels of salinity when compared with the corresponding ones in case of its absence.

From the previous gains, it is recommended to add magnetic iron (magnetite) at the rate of 2 g/pot for best germination of *Moringa oleifera* Lam. seeds and high quality of the resulted seedlings under salt stress.

Key words: germination characteristics, germination rate index, magnetic iron, *Moringa oleifera*, salinity.