

EFFECT OF BIOSTIMULANTS REMEDIATION SUBSTANCES (BRS) ON SEED GERMINATION AND SEEDLING GROWTH OF SOME SUGAR BEET CULTIVARS UNDER STRESS CONDITIONS

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ABSTRACT

Two newly cultivars from sugar beet (*Beta vulgaris*, L.; Chenopodiaceae Pleno(C1) and Plever(C2)) were used to study the effects of certain antioxidant application on elevating the harmful effects of drought stress condition on seed germination as well as seedling growth and its constituents Mannitol levels and/or Ascorbic; AsA, Salicylic; SA, Humic; HA and seaweed; SWE were examined as biostimulants remediation substances (BRS).

Analysis of variance showed a significant effects of Mannitol level and/or the BRS used ($P < 0.001$) on the rate of germination as well as fresh and dry weights of the seedling. The reduction in germination % and the increase in time required for seeds to germinate due to stress was observed in both sugar beet cv(s) studied. However, cv(2) was more susceptible than cv(1) in this respect.

Germination was progressively inhibited by an increase in mannitol level in both cv(s). The strongest inhibition occurred at the third mannitol level (0.3 M) in cv(2). However, cv(1) did not exert any significant effect on ultimate germination % under the 2nd mannitol level. Increasing mannitol level was associated with a marked reduction in AsA, glutathione; GSH, catalase; CAT, guaiacol peroxidase; GPOD and superoxide dismutase; SOD as well as total carbohydrates and total N concentrations, whereas, increased that of H₂O₂ and proline as well as T.S.S. and osmotic pressure of the leaves and roots in both seedling cv(s).

BRS decreased concentrations of H₂O₂ and proline whereas, increased that of AsA and GSH as well as CAT, GPOD and SOD in the development seedling of both cv (s). Treatment with SWE showed an additive effects to that of stress treatments on increasing non-enzymatic and enzymatic antioxidants concentrations in both cv (s). Cv (1) showed, in general higher concentrations of AsA and GSH as well as CAT, GPOD and SOD than that of cv (2).

The interactions treatments showed that any of the BRS used elevating the harmful effect drought stress caused by increasing mannitol level up to 3rd one (3.0 M). Again the SWE followed with HA treatments were the best in this respect.

Keywords: Germination, BRS, stress, mannitol, SWE, AsA, Ha, SA, GSH, CAT, GPOD, SOD, T.S.S, sugar beet.

INTRODUCTION

Water deficient is one of the main limiting factors of sugar beet production in arid and semi arid regions. It have serious impacts as germination and normal development of roots and shoot extension during germination. Moreover, it delaying seedling emergence prolonging critical growth period, increasing changes of seedling damage by pathogenetical and environmental factors. Seed germination and early seedling growth are the