

**Effect Of Some Growth Regulators On Enzymes Involving In  
Germination Of Zea-Maize**

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by

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## APPROVAL SHEET

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EFFECT OF SOME GROWTH REGULATORS ON ENZYMES  
INVOLVING IN GERMINATION OF ZEA-MAIZE

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## ABSTRACT

Amal Hassan Mahmoud. Effect of some growth regulators involving in germination of Zea maize. unpublished, Master of Science, University of Ain Shams, Faculty of Agric., Department of Biochemistry, 1996 .

The present study was carried out to reveal the changes in the biochemical constituents together with some enzyme activities during maize seed germination and the early seedling growth up to 11 days after sowing. Effect of salt - stress (4000 and 6000 ppm NaCl salinized irrigation), gibberellic acid ( $GA_3$ ) (10 and 50 ppm), nicotine (5 and 7.5 mM) were studied. The interaction between salt - stress and pre - sowing treatments was taken into consideration. However, this attempt may correlate these factors and the induction of seed germination which facilitate the mobilization of reserve materials and the utilization of these reservers for axis growth. The carbohydrases ( $\alpha,\beta$  and total amylase), invertase, phosphorylase, oxidative enzymes (peroxidase & catalase) and  $Mg^{2+}$  ATPase were studied to elucidate their behaviour throughout germination and their response to salt stress, constituents  $GA_3$  and nicotine. The changes in the major constituents such as crude protein, soluble sugars and lipid contents were followed. The appearance of chlorophyll a, chlorophyll b and total carotenes were also detected beginning with the seventh day of seedling growth.

Data clearly indicate profound changes in amylases, invertase, phosphorylase and  $Mg^{2+}$  ATPase due to germination process, as their activities increased sharply during the first three days of seedling growth. As seedling age proceeded up to the eleventh day, these changes were decreased. However, these enzymes showed variable responses to salt stress and application of  $GA_3$  and nicotine treatments. It has been found that salinity induces a depressive effect on catalase activity, meanwhile  $GA_3$  and nicotine treatments were found to overcome this inhibitory effect and stimulate its activity.  $GA_3$  treatment resulted in profound inhibitory effect on peroxidase activity throughout seedling age compared with that resulted from nicotine treatment. Salt stress depressed sharply the peroxidase activity at onset of germination, while it attained its activity with increasing seedling age. Application of either  $GA_3$  or nicotine stimulated markedly the peroxidase activity in salt stressed seedlings. Intense changes in soluble sugars, crude protein and lipid content were recorded due to germination

under salinity conditions and application of either GA<sub>3</sub> or nicotine treatments. GA<sub>3</sub> application yielded a remarkable decrease in both chlorophyll a and chlorophyll b and an increase in carotene and vice versa for nicotine treatment. Also chlorophyll a and b were inversely correlated with salinity conditions which favoured carotene accumulation within the salt stressed seedlings throughout seedling stage (11 days). At close application of either GA<sub>3</sub> and nicotine may favour the performance of maize seed germination under salt stress .

**Key words:-** Corn ( zea maize ) , germination, seedling stage, nicotine , salt stress, enzymes, chemical constituents , photosynthetic pigment , growth regulators

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