

## Effects of Different Concentrations of Cytokinin and Auxin Hormones on Yield and Yield Components of Grain Maize (*Zea mays* L.) in Salinity Conditions

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### Abstract

#### Background and Objectives

Maize (*Zea mays* L.) belongs to the family of Poaceae and it is the third important cereal crop of the World after wheat and rice. Salinity is one of the major environmental factors limiting plant growth and productivity. Maize is sensitive to salinity. Ba is one of the cytokinins known to significantly improve the growth of crop plants grown under salinity. IBA is also known to play a significant role in plant tolerance to salt stress. However, little information appears to be available on the relationship between salinity tolerance and auxin or cytokinins levels in plants. In this respect, the objective of this study was to study the effects of spraying of cytokinin and auxin hormones on yield and yield components of grain maize in saline conditions.

#### Materials and Methods

To study the effects of cytokinin (0, 75 and 100 mg.l<sup>-1</sup>) and auxin (0, 15, 20 mg.l<sup>-1</sup>) hormones on yield and its components of grain maize (*Zea mays* L.) under saline conditions, an experiment was conducted during 2013 in the research station of Bushehr Agricultural and Natural Resources Research Center in a factorial design based on randomized complete design with three replications. Cytokinin (Benzyl Adenine, Merck) and Auxin (Indole-3-Butiric Acid, Merck) were sprayed on the entire plant in the evening. Data was analyzed using the SAS (Ver.9.1) and significance of the differences between the means was conducted using LSD test.

#### Results

Results of Analysis of Variance showed that the highest grain yield was obtained by application of cytokinin and auxin with concentrations of 100 and 20 mg.l<sup>-1</sup>, respectively. The characteristics of plant height, stem diameter, ear length, row number per Ear and biological yield increased by spraying 100 mg.l<sup>-1</sup> cytokine. In the treatment of without spraying auxin, the highest kernel number per row was obtained by spraying cytokinin at 75 mg.l<sup>-1</sup> while in the treatment spraying auxin at 15 and 20 mg.l<sup>-1</sup> the highest kernel number per row was obtained by spraying 100 mg.l<sup>-1</sup> cytokinin. In three levels of cytokinin, application of auxin increased 1000 kernel weight. The highest harvest index was obtained by application of auxin at 20 mg.l<sup>-1</sup>.

#### Discussions

It has been found that both auxin and cytokinin may have a role in mediating cell division in the endosperm during the grain-filling stage. Therefore, these hormones might regulate the grain capacity (sink size) for the accumulation of carbohydrates. It was found that IAA actively participated in the mobilization and accumulation of carbohydrates in seeds. Auxin and cytokinins hormones are also thought to be involved in regulating sink strength either by mediating the division and enlargement of endosperm cells or by controlling the import of assimilates to the sink. Results of this study demonstrated that spraying cytokinin at 100 mg.l<sup>-1</sup> and auxin at 20 mg.l<sup>-1</sup> reduced the effects of salinity on yield and increased the grain yield.

**Keywords:** *Hormone, Furrow planting, Foliar spraying, Growth stage.*