

Thesis Submitted in Partial Fulfillment of the Requirement for the degree of Master of Science Ph.D in Agronomy

## Title

The effect of auxin and gibberellin hormones on some agronomic, physiological and biochemical characteristics of Descurainia Sophia under different levels of humic acid

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Spring 2022

#### Abstract

The use of plant hormones in the last decade has been considered due to the expansion of sustainable agriculture and therefore should be investigated in integrated crop management. Humic acid not only improves the chemical, physical and biological properties of the soil, but also increases production due to the presence of a variety of hormones and vitamins. In order to investigate the effect of the application of different plant hormones (auxin and gibberellin) on some agronomic, physiological and biochemical characteristics of sorrel under different levels of humic acid, an experiment was conducted in the form of split plots in a randomized complete block design with 3 Repetition was performed for two years in the research farm of the Agricultural Research Institute of Zabol University (Chah Nimeh). The main factor includes two concentrations of humic acid (0 and 5 liters per hectare) and the secondary factor includes nine concentrations of foliar application including control (foliar spray), auxin hormone in concentrations of 10, 20, 30 and 40 mg. L / indole was butyric acid and gibberellin at concentrations of 15, 30, 45 and 60 mg / 1. The results of combined analysis of data showed that the three-way effect of experimental treatments was not significant for any of the studied traits but the interaction of humic acid and foliar application on plant height, flowering pods, number of non-flowering pods, number of seeds per pod, weight 1000 Grain, grain yield, biomass yield, harvest index, leaf chlorophyll, carotenoids, leaf protein, grain protein, grain saturated fatty acid, grain unsaturated fatty acid, grain mucilage, leaf iron, leaf phosphorus and leaf potassium were significant. Humic acid significantly increased plant height, number of seeds per pod, leaf chlorophyll percentage, harvest index and grain yield. Also, spraying level of 20 mg / 1 indole butyric acid increased plant height, number of seeds per pod, 1000-seed weight, leaf chlorophyll and grain yield. Levels of 60 and 45 mg / l gibberellin increased plant height and 1000-seed weight. The highest number of unopened pods was obtained from a combination of 5 liters per hectare of humic acid and foliar application of 10 mg / 1 of auxin. Nashkofa pouch) was not significantly different. The use of humic acid increased unsaturated fatty acids. Gibberellin was also more effective than auxin in increasing unsaturated fatty acids. Application of humic acid at the rate of 5 liters per hectare increased grain protein and grain mucilage and the highest protein and grain mucilage were observed from the treatment combination of 45 and 30 mg / l gibberellin with the application of 5 liters per hectare of humic acid. The use of humic acid caused the absorption of iron, potassium and phosphorus. Among the hormones of gibberellin and auxin, gibberellin hormone was more effective than auxin hormone in the absorption of the above nutrients.

Keywords: Fatty acids, Indole butyric acid, Pouch flour, Mucilage, Plant hormones.