

## **Effect of NPK chemical fertilizers and nanobiomic spray on yield and yield components of Garlic (*Allium Sativum*)**

### **Abstract**

In order to investigate the effect of NPK chemical fertilizers and nanobiomic spray on yield and yield components of Garlic, an experiment as factorial was conducted in a randomized complete block design with three replications. Garlic cultivars include Chinese, Hamedani and Mazand as the first factor and fertilizer levels including non-fertilizer use (control), full use of NPK fertilizers (from urea, triple superphosphate and potassium sulfate, respectively, at 200, 100 and 150 kg ha<sup>-1</sup>), nanobiomic spray (2 lit ha<sup>-1</sup>), NPK fertilizer + nanobiomic spray (2 lit ha<sup>-1</sup>) as the second factor. The results of analysis of variance showed that the interaction of cultivars and fertilizer levels on plant height, number of cloves, garlic length, garlic diameter, garlic yield, chlorophyll a, chlorophyll b, total chlorophyll and carotenoids concentrations, as well as on leaf nitrogen, phosphorus and potassium concentrations in garlic cultivars was significant. The highest plant height (53.33 cm), number of cloves (13 number), garlic length (4.60 cm), garlic diameter (4.51 cm), garlic yield (8980.88 kg ha<sup>-1</sup>), the highest concentration of total chlorophyll and carotenoids (respectively 1.156 and 0.333 mg g<sup>-1</sup> fresh weight), the highest concentration of nitrogen (0.0077 ppm), phosphorus (3.024 ppm) and the highest potassium concentration of leaf (117.77 ppm) from Hamedani variety, was obtained in complete use of NPK chemical fertilizers and nanobiomic spray application. In general, using Hamadani and then Mazand variety in the conditions of full use of NPK chemical fertilizers and nanobiomic spray, it is recommended to cultivate garlic cultivars in the region.

**Keywords:** Clove, Super phosphate triple, Garlic yield, Nanobiomic, Chlorophyll



University of Zabol  
Graduate School  
Faculty of Agriculture  
Department of Agronomy

**Thesis Submitted in Partial Fulfillment of the Requirement  
for the degree of MSC in Agronomy**

**Title:**

**Effect of NPK chemical fertilizers and nanobiomic spray  
on yield and yield components of Garlic (*Allium sativum*)**

**Supervisor:**

Dr. Mohammad Galavi

**Advisor:**

Dr. Mahmood Ramroodi

**By:**

Ehsan Samani'fard

Summer 2018