

## Effect of nickel nutrition on yield, urea accumulation and urease enzyme activity of lettuce

F.Hosseini\*, A. H. Khoshgoftarmanesh, M. Afyuni and F. Nourbakhsh<sup>1</sup>

(Received : 10 May 2010 ; Accepted : 25 December 2010)

### Abstract

Although nickel (Ni) is known as an essential element for higher plants, the biological effects of this nutrient on growth, yield, and N metabolism of some plants, particularly leafy vegetables, is still unknown. Therefore, this study was carried out to investigate the effects of Ni and urea nutrition on the growth and yield of lettuce (*Lactuca sativa* L. cv. Baker) and urea accumulation in plant tissues. In this study, nitrogen was supplied from the source of urea or ammonium nitrate at three levels (5, 10 and 20 mM) and Ni was supplied in the form of NiCl<sub>2</sub> at two levels (0 and 0.04 μM). The plants were harvested 6 weeks after transplanting and the fresh weight of shoots and roots were determined. The shoots urea concentration and activity of urease enzyme in the leaves were also measured. The results indicated that shoots fresh weight of the urea-fed plants increased with increasing urea concentration in the nutrient solution. Addition of Ni to the nutrient solution significantly promoted the root and shoots fresh weight of urea-fed plants, regardless of N level. Ni nutrition significantly increased the urease activity in the lettuce leaves and as a result, reduced urea accumulation in the shoots and toxicity effects of urea. Therefore, it seems that urea in combination with Ni can successfully be used in production of lettuce in soilless culture systems.

**Keywords:** Nickel, Urea, Urease enzyme, Lettuce, Hydroponic.

---

<sup>1</sup> PhD Student, Assoc. Prof., Prof. and Assoc. Prof., Dept. of Soil Sci., College of Agric., Isf. Univ. of Technol. Isf., Iran.

\*: Corresponding Author, Email: f.hosseini@ag.iut.ac.ir