

## Effect of urea and nickel on growth, physiological traits and total nitrogen concentration of lettuce in hydroponic culture

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### Abstract

Nitrate fertilizers are common source of nitrogen (N) in nutrient solutions. Substitution of urea with nitrate could reduce this dependence. Also, nickel (Ni) is essential for activation of urease in plants fed with urea. For this aim, a factorial experiment was conducted in a completely randomized design with four replicates. Urea in five levels (0, 25, 50, 75 and 100 mg/L) and Ni in two levels (0 and 2 mg/L) were used for lettuce (*Lactuca sativa* cv. Siyahoo) in hydroponics. The results showed that the highest fresh and dry weight of leaves and stem were obtained in 50 mg/L urea treatment. Leaf area was reduced in treatments having more than 25 mg/L urea concentration. The highest chlorophyll index and maximal quantum yield of PS II photochemistry efficiency ( $F_v/F_m$ ) were obtained in 100 and 75 mg/L urea, respectively. Total nitrogen concentration of leaves was increased significantly with increasing urea concentration; plants treated with 100 mg/L urea had the highest total nitrogen concentration. Nickel application reduced yield and physiological traits of lettuce; while it had no significant effect on total nitrogen concentration.

**Keywords:** Nitrate fertilizer, Ni deficiency, Higher plants, Photosynthesis.

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