

## Effects of foliar application of nano-fertile fertilizer containing humic acid on growth, yield and nutrient concentration of mint (*Mentha sativa*) in aquaponic system

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### Abstract

Due to recent droughts in Iran and other parts of the world and consequently limited water resources, tending to aquaponic system, in which fish and plants grow together, is a logical and practical method. For this reason, in the current experiment, possibility of mint planting in aquaponic system and the effects of applying nano-fertile fertilizer containing 60% humic acid on its growth was investigated. Mint rhizomes were planted in pure-perlite-contained pots and after reaching transferable stage, the plants were transferred to coarse-sand medium of aquaponic system. Nano-fertile fertilizer concentrations for foliar spray were 0 (control), 500, 1000 and 1500 mg/L, with 100 mL for each treatment. Foliar application was continued every week, for 6 weeks, and the plants were harvested after 60 days. Results showed that all concentrations of foliar spray of mint plants with nano-fertile fertilizer increased fresh and dry weight of shoot and root as compared to control. Nano-fertile fertilizer increased chlorophyll content, soluble sugars,  $F_v/F_m$ , and PI as compared to control plants. Plant growth enhancement and better physiological conditions of nano-fertile sprayed plants were correlated with higher potassium, phosphorus, calcium, iron, manganese and copper content in shoots of the treated plants. Therefore, considering higher concentration of some nutrients and chlorophyll content in the leaves of plants treated with nano-fertile fertilizer and consequently higher photochemical quantum yield ( $F_v/F_m$ ) and photosynthesis performance index (PI), it is concluded that nano-fertile-treated plants had a better photosynthesis condition and thus carbon fixation was carried out well, dry matter was increased and plant growth was improved.

**Keywords:** Soilless culture, Micronutrients, Macronutrients, Photosynthesis performance index.

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