Effect of water flow rate on quantity and quality of lettuce (Lactuca sativa L.) in nutrient film technique (NFT) under hydroponics conditions

ABSTRACT

In the study of hydroponics, questions have risen concerning about ideal water flow that allow the plant to absorbing highest amount of nutrient from the nutrient solution during irrigating process. Thus, this experiment was aimed to determine the ideal water flow rate in nutrient film technique system in order to optimize the nutrients uptake with growth of lettuce. Different flow rates 10, 20 and 30 L/hour were assigned as T1, T2 and T3, respectively, with lettuce plants and the space between plants 15 cm. Generally, the growth decreased significantly with increasing in water flow rate. The analysis of lettuce hydroponics variable reveals that flow rate at 20 L/hour provides higher mean rank rather than other flow rate 10 L/hour and 30 L/hour. The findings of this research stated that if flow rate is increased to 30 L/hour plant height, number of leaves, number of outer and inner leaves, heat mass and stem mass decreases. On the whole from the analysis it is concluded that for flow rate 20 L/hour enhances the growth rate of lettuce in hydroponics hence it is stated that flow rate of 20 L/hour is good flow rate rather than 10 L/hour and 30 L/hour. Water flow in nutrient film technique is essential to be ideal through allow the plants root to absorb all elements needed form nutrient solutions in hydroponics system. And thus, water movement in the system and the rate of turnover should be designed to ensure good contact time for roots and water flow in the system.

Keyword: Lettuce; Hydroponics; Water flow rate; Nutrient film technique