



Water and fertilizer use efficiency of lettuce plants cultivated in soilless conditions under different irrigation systems

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Received 13 April 2022; Accepted 21 August 2022

ABSTRACT

The lack of agricultural areas and limited access to water facilities forced the researchers to explore innovative water-efficient technologies in Palestine. This study aims at evaluating the biomass, water, and fertilizer use efficiency of soilless lettuce grown under two irrigation systems (surface drip irrigation (SDI) and responsive drip irrigation (RDI)). Two hundred lettuce seedlings were grown in a soilless system, where only the roots extend through standard channels filled with a mix of Peat moss, perlite, and vermiculite. The total number of lettuce plants harvested from the RDI system was 90 out of 100, while 66 out of 100 plants were harvested from the SDI system. RDI system had lower water consumption than SDI (340 vs. 440 L), with higher productivity (7.755 vs. 2.885 kg of lettuce). The water use efficiency in the RDI system was higher than in the SDI system (22.81 vs. 6.56 g/L). The RDI system improved the fertilizer use efficiency compared to the SDI system (10.34 vs. 3.85 kg/g). Soilless media with RDI has the potential for water-efficient and productive agricultural systems.

Keywords: Irrigation improvement; Crop management; Responsive drip irrigation “RDI”; Surface drip irrigation “SDI”

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Presented at the 1st Palestinian-Dutch Conference on Water, Sanitation and Hygiene (WASH), and Climate Smart Agriculture (CSA), 5–6 September 2022, Nablus, Palestinian Authority

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