

Functional Design of Pocket Fertigation under Specific Microclimate and Irrigation Rates: A Preliminary Study

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Abstract	<p>Irrigation and fertilization technologies need to be adapted to climate change and provided as effectively and efficiently as possible. The current study proposed pocket fertigation, an innovative new idea in providing irrigation water and fertilization by using a porous material in the form of a ring/disc inserted surrounding the plant's roots as an irrigation emitter equipped with a "pocket" /bag for storing fertilizer. The objective was to evaluate the functional design of pocket fertigation in the specific micro-climate inside the screenhouse with a combination of emitter designs and irrigation rates. The technology was implemented on an experimental field at a lab-scale melon (<i>Cucumis melo</i> L.) cultivation from 23 August to 25 October 2021 in one planting season. The technology was tested at six treatments of a combination of three emitter designs and two irrigation rates. The emitter design consisted of an emitter with textile coating (PT), without coating (PW), and without emitter as a control (PC). Irrigation rates were supplied at one times the evaporation rate (E) and 1.2 times the evaporation rate (1.2E). The pocket fertigation was well implemented in a combination of emitter designs and irrigation rates (PT-E, PW-E, PT-1.2E, and PW-1.2E). The proposed technology increased the averages of fruit weight and water productivity by 6.20 and 7.88%, respectively, compared to the control (PC-E and PC-1.2E). Meanwhile, the optimum emitter design of pocket fertigation was without coating (PW). It increased by 13.36% of fruit weight and 14.71% of water productivity. Thus, pocket fertigation has good prospects in the future. For further planning, the proposed technology should be implemented at the field scale.</p>
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