



## **Capillary irrigation by wick in the lettuce crop (*Lactuca sativa* L.) in a combined system of nutrient solution and soil**

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In the urban centers of western Bolivia there are problems to transport vegetables from the inter-Andean valleys, because most of the roads are dirt roads and are in areas of rugged topography. In addition, there are recurrent droughts in these areas. As a consequence, urban agriculture is becoming increasingly popular, which is why it is necessary to make efficient use of water, with adequate plant nutrition techniques. The study was carried out in greenhouses of the Universidad Mayor de San Andrés, in the city of La Paz at 3400 masl, at 16°32' S and 68°8' W, in two production cycles of the lettuce crop (*Lactuca sativa* L.) Var . Waldman's Green. Two systems, irrigation with wick and without wick (in the first cycle only with wick), two types of soils (loamy and sandy) and three types of nutritive solutions (FAO, La Molina and Boliviana) were used. Additionally, the evaporation of water from the soil in systems without crop was determined. Recycled plastic containers of 5 liters were used for cultivation. Initially, the upper part was cut, and it was turned to place the soil. In the lower part, the nutritive solution was placed together with the water in a total volume of 2700 cm<sup>3</sup>. Subsequently, a cotton wick was inserted to the bottom of the container. To eliminate the evaporation of water, the soil was covered with aluminum foil. The three nutritive solutions combined with the two types of soils gave six treatments.

In the first cycle, the average total water consumption due to transpiration varied from 2263 to 2335 cm<sup>3</sup> / plant, and the water productivity through transpiration was between 25 to 40 g / L. In the second cycle, the water consumption in irrigation by wick fluctuated from 2246 to 2469 cm<sup>3</sup> / plant, and the water productivity between 26 to 40 g / L; in the irrigation without wick the water consumption varied between 2296 to 2469 cm<sup>3</sup>/ plant, and the water productivity between 26 to 42 g / L. . There were no significant differences regarding water consumption. Water consumption by evaporation was higher than transpiration, mainly in containers with sandy soil and wick. The nutrient solution that gave the best results was the one recommended by FAO, since it is the most complete. In relation to the substrates used (loam and sandy soil) there were no significant differences in yield.

Water consumption in wick irrigation systems was low compared to hydroponic lettuce cultivation systems. Additionally, there is labor savings when water is applied at one time, as well as energy savings.