

## The Hydraulic Evaluation of Lhb and Dis as a Localized Irrigation Systems and treated Agricultural Wastewater for Potato Growth and Water Productivity

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**Abstract:** A field experiment was conducted during 2013 and 2014 at the Experimental Farm of National Research Center (NRC), El-Noubaria Governor, Egypt, in sandy soil to study the hydraulic evaluation of localized irrigation systems LHB and DIS (Low Head Bubbler and Drip Irrigation System), water quality (fresh and treated), and water amounts (100, 80, 60 % from ET) on vegetative growth, tuber yield and water productivity (WP). In the hydraulic evaluation of irrigation system used, the pressure head losses by using LHB irrigation system was 0.21 m head or 2.1 %, while in DIS irrigation system pressure head losses was achieved 1.925 m or 19.25 %. In this hydraulic evaluation we can notice that LHB irrigation system saved the operating irrigation system energy by 17.15 % relative to DIS irrigation system. The parameters of vegetative growth (plant length, LAI; branches number) under irrigation system, treated waste water (TWW) were increased by 6.0 %, 14.6 %; 15.3 % relative to LHB irrigation system and FW, respectively. Yield and WP under DIS irrigation system, increased by 5.4 % and 5.7 % relative to LHB irrigation system and fresh water (FW), respectively. Plant length and leaf area index (LAI) were the highest values under the control treatment (100% ET to water applied), while the branches number increased by decrease of applied water. The effect of irrigation by DIS irrigation system and using TWW was positively on vegetative growth parameters, (yield and WP). This could be attributed to the improvement in soil physical characteristics under using DIS irrigation system relative to LHB irrigation system and the soluble nutrients in the TWW relative to fresh water.

**Keywords:** LHB, DIS, Irrigation system, FW, TWW, WP, FP, Potato.

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