Desalination and Water Treatment
www.deswater.com
doi: 10.1080/19443994.2014.915767

54 (2015) 1344–1352
April

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Nutrient removal by different plants in wetland roof systems treating domestic wastewater

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Received 15 January 2014; Accepted 14 April 2014

ABSTRACT

This study evaluated nutrients removal from domestic wastewater by five plants in wetland roof systems (WR). The study plants include *Arachis duranensis* (1), *Evolvulus alsinoides* (2), *Cosmos Bipinnuatus* (3), *Cyperus alternifolius* Linn (4), and *Philodendron hastatum* (5). The WRs were acclimatized at hydraulic loading rates (HLR) of 220 m^3/ha d and operated at HLR of 300 m^3/ha d. The plants (1), (2), (4), and (5) had the ability to grow under the rooftop conditions with domestic wastewater as a nutrient source while the plant (3) was not suitable and dead after 20 d of operation. Generally, *A. duranensis* (1) and *C. alternifolius* Linn (4) were the most suitable plants treating domestic wastewater under the conditions of WR. The average phosphorus removal efficiencies of (1) and (4) were approximately 75 and 89%, respectively, while the average nitrogen removal efficiencies were 69 and 92%. The phosphorus accumulation in plants (1) and (4) during operation was 20.4 and 29.4%, respectively, while the nitrogen accumulation was 21.5 and 93%. It is concluded that *C. alternifolius* Linn (4) has best nutrient removal among the study plants under the conditions of shallow bed WR treating domestic wastewater (24 ± 4 and 2.0 ± 0.4 kg TP/ha d).

Keywords: Wetland roof; *Arachis duranensis; Evolvulus alsinoides; Cosmos Bipinnuatus; Cyperus alternifolius* Linn; *Philodendron hastatum*

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Presented at the 6th International Conference on the "Challenges in Environmental Science and Engineering" (CESE-2013), 29 October–2 November 2013, Daegu, Korea