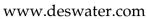
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Nutrient removal by different plants in wetland roof systems treating domestic wastewater

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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 $(24\pm 4\ and\ 2.0\pm 0.4\ kg\ TP/ha\ d)$.

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

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