



CONSTRUCTED WETLANDS FOR TREATING REVERSE OSMOSIS BRINE WATER GENERATED BY DOMESTIC LEVEL RO FILTRATION SYSTEM

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Abstract: Several studies indicated that the major issue of RO plant is brine generation (Reverse Osmosis Concentrate-ROC) as by-product. ROC is mainly discharged into natural water bodies and into the ground with or without dilution. This action negatively impact on the groundwater quality and causes the drinking water issues, especially in the Northern Province of Sri Lanka. This study aims to assess the effluent of ROC passing through constructed wetlands in Vavuniya. Two pilot-scale surface flow constructed wetlands (CWs), each measuring 2.5 m x 1.0 m x 0.4 m, were established in Vavuniya. Native plants, *Canna indica* and *Scirpus grossus*, were planted in each CW separately, maintained for a month, and then the ROC was passed through. 15 trials were done having the hydraulic retention time (HRT) as one day in both CWs. Chemical parameters in influent and effluent samples were analyzed using standard laboratory testing methods. The results revealed that *Canna indica* reduced the total dissolved solids (TDS), alkalinity and hardness by 4.17%, 7.27% and 11.29% respectively in one day HRT. Corresponding reductions for *Scirpus grossus* were found to be 6.92% of TDS, 5.68% of alkalinity and 7.61% of hardness while deploying one-day HRT. Student *t*-test confirms that *Canna indica* and *Scirpus grossus* significantly reduced TDS and alkalinity ($p < 0.05$) whereas no significant reduction was observed on hardness. Though the reduction of TDS and alkalinity is statistically significant in both CWs, they are by low percentages. Hence, this study recommends to explore coagulation as a pretreatment method for ROC in future holds for optimizing the performance and environmental sustainability of constructed wetlands in treating ROC.

Keywords: Constructed wetland; ROC; Wastewater treatment.

Supervised (internal) by: Prof. (Ms.) A. Nanthakumaran