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Effectiveness of Constructed Wetlands with Floating Macrophyte for Removal of Reverse Osmosis Rejects in Chronic Kidney Disease of unknown Etiology (CKDu) Affected Area in Wilgamuwa, Sri Lanka.

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Abstract

Reverse osmosis is a water purification technology which uses a semipermeable membrane under pressure to remove particulate and dissolved contaminants mainly pathogenic microorganism, organic compounds, hardness and heavy metals. The research aimed the reject water from reverse osmosis purification unit installed in the agrarian service centre, Handungamuwa, Wilgamuwa which is located in Chronic Kidney Disease of Unknown Etiology prevailing area of Sri Lanka. Improvement of the quality of reverse osmosis reject water, suitable treatment for reverse osmosis rejects and finding out the possibility of Water Hyacinth (Japan Jabara) to treat reverse osmosis rejects were the main objectives of this study. The wetland was constructed with *Water Hyacinth* (Japan Jabara), a floating macrophyte in reject water. The horizontal subsurface flow constructed wetland was created at a hydraulic retention time of 4 days with dimensions of 0.6×0.3×0.2 m. Removal efficiency of physical and chemical parameters including pH, electrical conductivity, total alkalinity, total dissolved solids, total hardness, nitrate, calcium, magnesium, copper, manganese and cadmium were analysed in the constructed wetland. Results revealed that the constructed wetland has a maximum removal efficiency of manganese, nitrate, copper, cadmium and total alkalinity with a percentage of 64.29%, 42.37%, 34.38%, 29.63% and 27.23% respectively. Magnesium, calcium, total hardness, total dissolved solids and electrical conductivity were not removed by the constructed wetland. According to the previous research studies it has been proved that the constructed wetland with Water Hyacinth has the ability to remove most of the chemical and physical parameters from industrial waste water. But, according to the results it is possible to conclude that the constructed wetland with Water Hyacinth has a lesser efficient in the treatment of reverse osmosis reject water than the waste water generating from the industries.

Keywords: Chronic Kidney Disease of Unknown Etiology, Reverse osmosis rejects, Water hyacinth