Reverse osmosis - is it the answer to the burning water problem in Anuradhapura? (A preliminary study)

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Abstract

Due to prevailing Chronic Kidney Disease of unknown etiology (CKDu) in Anuradhapura District, water filtered through Reverse Osmosis (RO) has become the main source of drinking water in rural areas. This RO filtered water is considered potable, therefore it's usually consumed without boiling. To check the quality of RO filtered water, this preliminary study was carried out to determine the physical, chemical and microbial content of water before and after being filtered by RO filters present in two faculties of Rajarata University of Sri Lanka. The results were compared with recommended Sri Lankan Standards for potable water (SLS 614: 2013).Water samples from 7 RO filters (before and after filtration by RO filter) were tested for pH, electrical conductivity, alkalinity, total dissolved solids, Nitrate, Phosphorus, Ammonia, Sodium, Magnesium, Calcium, Cadmium, Arsenic and Lead concentrations. Testing was done using standard analytical procedures with inductively coupled plasma-optical emission spectrophotometer (ICP-OES) and UV visible spectrophotometer. In addition, total coliform and *E.coli* contamination was checked using the Most Probable Number method. In all samples tested before and after filtration, all parameters tested except for Lead and Ammonia concentration were in par with the SLS standards. Lead and Ammonia concentrations were higher than the permissible SLS values in all water samples tested. Before filtration, concentrations of Lead and ammonia greater than the SLS standards were detected in 6 (85.71%) and 7 (100%) samples respectively. After filtration all samples had Lead and Ammonia concentrations greater than the permissible SLS values. The reason for the lower Lead concentration before filtration in one sample was unclear. However, with a large sample number a sound explanation for this would be possible. Of the 7 water samples, total coliform count was greater than permissible SLS values in 6 (85.71%) and in 4 (57.14%) samples before and after filtration respectively. Before filtration *E.coli* count of only one sample was higher than the SLS value and none were contaminated with *E.coli* after filtration. As coliforms are present in RO filtered water, it should be boiled before consumption. If this study could be done on a large scale, quality of water filtered by the RO filters could be determined precisely.

Keywords: *Anuradhapura, CKDu, Potable water, RO filters, SLS standards*

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