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## A cost effective electrocoagulation system for improving drinking water quality

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Electrocoagulation method is an advanced technology used to remove various substances. The aim of the study was to investigate the efficiency of this technique in removal of water hardness under different conditions. This experimental was performed using batch cell with effective volume 4.5 L. Six iron and aluminium electrodes with 1cm interelectrode distance and total effective area of 0.336 m<sup>2</sup> were used. Electrodes were connected to the DC power supply in a monopolar and dipolar mode. Jaffna peninsula was selected as study area where groundwater is the major water source. One of the undesirable character is excessive hardness. SLS maximum limit of hardness is 250 mg/L for potable water. There are concerns associated with hard drinking water as health complication, unfavorable taste, deposition in the pipe lines, scaling and less efficiency of detergents. Electrocoagulation was used to remove hardness from the drinking water. Ten wells were selected in different area in Jaffna Peninsula. Chemical parameters and heavy metal analysis were done for raw water and treated water samples. The results showed that the greater removal efficiency has occurred addition of 0.01g NaOH, pH 9, voltage 20 and running time of 20 min; which was 80% for total hardness. Along with hardness Chloride, Nitrate, phosphate, and Fluoride were removed. Heavy metal analysis was shown reduction in the initial heavy metal concentration. Unit with Iron electrode cost was 74% lower than unit with aluminium electrode. The results suggested that the electrochemical technique might be used as an alternative for hardness removal.

**Keywords:** *Electrocoagulation, limestone aquifer hardness, electrodes, monopolar, diepolar*