Study on the removal of iron and manganese in groundwater and surface water by oxidation and micro filtration

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Water resources are becoming increasingly scarce in many areas of the world due to development, and increased demand. Groundwater is the major natural water resource in the Jaffna peninsula. One of the problems related to groundwater is the reddish colour caused by the presence of ferrous and manganese which may cause taste, odour, colour, or turbidity problems.The objectives of the study were focused on removal efficiency of iron and manganese, turbidity, color, and bacteriological parameters through oxidation and microfiltration process and consideration of low cost and suitability in domestic level. Water samples were collected with problematic locations as especially from Thenmaradchi for iron and manganese, Thirunelvely, and Pasaiyoor and Kurunagar areas pond water for coliforms and E.Coli. Preliminary test was conducted to select suitable aeration time and overnight aeration was identified based on the removal efficiency. The iron, manganese, color, turbidity, pH, electrical conductivity, alkalinity, fluoride, sulphate, total phosphate, chloride, nitrates, total coliforms and *E.Coli* were tested for raw and treated water samples. The iron removal efficiency through micro filtration alone was varied from 18% to 100% and the manganese removal efficiency was varied from 65% to 100%. Higher percentage of Mn^{2+} was removed by microfiltration compare to Fe^{2+}. But the removal efficiency for both Fe^{2+} and Mn^{2+} was 95% by oxidation and microfiltration process for surface and groundwater. The color and turbidity both reduced due the removal of iron and manganese. The bacteriological removal efficiency, total coliforms and *E.Coli* was 100%. There were no different in other water quality parameters.

Microfiltration process also reduces the nitrate nitrogen content of the groundwater. Microfiltration could be introduced for treatment of groundwater and surface water for color, turbidity, iron and manganese and bacteria removal at domestic level.

Keywords: Ground water, Iron, Manganese, Micro filtration, Oxidation, Surface water.