

Experimental Evaluation of Electrocoagulation for Hardness Removal of Bore Well Water

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Abstract : Water is an important resource for the survival of life. The inadequate availability of surface water makes people depend on ground water for fulfilling their needs. However, ground water is generally too hard to satisfy the requirements for domestic as well as industrial applications. Removal of hardness involves various techniques such as lime soda process, ion exchange, reverse osmosis, nano-filtration, distillation, and, evaporation, etc. These techniques have individual problems such as high annual operating cost, sediment formation on membrane, sludge disposal problem, etc. Electrocoagulation (EC) is being explored as modern and cost-effective technology to cope up with the growing demand of high water quality at the consumer end. In general, earlier studies on electrocoagulation for hardness removal are found to deploy batch processes. As batch processes are always inappropriate to deal with large volume of water to be treated, it is essential to develop continuous flow EC process. So, in the present study, an attempt is made to investigate continuous flow EC process for decreasing excessive hardness of bore-well water. The experimental study has been conducted using 12 aluminum electrodes (25cm*10cm, 1cm thick) provided in EC reactor with volume of 8 L. Bore well water sample, collected from a local bore-well (i.e. at - Vishrambag, Sangli; Maharashtra) having average initial hardness of 680 mg/l (Range: 650 - 700 mg/l), was used for the study. Continuous flow electrocoagulation experiments were carried out by varying operating parameters specifically reaction time (Range: 10 - 60 min), voltage (Range: 5 - 20 V), current (Range: 1 - 5A). Based on the experimental study, it is found that hardness removal to the desired extent could be achieved even for continuous flow EC reactor, so the use of it is found promising.

Keywords : hardness, continuous flow EC process, aluminum electrode, optimal operating parameters

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