

# Design and Manufacturing of Electrocoagulation Based Domestic Water Purification System

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## Abstract

Water is one of the basic needs for every living being. However, the amount of drinkable water available on the earth surface is considerably low due to human activities and other natural disasters like flooding. With increasing population, demands for the drinking water also increases and need to apply various techniques to purify water in rivers and reservoirs to fulfil the drinking water demand. Therefore, it is essential to find the ways to remove heavy metals, microorganisms, sediments, organic compounds and fluoride in water obtain from rivers and reservoirs. Various techniques have been used to purify water taken from rivers and reservoirs before use as domestic purposes. In this work, domestic scale water purification system was designed and studied on the effect of different parameters in purification process. Heavy metal like arsenic was removed by electrocoagulation technique with aluminium electrodes. This process was carried out by changing the reaction time and the settling time with supply voltage of 12 V (DC). Current density was kept as 0.55 mA/cm<sup>2</sup>. The highest arsenic removal was obtained at the reaction time of 5 minutes and settling time of 24 hours. Suspended particles were filtered by a cloth mesh of 149 micron. Fluoride was removed by using a bed type filtration device with different absorbents materials. In this defluoridation process, kaolinite which was used as absorbent material, showed 77.47 % of fluoride absorption. According to the results, the parameters tested herein for the water sample was found to be in good proximity with the World Health Organization requirements for drinking water.