

# Hardness Removal from Drinking Water Using Inorganic Ion Exchange Resin- Zeolite

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The hardness of drinking water has become a major environmental problem at present and it has to be removed using cost effective technologies. This research focuses on using synthesized inorganic zeolite as an inorganic ion exchange resin for hardness removal. It is to be achieved by controlling the physical parameters on performance of zeolite in different hardness level of water. The research approach includes both batch and column experiments performed in laboratory condition to determine optimum level of zeolite on the removal process of  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  from water. A Batch contact time experiment was carried out with varying contact time for 10 g L<sup>-1</sup> of a constant adsorbent mass at the concentration of 250 ppm for both  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$ . One hour was the optimum time. Accordingly, the experiment was carried out by varying adsorbent mass for different hardness level of Synthetic Hard Water (SHW). The different hardness level of water samples was reduced by 80-95% from 3-5 g dosage of zeolite. The data obtained from the batch adsorption system is not applicable for design a continuous adsorption system. Then, column sorption studies were carried out using fixed bed column, which was filled with sand and zeolite, mixed in 1:1. The influent flow rate and concentration of the SHW solution were kept constant at 12.7 mL min<sup>-1</sup> and 100 ppm, respectively. The column was reached exhaustion after the 30 min, according to the breakthrough curve for the column. According to results, it can be concluded that synthetic inorganic zeolite can be used to remove hardness from all the hardness range of moderately hard water, hard water and very hard water in high percentage (80-95%).

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