



Removal of nitrate from drinking water by adsorption using ion exchange resin

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ABSTRACT

Ion exchange technology is currently the best way to remove nitrate from drinking water. A commercial resin was tested to examine the effectiveness of adsorption for nitrate removal; the resin is Amberlite IRA 400, since it is considered the most promising owing to its chemical stability and ability to control surface chemistry. KNO₃ solution (22.15 mg L⁻¹) was used in batch adsorption experiments. Adsorbent dosages were varied from 0.875 to 5 g L⁻¹. An increase in adsorbent dosage increased the percent removal of nitrate. The retention was initially very fast and maximum retention was observed within 30 min of agitation. Two simplified kinetic models were considered to investigate the ion exchange mechanisms, i.e. the liquid film diffusion and the intra-particle diffusion models, and it was shown that the former controlled the beginning of the process while the latter predominated at the end of the process.

Keywords: Adsorption; Ion-exchange resins; Kinetic models; Nitrate removal

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