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Nitrate removal from aqueous solutions by nanofiltration

Amir Hossein Mahvi[a,b], Mohammad Malakootian[c]*, Ali Fatehizadeh[c], Mohammad Hassan Ehrampoush[d]

[a]*School of Public Health and Center for Environmental Research, Tehran University of Medical Sciences, Tehran, Iran*
[b]*National Institute of Health Research, Tehran University of Medical Sciences, Tehran, Iran*
[c]*School of Public Health, Kerman University of Medical Sciences, Kerman, Iran*
Tel. +98 9131401536; Fax +97 3413205105; email: m.malakootian@yahoo.com
[d]*School of Public Health, Yazd University of Medical Sciences, Yazd, Iran*

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ABSTRACT

Due to excessive usage of nitrate fertilizers in agricultural sectors and dumping of domestic wastewaters, nitrate levels of water resources are increased in aqueous environments. Increased nitrate-containing compounds in the water resources, could lead to serious problems including eutrophication, and cause potential hazards for human and animal health. The aim of the present study was to investigate the effectiveness of nitrate removal from aqueous environments using nanofiltration (NF) membranes. In this study, the effect of different factors such as initial nitrate concentration, flow rate and associated cation and co-existing anions on the retention of nitrate by NF was examined. The results showed that with increased initial concentration of nitrate, flow rate and associated anions, the removal efficiency of nitrate decreased. The experiment indicated that many of negative charge groups on the membrane surface are covered by cations. The divalent cations covered membrane charge more effectively than monovalent cations. The result showed with high removal of sulfate ion, many nitrates are forced to pass through the membrane. The highest nitrate removal efficiency was 80.5%. According to the findings of this study, NF membrane usage could be recommended as an effective and reliable method for removing nitrates from aqueous environments.

Keywords: Water treatment; Flow rate; Co-anion; Associated cation; Membrane; Kerman water

* Corresponding author.