

ANION EXCHANGE PROCESS FOR SELECTIVE NITRATE REMOVAL FROM LIQUID VEGETABLE PRODUCTS

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Nitrate selective anion exchange resins primarily developed for the treatment of water supplies were successfully applied to nitrate removal from more complex systems like liquid food products or processing media. This new application is a promising alternative to microbiological denitrification.

Experiments to determine selectivity of these anion exchange materials were conducted in 7 major anion species present in vegetables. The exchangers tested prefer nitrate to all other anions. For all exchangers tested the following selectivity sequence was obtained:

Nitrate > Oxalate > Malate > Nitrite > Sulfate > Chloride > Phosphate

Hence, both nitrate and oxalate could possibly be removed.

Exchange equilibria were described by a theoretical approach that allows the prediction of multicomponent equilibria by parameters of binary equilibria. There is an excellent agreement between predicted and experimental data.

Breakthrough experiments in a complex vegetable extract (spinach blanching broth) confirmed the selectivity sequence derived from binary equilibria studies. It may be concluded that this vegetable extract does not contain substances of higher affinity to the exchanger than nitrate.

Fouling caused by adsorption of organic substances on the ion exchanger materials did not reduce exchanger performance over repeated cycles. Adsorption has been found to decrease with increasing numbers of exchange/regeneration cycles.

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ABSTRACTS