

Removal of Ammonium Ions from Fellingmongery Effluent by Zeolite.

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Abstract: The introduction of the Resource Management Act in 1991 in New Zealand enforces statutory requirements for the disposal of farm and industrial wastewaters in ways that minimize environmental impacts. Wastewaters often contain high concentrations of **ammonium** (NH₄⁺) phosphate (H₂PO₄⁻) and potassium (K⁺) **ions**, and in some cases heavy metals. **Zeolite** is a naturally occurring, porous and electrically-charged aluminosilicate mineral, which can be used to adsorb cation and anion contaminants from wastewater. **Zeolites** of New Zealand origin were obtained from New Zealand Resource Refineries Ltd. and evaluated for their effectiveness to remove NH₄⁺ **ions** from a **fellingmongery** wastewater stream. The natural **zeolites** were of clinoptilolite species and had high cation exchange capacity (CEC) (> 100 cmol kg⁻¹), which after treatment with alkali solutions increased by up to 74%. The CEC of the **zeolites** indicated that these samples can hold a potential maximum of 18.7 to 20.1 g NH₄⁺ kg⁻¹ **zeolite**. The adsorption of NH₄⁺ **ions** by the **zeolites**

increased with increasing NH_4^+ concentration in the **fellingmongery** wastewater. The presence of other cations in the **fellingmongery** wastewater apparently interfered with NH_4^+ ion adsorption, resulting in only a small fraction of the CEC getting occupied by the NH_4^+ ions. Although an increase in CEC due to alkali treatment increased the adsorption of NH_4^+ , H^+ ion saturated **zeolites** adsorbed higher amount of NH_4^+ ions than the **zeolites** saturated with other cations. The cation-loaded **zeolite** was regenerated for NH_4^+ ion adsorption by leaching with 0.5 M HCl, and even after 12 regeneration cycles the amount of NH_4^+ ion adsorption remained unaffected, indicating the potential for recycling **zeolite** for removing NH_4^+ ions from the waste stream. [ABSTRACT FROM AUTHOR]

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