Using adsorbent natural material for ammonium and ammonia removal

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The usage of natural sorbents in N recovery can be helpful in modification of the natural N cycle, to avoid further growth of anthropogenic reactive N environmental impact and its changes. Although natural minerals possess advantage such as good selectivity to NH4+, good availability, and low cost, they have not been widely used on a commercial scale for wastewater treatment, probably because the exchanged minerals require further disposal, or because of the application of the regeneration process.

Natural material (NM), metal oxide material derived from the quartz sand enrichment process have been successfully utilized for their ammonia removal efficiency. A comparison of mathematical model applied to the adsorption of ammoniacal nitrogen was evaluated for the Langmuir and Freundlich adsorption models. We obtained much higher R^2 values (0.993) for the Freundlich model, compared to the Langmuir model for the ammonium removal by NM. Various kinetic models have been proposed and used to study and describe the mechanism of a solute uptake by an adsorbent from aqueous solution. In the present study two models are considered to describe the adsorption kinetics for the experimental data: the pseudo-first order kinetics model by Lagergren and the second-pseudo order kinetics model by Ho & McKay. The obtained data revealed that pseudo-second order equation provides the best correlation coefficient with high values (0.9988).

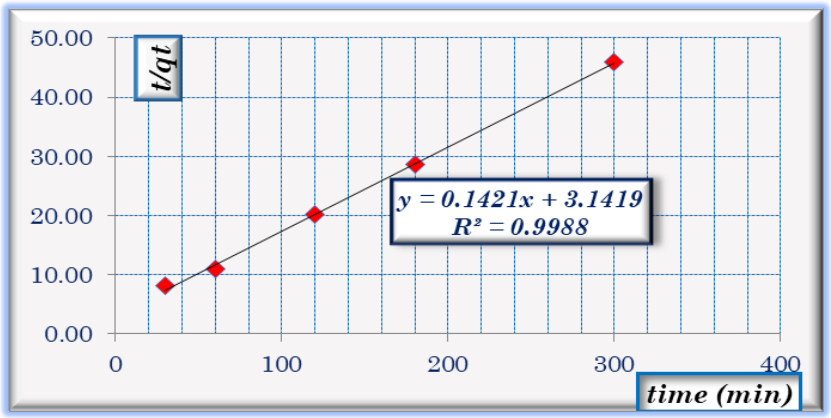

Figure 1: Pseudo-second order graph

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