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EVALUATION OF CLAY SOIL EFFICACY CARRYING ZERO-VALENT IRON NANOPARTICLES TO REMOVE NITRATE FROM AQUEOUS SOLUTIONS

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Evaluation of nitrate removal from water resources by using clay soil adsorbent with zero-valent iron nanoparticles as reduction factor was the objective of this study. The optimal parameters such as pH, contact time, amount of adsorbent and various nitrate concentrations were then determined and adsorption isotherm coefficients were calculated based on optimum conditions. The optimal parameters in real solution samples were then analyzed. Physical features of adsorption column were determined using SEM and TEM tests. Data analysis was performed using descriptive statistics. At pH 3, contact time of 80 min, the amount of adsorbent 10 g/L and nitrate concentrations of 50 mg/L; maximum nitrate removal rate 99 % was achieved. This amount was 95 % in real solution. Nitrate uptake absorption was conducted using the Freundlich isotherm model. Regarding removal efficiency of 95 %, clay soil modified by zero-valent iron nanoparticles had high capacity to remove nitrates from water. This method is thus recommended.

Keywords: nitrate, isotherms, absorption.

Introduction

Water pollution by nitrates is considered as a serious problem [1, 2]. Indiscriminate uses of nitrogenous fertilizers, lack of proper management of urban and industrial wastewater are major sources of nitrates entering water

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