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## NITROGEN ADSORPTION OF SHALE FOR USE AS MEDIA IN CONSTRUCTED WETLAND

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### Abstract

The constructed wetlands are considered as a low-cost alternative system for nitrogen removal. Shale was selected as a media in constructed wetlands, on the basis of adsorption capacity and suitability for plant growth. The specific objective of this study was to evaluate nitrogen adsorption capacity for using as a media in constructed wetlands. Shale was sieved into 5 particle sizes Shale A-E. The physical and chemical characteristics of shale showed that it is suitable to be use as a media in constructed wetlands. The nitrogen adsorption data corresponded well with Langmuir and Freundlich isotherm. Nitrogen of adsorption capacities increased when the particle size and temperature decreased, increasing the adsorbate dosages and contact time. The maximum ammonium and nitrate adsorption capacities were obtained at the pH of 6 and 2, respectively. The results of highest adsorption capacities of Shale E were equal 0.18 mg g<sup>-1</sup> for both ammonium and nitrate. The ammonium and nitrate removal efficiencies of Shale A-E were found to be in the range of 52.95-69.06% and 57.04-72.04% respectively. These results of shale were better than those of sand and gravel. Therefore, it can be concluded that shale has a potential to be utilized as a media to remove nitrogen in constructed wetlands.

*Key words:* adsorption, ammonium, constructed wetland, nitrate, shale

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