

Comparison study of COD and ammoniacal nitrogen adsorption on activated coconut shell carbon, green mussel (*Perna viridis*), zeolite and composite material in stabilized landfill leachate treatment

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ABSTRACT

Ammoniacal nitrogen and organic constituent (COD) are two crucial problematic parameters in leachate wastewater treatment. To achieve the objectives of this research, isotherm parameters for adsorption of COD and ammoniacal nitrogen by activated coconut shell carbon, green mussel (*Perna viridis*), zeolite and newly composite mass were investigated. All the adsorption materials were crushed and sieved to obtain the desired particle size of 150 μm . The optimum batch adsorption study condition was reported at 120 min contact time, 200 rpm shaking speed and pH 7. The result shows that all the adsorbents were well fitted with two different models namely Langmuir and Freundlich isotherm model whereas the coefficient of determination (R^2) value is greater than 0.9 for COD. A comparison research study indicates that the adsorption ability of composite adsorbents shows a higher tendency reduction of both COD and ammoniacal nitrogen than granular activated carbon, green mussel and zeolite. Generally, the results of the findings revealed that the Langmuir adsorption model was slightly better fitted and suitable for organic constituents while Freundlich was good for ammoniacal nitrogen. Langmuir adsorption coefficient of determination (R^2) for COD are 0.9968, 0.9914, 0.9944 and 0.9991 and Freundlich adsorption coefficient of determination (R^2) for ammoniacal nitrogen are 0.9514, 0.7136, 0.9568 and 0.9667, respectively.

Keywords: Activated coconut shell carbon; Green mussel shell; Zeolite; Composite adsorbent; Ammoniacal nitrogen and chemical oxygen demand (COD); Leachate wastewater

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