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Study of isotherm equations of biosorption for removal of heavy metals (nickel)

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Abstract

Landfilling is directly related to public health, water, soil and air pollution in landfills. The limitation of water resources on the one hand and the increase of toxic pollutants in surface and groundwater on the other hand, make it necessary to find various and environmentally acceptable solutions to eliminate such pollutants. The biosorption of nickel by inanimate and microbial inactive biomass or plant-derived biomass is an innovative and innovative technology to remove this contamination from aqueous solutions, which while eliminating the problems of conventional methods mentioned in this article, is highly absorbent. It has high renewability and absorption capacity. In this study, with the aim of introducing different types of microbial and plant-derived biosorbents in order to remove nickel from aqueous solution and to reveal the adsorption capacity of each adsorbent, the articles found between 2001 and 2020 have been used. Research and its results suggest the use of these biomasses as biosorbents to remove nickel in aqueous solution as a promising and environmentally friendly perspective, considering the potential benefits. The adsorption isotherm equations present the relationship between the amount of solute adsorbed and the concentration of solute in the aqueous phase in equilibrium. The Langmuir isotherm equation was evaluated as the best model in many papers with the highest correlation coefficient.

Keywords: Biosorption, nickel, heavy metals, isotherm equations, aqueous solutions.

Highlights

•Limited water resources on the one hand and the increase of toxic pollutants in surface and groundwater make it very necessary to treat various pollutants.
• The bioabsorption of nickel by inanimate and inactive microbial biomass or plant-interested biotechnology has become a technology.
• Biomasses as biosorbents to remove nickel in aqueous solution is suggested as a promising and environmentally friendly prospect.