The Potential Effectiveness of Marine Algae in Removal of Heavy Metal from Aqueous Medium

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Abstract : Heavy metal pollution has become a hard threat to marine ecosystems alongside extremely industrialized and urban (urbanized) zones because of their toxicity, resolution, and non-biodegradable nature. Great interest has been given to a new technique -biosorption- which exploits the cell envelopes of organisms to remove metals from water solutions. The main objective of the present study is to explore the potential of marine algae from the Red Sea for the removal of heavy metals from an aqueous medium. The subsequent objective is to study the effect of pH and agitation time on the adsorption capacity of marine algae. Randomly chosen algae from the Red Sea (Jeddah) with known altitude and depth were collected. Analysis of heavy metal ion concentration was measured by ICP-OES (Inductively coupled plasma - optical emission spectrometry) using air argon gas. A standard solution of heavy metal ions was prepared by diluting the original standard solution with ultrapure water. Types of seaweed were used to study the effect of pH on the biosorption of different heavy metals. The biosorption capacity of Cr is significantly lower in Padina Pavonica (P.P) compared to the biosorption capacity in Sargassum Muticum (S.M). The S.M exhibited significantly higher in Cr removal than the P.P at pH 2 and pH 7. However, the P.P exhibited significantly higher in Cr removal than the S.M at pH 3, pH 4, pH 5, pH 6, and pH 8. In conclusion, the dried cells of algae can be used as an effective tool for the removal of heavy metals.
Keywords : biosorption, heavy metal, pollution, pH value, brown algae
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