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Studies on *Amphiroa flagillisma* brown algae powder for removal of Cr^{+3}

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The present investigation attempted to analyze the biosorption behavior of novel biosorbent, *Amphiroa flagillisma* brown algae powder, for the removal of Cr^{+3} from solution against the function of initial metal ion concentration, pH, temperature, sorbent dosage and biomass particle size. The maximum biosorption was found to be 98.51% at pH 4.7 and biosorption capacity (q_e) of Cr^{+3} is 11.04 mg/g. The Langmuir, Tempkin and Freundlich equilibrium adsorption isotherms were studied and observed that Langmuir model is best fitted than the other model with correlation co-efficient of 1.0. Kinetic studies indicated that the biosorption process of Cr^{+3} well followed the pseudo second order model with R^2=1.0. The process is exothermic and, spontaneous nature of the process. The chemical functional groups –OH, CH_2 stretching vibrations, C=O of alcohol, C=O of amide, P=O stretching vibrations, -CH, were involved in the process. The XRD pattern of *Amphiroa flagillisma* brown algae powder was found to be mostly amorphous in nature. The SEM studies showed Cr^{+3} biosorption on selective grains of the biosorbent. It was concluded that *Amphiroa flagillisma* brown algae powder can be used as an effective, low cost, and environmentally friendly biosorbent for the removal of Cr^{+3} from aqueous solution.

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Performance assessment of Hargreaves & Samani Model in estimating global solar radiation in Central and Western Africa: Case study of some localities of Cameroon and Senegal

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Renewable sources of energy acquire growing importance due to its enormous consumption and exhaustion of fossil fuel. Renewable energy is abundant, free, sustainable, clean and can be harnessed from different sources in the form of wind, solar, tidal, hydro, geothermal and biomass. The knowledge of the availability of solar radiation at any given location is important for the design and performance evaluation of solar equipment. However, for the efficient functioning and better performance of renewable energy devices, the information of solar radiation and its components at particular location is very essential for designing the solar energy devices. In developing countries like ours, the number of observing stations is inadequate. Therefore, it is essential that some reliable mathematical models be developed to estimate the solar radiation for places where measurements are not carried out and for places where measurement records are not available. Thus, over the years, several empirical correlations have been developed by different authors in order to estimate the more appropriate solar radiation around the world. We presents in this paper a review of Hargreaves & Samani model in order to estimate the solar distribution in four sites in Cameroon and Senegal, and we discussed about its performance. The proposed model was simulated using Matlab software environment. Statistical parameters like root mean square error, t-statistic and coefficient of determination were calculated in order to assess the performance of our models.

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