



Biosorption for Wastewater Contaminants

Editor(s): Rangabhashiyam Selvasembian, Pardeep Singh

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Pollution due to various anthropogenic activities continues to increase. In terms of water pollutants, organic and inorganic pollutants are the most problematic. Although several measures have been proposed and implemented to prevent or reduce contamination, their increased concentration in water bodies has created serious concerns. Over the years, the problem has been aggravated by industrialization, urbanization and the exploitation of natural resources. The direct ... [Show all](#) ▾

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Summary

Biosorbents are biomass-based materials that are capable of translocating adsorbate molecules from the bulk liquid phase to their surfaces by means of preferential adsorption. These biosorbents are ample, biodegradable, and inexpensive; they generate minimal or no sludge; they have simple pretreatment methods and are easy to operate; and they have highly versatile or manipulable surface functional groups and constructive surface-related properties. Thus they have been identified as promising candidates for removing contaminants from wastewater. The physicochemical properties of these sorbents are usually dependent on the phytochemistry of the biomass and their



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Biosorption is a separation process driven by the concentration gradient in which solute molecules are diffused into a biosorbent at the solid-liquid interface until equilibrium is attained. Among the conventional water treatment techniques, biosorption is highly efficient and cost-effective, as most of biosorbents are versatile and derived from recycled biomasses. The presence of specified functional groups and the ease of tailor-made modifications to the surface of the sorbents have attracted scientific researchers to exploit their potential for removing heavy metals and a wide range of organic compounds in batch- and continuous-mode operations. This chapter critically reviews the reported dynamic biosorption studies of the removal of various pollutants from wastewater. Further, it focuses on the influence of various operational parameters that significantly affect the breakthrough curves and thus the efficacy of the fixed-bed column



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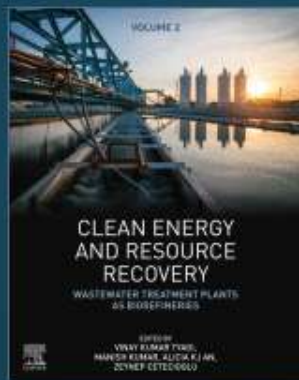
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Abstract

The effect on climate change of greenhouse gases from fossil fuel combustion has increased the need for clean and renewable biological energies necessary for the future. A substitution for fossil-based fuels may be renewable biofuel biogas from wastewater (WW), which has the tremendous potential to meet energy demand and minimize greenhouse gas emissions. In green energy production technology, WW is wildly attracted to biogas recovery because it has environmental and economic benefits from domestic to industrial sectors. Owing to the growth of human lifestyles, urbanization, construction of WW treatment plants, and environmental legislation, the discharge of WW with high organic strength has

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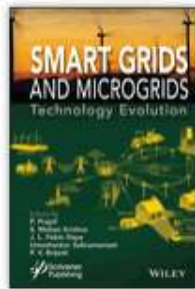
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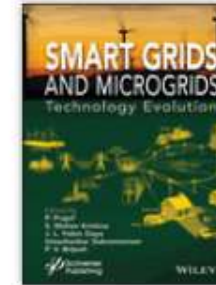
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The amplex and non-polluting nature of power generation from solar photovoltaic (SPV) is used worldwide to meet the ever-increasing load demand. In order to operate SPV efficiently, an accurate modeling and control is required prior to the installation. Therefore, this chapter presents the Single Diode Model (SDM) of SPV module through



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Kumaran T., Sivarasan E. N.

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[Finite Wing Theory](#) (pages 88-128)

Madhankumar G., Mothilal T., Kumar K. M., Muralidharan G., Mala D.

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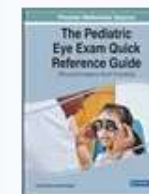
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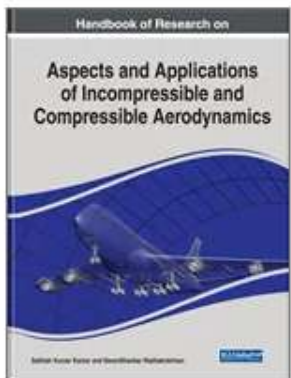


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This chapter describes the basic concepts of aerodynamics, evolution of lift and drag, types of drag, reduction of wing tip vortices, non-planar wing concepts for increased aerodynamic efficiency, various methods for determination of aerodynamic forces of an airplane, classification of wind tunnels, blower balance tunnels, and a case study report on aerodynamic force measurement of the non-planar wing systems. To increase the aerodynamic efficiency of the monoplane configuration, the 'C-wing' configuration is presented in this chapter. The aim is to prove, at all angles of attack, C-wing produces a higher (L/D) ratio than straight wing for the same wetted surface area. The aerodynamic characteristics of three different wing models with NACA-64215 aerofoil such as straight wing, C-wing, and inverted C-wing at different angles of attack and low Reynolds number are shown. The inverted C-wing created more lift but produced more vibration, which may lead to lesser structural integrity.

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