

Chapter 8

Phytoremediation: Utilizing Plants to Treat Industrial Wastewater

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ABSTRACT

The untreated water discharge is the most threatened, making it difficult to manage and providing clean water supply to both rural and urban areas. A wide range of toxic chemical substances were released as the consequences of industrial revolution. The free discharge of these hazardous chemical substances in the form of dyes, heavy metals, organic and inorganic compounds can cause serious threat to human health and environment. Green plants which are considered as the producers can transform these pollutants into safer forms in a cost-effective and environment friendly manner known as phytoremediation. Phytoremediation works on the ba-

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sic idea of pollutants removal through natural systems. Numerous plant species, including Canna indica, Colocasia, Hymeno callislittoralis, Pteris vittata, Thlaspi caerulescens, Brassica juncea, Hordeum, Solanum, Eichhornia crassipes, Salvinia molesta, and Pistia stratiotes are frequently used to treat industrial wastewater. It is also used for environmental restoration and wasteland site remediation.

1. INTRODUCTION

The conditions under which organisms survive are collectively referred to as the environment. The primary cause of the contamination or pollution of the environment affects all organisms, either directly or indirectly. The issue of pollution is now worldwide in scope. An unfavorable alteration to the land, water, air, or soil that poses a threat to human health or that of other living things, industrial processes, quality of life, or cultural assets is known as pollution (Khasanova et al., 2023).

Undoubtedly, scientific advancements, technology, the industrial revolution, and agricultural innovations have enhanced our way of life beyond our wildest dreams a decade ago. However, these developments have also resulted in environmental pollution. Environmental pollution is a major concern as a result of the growing use of a wide range of heavy metals in agriculture and industry. The unchecked utilization of sewage sludge, compost, mining waste, chemical fertilizers, and industrial development leads to the build-up of heavy metals in agricultural areas, which pose a long-term hazard to the soil. Restoring soils that have been contaminated by potentially harmful metals and metalloids is a serious global concern (Alam et al., 2023).

Industrial wastewater is becoming a bigger concern every day for a number of reasons, according to the United Nations Environment Program (2017). There is a rise in wastewater generation as a result of industry expansion and new industry development, which pollutes water supplies more. As a result, untreated or insufficiently treated wastewater is released into water bodies by several enterprises that still lack the necessary equipment and infrastructure to properly treat their effluent (Singh et al., 2023).

The enormous pollution load of industrial wastewater and its possible effects on public health and water quality make it a serious environmental problem. The most dangerous substance to the local environment is wastewater, which makes it difficult to control the difficulties in providing clean water to both rural and urban areas. Wastewater is where untreated water discharges most frequently. Wastewater effluents, which induce eutrophication, are the primary source of concerns with water contamination. These could, however, promote the growth of algae, increase the expense of purification, endanger the health of people and animals, and result in excessive oxygen loss, all of which could alter the population dynamics of aquatic

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