



# Chapter 1

## Different Bioremediation Techniques for Management of Waste Water: An Overview


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### ABSTRACT

*Water contamination remains an issue. A combination of biodegradation and nanotechnology is proposed as a potential proficient, minimal effort, and naturally amiable system to deal with it. Among different mediations, bioremediation procedures can conceivably be utilized to decrease the versatility of materials in the subsurface, reducing the potential for human and ecological exposure. The metabolic diversity of microorganisms ensures an assortment of substrates to be expended. Photosynthetic microorganisms have been found as a compelling and eco-friendly species that can remove carbon, nitrogen, and phosphorous in the manufactured sewage and wastewater. This chapter particularly emphasizes environmentally friendly NMs that give information for removing contaminants from wastewater and effluents. Additionally, various nanocomposites and different natural methods utilized in the wastewater treatment process are also briefly discussed.*

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## **INTRODUCTION**

Water on the planet is the most significant natural resource. Presently ecological water sully has been ascendant in most recent couple of decades as a result of expanded human exercises, risky farming practices and industrialization (Azubuike et al. 2016). Thus, the principle challenge is consistent defilement of water resources by different inorganic and natural pollutants. So, conventional treatment strategies are not proficient to whole expulsion of toxins and accessible methods for waste water have numerous disadvantages (Ferroudi et al. 2013). Presently, contamination in view of overwhelming metals in ground water, waste water and lakes caused problematic wellbeing impacts in living creatures. This section centers the distinctive nanoparticles for contaminant water treatment forms. The procedure of contamination evacuation relies principally upon the idea of the toxin, which may include: agrochemicals, chlorinated mixes, colors, ozone depleting substances, overwhelming metals, hydrocarbons, atomic waste, plastics and sewage (Akhavan and Azimirad 2009). Pollutant nature, profundity and level of contamination, kind of condition, area, cost, and ecological approaches are a portion of the determination criteria that are viewed as while picking any bioremediation strategy (Beaver et al. 2014). Besides, given the idea of exercises prompting raw petroleum contamination, all things considered, contamination of nature with toxins barring hydrocarbons can without much of a stretch be forestalled and controlled. The natural wastewater treatment is generally applied however these are normally moderate, restricted because of the nearness of non-biodegradable contaminant, and at some point makes toxicity to microorganisms because of some poisonous contaminants (Chen et al. 2016). The physical procedures, for example, ultrafiltration could evacuate the pollutant and impurity matters by changing primary stage to next however delivering more concentrate sludge, which is harmful and difficult to dispose. The genuine necessity for most incredible advancements for management of city and mechanical waste and polluted waters (Chong et al. 2010). Nanotechnology in various literature described as one of the best exceptional procedures for contaminate water treatment. Nano-materials have nano structures that people have created, having shape and size of nanometers. Nano-materials created in assortment of structures, for example, nanotubes, nanowires, particles, films, colloids and quantum dots (Douglas et al. 2016). Nano-adsorbent has been delivered using the particles of components which are unnaturally vibrant and have highest adsorption capacity on the outside of nano-material. The used materials for improvement of nano-adsorbents include activated silica, carbon, metal oxides, clay materials and modified compounds as nono-composites. Various sorts of nano-catalysts and electrocatalysts are utilized for degradation of contamination in wastewater. Fenton mediated catalysts for improving oxidation of natural toxins and various catalysts having antimicrobial activities [Eldyasti et al. 2011; Feng et al. 2014]. In nanomembrane classification, the pres-sure determined treatment of contaminated wastewater can demonstrate for improving water quality of desire. Among various sorts of film filtration (FF), and nano-filtration (NF) are mainly applied for management of contaminated water in ventures as an effect of minimal effort, little pore sizes, more efficiency and ease to handle.

### **Current Techniques for Removal of Contaminants**

Some physical treatment strategies like membrane filtration, ion exchange, precipitation, cementation, electrocoagulation, film filtration are utilized for the expulsion of waste water. Reductants like vaporous hydrogen sulfide and dithionites are utilized for reduction process. Chemical washing and chelate flushing techniques are used for the evacuation of metal contaminant (Feng et al. 2011; Gadhe et al.

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