

# *Exploring the dynamics of microalgal diversity in high-rate algal ponds*

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## **31.1 Introduction**

Pollution due to the presence of high concentration of nutrients in the surface of water of natural water bodies has become a global issue due to eutrophication and algal blooms. Bio-remediation of wastewater is necessary for the reduction of chemical oxygen demand (COD), biological oxygen demand (BOD), and nutrient levels [60,65]. In addition to nutrients, chemicals such as pharmaceuticals, antibiotics, plastics, and heavy metals have shown to cause detrimental effects to aquatic and human beings [64,66]. When these sludges rich in organic waste are let into natural streams, the increase in turbidity decreases the clarity and visibility of water [79]. Groundwater tables also might get contaminated when the assimilation capacity of water for nutrients increases [144]. On the other hand, phosphate resources are depleting due to increase in world population and supply of nutrients for food. The deposits of rock phosphates for manufacture of fertilizers are becoming scarce. Hence, these nutrients which are lost in wastewater should be regained [2,120].

Conventional wastewater treatment plants used chemicals such as aluminum and iron for the removal of phosphorus. The water bodies were fitted with meshes of nylon or other material for the filtration of nutrients. But the phosphates of these salts are toxic to plants even in slight concentrations and hence cannot be used as fertilizers [40]. Later, biological methods of using microorganisms for removal of nutrients came into use. This method is eco-friendly and doesn't generate activated sludge which makes them efficient for the removal of nutrients [120].