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Bacterial and algal compounds in marine water ecosystem

Jyothi Kolla*

Department of Marine Biology, Narayana Technology and Sciences, Nellore, India

Abstract

Algae and bacterial organisms have the co-existed ever since the early stages of an evolution. This co-evolution has the revolutionized life on the earth planet system in many aspects. Algae and bacteria are both together influence the ecosystems as varied by as deep seas to the lichens and represent it is all conceivable modes of an interactions- from the mutualism to parasitism. After several studies have shown that algae and bacterial organisms synergistically affect each other's physiology and metabolism actions, a classic case being algae-proteobacteria interaction occurs in parasitic actions. These interactions are made from ubiquitous, and they define the primary productivity in most of the ecosystems.

Keywords: Algae; Bacteria; Microbial Ecology; Biogeochemical Cycling

Discussion

In recent years, algae have confirmed and received the much attention for industrial exploitation but their interaction situations with bacteria is often considered to be a contamination during the commercialization. In a few recent studies have been shown that bacteria not only enhance algal formation but also help in flocculation, both essential processes in algal biotechnology fields. Hence, there is a need to calculate these interactions from an evolutionary individuals and ecological standpoints and integrate this understanding for industrial purpose items. Here the reflection between on the diversity of such relationships and their associated mechanisms, as well as the habitats that they mutually influence. This review also outlines the role of these interactions in key evolutionary events such as endosymbiosis, besides their ecological role in biogeochemical cycles. Finally, we focus on extending such studies on algal–bacterial interactions to various environmental and bio-technological applications.

The evolution of life is one of the most intriguing research questions that is still in shade. But a prominent bright spot in the overarching shade is a general agreement on the role played by algae and bacteria in earth's evolution. One of the most potential reasons for existence of human or multicellular organisms on earth is due to the presence of archaea, bacteria, cyanobacteria, and subsequently eukaryotic algae. These prokaryotic organisms (bacteria and cyanobacteria), which are the linchpin in the formation of eukaryotic algae and their subsequent interaction with each other, are discussed vividly in the subsequent sections. The other four groups have either of these two photosystems and perform anoxygenic photosynthesis. The defining moment in photosynthesis is the ability to use water as a source of hydrogen in the photosynthetic reaction, not the evolution of oxygen. Thus, photosynthesis originated in the anoxygenic form, perhaps in archaea, using a primitive photosystem I-like reaction center. Oxygenic photosynthesis is believed to have originated in the cyanobacterial lineage under ultra-violet light conditions prevailing then, in addition to depletion of electron donors. From this ancestor, photosynthesis possibly spread to other lineages through lateral gene transfer.

Conclusion

Algae depend on nitrogen and phosphorus from the environment for growth as they are non-diazotrophic. Macronutrient (N, P, S and C) of algae for prolonged periods results in severe stress leading to stagnation and eventually death. n the other hand, nutrient rich wastewaters when discharged in natural surface waters might result in blooms of toxic algae and cyanobacteria. heterotrophic bacteria require carbon and other nutrients for growth and are widely used for the treatment of wastewater. Naturally, algal–bacterial systems have been extensively used in the treatment of nutrient rich wastewaters.

***Corresponding author:** Jyothi Kolla, Department of Marine Biology, Narayana Technology and Sciences, Nellore, India, Email: kollajyothi64@gmail.com

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