ScienSage

Journal of Advanced Scientific Research

Available online through https://www.sciensage.info

ISSN 0976-9595

Review Article

INTENDED STUDY OF CYANOBACTERIA WITH THE HELP OF CHARACTERIZATION AND METAGENOMICS

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ABSTRACT

A cyanobacterial strain library of 16s rRNA would be a key point form were each strain having a specific toxin study will help us to find out an alternative medication for solving the future problem like dermatitis and other skin lesions problems caused by a cyanobacterial toxin. The study of anti-algal compounds and cyanobacterial toxins would give a novel way to tackle the depletion of important primary producers in any aquatic ecosystem. Well-defined morphological study and evaluation of cyano with a combination of modern methods like a bright field, phase contrast, confocal, electron microscopy, and molecular analysis for typical characters and markers of a cyanobacterial entity in various water bodies would help to make the proper decision for characterisation of any cyanobacterial strain. This review would be helpful for precise analysis of the distribution of various ecotypes along with genotypes markers may act as additional taxonomic markers in later studies along with much better phylogenetic awareness.

Keywords: Anti-algal, Cyanobacteria, Microscopy, Phylogenetic, Toxin.

1. INTRODUCTION

Cyanobacteria a type of gram-negative, photoautotrophic prokaryotic bacteria evolving oxygen and can be found in almost all imaginable habitats like extremely cold deserts of the Arctic and Antarctic Zones to the very extreme hot springs of the Yellowstone National Park. They represent a fascinating form of life in a wide range of aquatic and terrestrial environments. Cyanobacteria origin and their basic anatomical features are like typical bacterial type, but their ecological, biological, and morphological characters are quite explicit and diverse too. They show essential interesting features like the ability of buoyancy, performing oxygenic photosynthesis, and atmospheric nitrogen fixation [1, 2]. Cyanobacteria growth requires nutrients richness mainly nitrogen and phosphorus, light exposure, and temperature. Low ratios of nitrogen and phosphorus concentrations favour the development of cyanobacterial blooms. They include many species that produce toxins like hepatotoxins, neurotoxins, dermatotoxins, and lipopolysaccharides. Cyanobacterial cells when degraded or collapse they release all this of toxins in the environment. The proper identification and characterisation of cyanobacteria have become more crucial due to many adverse effects of toxins released in water bodies and eutrophication problems [2].

Cyanobacteria, one of the microalgae are important primary producers in any aquatic ecosystem responsible for producing almost half of the atmospheric oxygen [1]. Cyanobacteria are well known to produce antialgal compounds which inhibit the growth of algal blooms. An Antialgal compound mostly inhibits growth by creating hindrance in algal photosynthesis, respiration, carbon uptake, enzymatic activity and induces oxidative stress. Antialgal compounds can also lead to blockage of sodium channels [3, 4]. In some cases, cyanobacterial blooms may be the reason for severe water quality deterioration including scum formation, toxin production, hypoxia, bad taste, and odours. Cyanobacterial blooms may accumulate cyanotoxins and sooner or later, pose a high risk to human health. Therefore, the study of harmful cyanotoxins is a vital step for finding a rescue [5].

Direct molecular analysis of the community helps in the avoidance of biasing culture-dependent approaches in ecological studies [6]. Preliminary functional analyses of sites and other studies have disclosed the genes for stress responses and metabolism of aromatic and other organic compounds. Some of the genes encoding for various