International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 04 April 2023
DOI: 10.47191/ijcsrr/V6-i4-50, Impact Factor: 6.789
IJCSRR @ 2023
www.ijcsrr.org

Cyanobacteria: Isolation, Purification and Principles

Shishir V. Mendhekar
Department Of Microbiology, Kurukshetra University, Kurukshetra Haryana – 136119 India.

ABSTRACT: The primary means of nutrient uptake for cyanobacteria is oxygen-producing photosynthesis. Their ecological variety is astounding; they occupy a very wide range of lighted ecological niches in terrestrial, marine, and freshwater habitats. Despite this apparent metabolic consistency, they exhibit tremendous phylogenetic diversity. The fact that cyanobacteria have certain physiological and metabolic traits that are exclusively seen in prokaryotes significantly broadens this spectrum. The capacity to fix nitrogen in an aerobic manner under light is a special characteristic. Apart from Gonotheca species, all aerobic, nitrogen-fixing cyanobacteria—a structurally diverse group—produce heterocyst, the highly specialised cells that allow them to fix nitrogen efficiently in a fully aerobic environment by preventing the oxygen-sensitive enzyme nitrogenase from being inactivated quickly in vivo (Hazelton, 1978; Stanier and Cohen-Bazire, 1978; Stewart, Haystead, and Pearson, 1969). The same quantities of cyanobacteria could be isolated from freshwater using a technique using nutrient-saturated glass fibre filters, but the quantity of accompanying heterotrophic bacteria was reduced by 2- to 15-fold. a broad-spectrum antibiotic called imipenem. In comparison to some other Plactam antibiotics, the B-lactam antibiotic that inhibits peptidoglycan biosynthesis, was more effective at lowering the levels of heterotrophic bacterial contaminants associated with newly isolated cyanobacteria to a point that made it easier to grow axenic cyanobacterial cultures.

KEYWORDS: Blue Green Algae, Cyanobacteria, Photosynthetic Bacteria, Prokaryotic.

INTRODUCTION

Cyanobacteria are a varied category of Gram-negative photosynthetic prokaryotes in terms of morphology. In practically every imaginable ecosystem on Earth, they may be found, which makes them unique (Ferris et al., 1996; Ward et al., 1997; Nubel et al., 1999; 2000; Abed and Garcia-Pichel, 2001; Garcia-Pichel and Pringault, 2001; Abed et al., 2009; Sharma et al., 2011). According to Sinha and Hader, 1996; Zehr et al., 2000; Kalib, 2002; Saha et al., 2003, they may live in harsh settings such hot springs, rocky beaches, drought, desiccation, osmotic, and UV stressors, photooxidation, heat and cold shock, anaerobiosis, and nitrogen deprivation, among others. Because of their innate ability to use nitrogenase and rubisco enzymes, respectively, to fix atmospheric CO2 and N2, cyanobacteria play a key role in the worldwide cycle of nutrients (Sinha et al., 1995; 1997). Certain cyanobacteria can fix atmospheric nitrogen by forming heterocysts (Capone et al., 2005). Cyanobacteria were previously only of academic interest and were largely disregarded as a nuisance, but recent research has shown them to be potential candidates for extensive biotechnological use (Richmond, 1990; Sundararaman and Sekar, 2001; Thajuddin and Subramanian, 2005; Govindjee and Shevela, 2011). Due to their historical placement among the algae, phycologists working under the guidelines of the Botanical Code devised the categorization of these species (Stafleu et al., 1972).

For research on physiology, genetics, and taxonomy, cyanobacteria must be grown in axenic cultures. Axenic cultures of microscopic and macroscopic cyanobacteria are typically made by single-cell isolation using a variety of techniques, such as serial dilution technique, streak plate method, UV irradiation, filtration, treatment with different antibiotics (Rippka, 1989; Choi et al., 2008), other germicidal chemicals (Kim et al., 1999), density gradient centrifugation, and rinsing (Vaara et al., 1979; Bolch and Blackburn, 1996).Given the poor success rate, dealing with cyanobacteria can be difficult and time-consuming, especially when trying to acquire axenic cultures. For several reasons, estimation and conservation of cyanobacterial biodiversity from yet unexplored habitats become very important, which need to be initiated with \systematic survey followed by collection, establishment of pure culture and their \characterization (Biswas, 1930; 1934; Bordoloi, 1980; Singh et al., 1997; Singh et al., \s1997a, 1997b; Ahmed et al., 1999; Devi et al., 1999; Rout and Dey, 1999; Singh et al., \s2011). Because of their prevalence and distinctive hues of green, blue green, and olive green in nature, cyanobacteria can be distinguished from other creatures with ease. Although there are some signs of cyanobacteria in nature, such as these, they must be inspected under a microscope and their pigment composition determined (Rippka, 1979).

International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 04 April 2023
DOI: 10.47191/ijcsrr/V6-i4-50, Impact Factor: 6.789
IJCSRR @ 2023
www.ijcsrr.org

Even though cyanobacteria with a diversity of morphologies can be found in many different terrestrial and aquatic
research on these bacteria has only focused on a small subset of them. This appears to be partially due to issues tha
the isolation and later purification of these microbes. The number of cyanobacterial species that can be easily gr
hypothesised to be heavily constrained by the methods typically used to separate them. Agar is frequently used as a solidi
in bacterial media and is known to contain contaminants. Some of these impurities are thought to be the cause of the repeated observations that agar inhibits the development of some cyanobacteria. Various strategies have been employed to lessen or get rid