

Blue Green algae: an Important Microorganism in Terms of food, Medicine and Economic Structure

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Abstract:

Because they are biological observers of intricate relationships between large and small creatures, microorganisms are significant.

Several aquatic creatures eat blue green algae as food. In certain nations, the blue-green algal spirulina is used as sustenance for humans. Nostoc again a very important source of food. These blue green algae have ability of nitrogen fixation. And thus also act as bio fertilizer. Some medicines like antibiotics are also manufactured from extract of Lyngbiaa blue green algae. Nitrogen fixing cyanobacteria are often used for reclaiming user soil like Nostoc, Anabaena. These are the good source of protein rich food. Cyanobacteria have an emerged potential as bio fertilizer. They have the ability to utilize CO₂, H₂O and nutrients to convert solar energy into biomass. Effective applications of cyanobacteria have been reported in agricultural practices to reduce global warming by decreasing CO₂ gas.

Key Words: Blue green algae, Bio fertilizer, Nitrogen fixation, protein rich food, antibiotics, global warming

I. INTRODUCTION:

The algae as a group have no official existence ;it is a group of collective term for all those chlorophyll bearing organism, which are thalloid .They are important members of plant group and several of them are significant to man in many ways.

Cyanobacteria, commonly called blue green are found all over the world in different habitats. They are found in fresh water bodies like ponds, lakes rivers streams etc., terrestrial like tree bark, moist wall, rocks, stones etc. They are also present in salty water. The use of algae as indicator of river water quality and pollution has been emphasized by Venkateshwarlu (1981)

It is believed that mass culture of algae especially blue green algae help to fulfill the requirement of global protein. Spoehr and Milner (1949).

Cyanobacteria are playing an important role in increasing the fertility of various ecological agriculture as they are widely distributed in the world .They are able to this as they are free living organisms and have symbiotic relationship with Azolla the water fern, and it is the main principle of so many species that they have nitrogen fixing ability which subsequently increase the fertility of soil. (Fay, 1983)

Saadatnia and Riahi(2009) have shown experimental work on germination of rice seed treated with cyanobacteria compare with control. The more germination was reported with blue green algae.

Blue green algae functions food to several aquatic animals as well as human beings too Spirulina is regularly collected for human consumptions and act as protein rich food supplement for humans and animals. Many food supplements ,antibiotics and other medicines are prepared by using blue green algae.

They are one of the early colonizers of bare and barren areas .They provide suitable conditions for the growth of other organism even in the most hostile environment. Some sps of Anabaena and Aulosoria do not allow mosquito larva to grow nearby. Such algae are inoculated in village ponds and rice fields to prevent the growth of mosquitoes.

Some blue green algae like *Microcystis aeruginosa* is harmful too; they produce toxins harmful to aquatic animals as well as human beings.

II. MATERIAL AND METHODS:

A search was made from the internet and serial material and literature. Various journal and phycology, food and agricultural organization documents and related books were consulted with regards to ecological importance of blue green algae.

III. RESULTS AND DISCUSSION:

Cyanobacteria are currently regarded as important sources of nutrients and biofuel and form an integral part of novel innovative energy efficient designs. Being autotrophic organism's cyanobacteria are well suited for large scale biotechnological applications due to the low requirements for organic nutrients. The application of cyanobacteria in management of soil and environment includes the economic benefits (reduced input cost), nutrient cycling, N₂ fixation, bio availabilities of phosphorous, water storage and movement, environmental protection and prevention of pollution and land degradation.

Species of Nostoc and Anabena help in nitrogen fixation. Nostoc species can be used as a protein rich food. Cyanobacteria performs the oxygenic photosynthesis and they are the chief producer of biosphere.

Species of Lyngbya used in preparation of antibiotics.

If the alkaline land is made water logged then there is a growth of the blue green algae which enhance the fertility of the soil. They assist in the recovery of alkaline soils. Cyanobacteria have heterocyst which are helpful in the fixation of atmospheric nitrogen. They release O₂ in the environment due to their photosynthetic activity. Oscillatoria and few other cyanobacteria can be used as pollution indicators.

Nostoc is known to secrete an antibiotic known as bacteriocin that can kill related strains of algae. Bacteriocin is a proteinaceous antibiotic that is active against prokaryotic strains closely related to the organisms that produces the antibiotic.

Scytonema hofmanni is known to secrete cyanobacteria, a chlorine containing gamma lactone. Pignatello; J.J. Spoorwall 1983. These antibiotics play a role in inhibiting the growth of competing organisms.

Microcystis has been observed to inhibit the growth of Staphylococcus (a bacterium) and Closterium (a green algae)

Blue green algae help in land reclamation as they are the first colonizers of marsh lands. They hold soil and dust particles as they dry up thus they are important in ecological succession. Also saline –alkaline soils are generally unsuitable for raising crops but blue green algae help in reclamation of such soils as they absorb sodium from soil, Nweze. N.O and N.Domrufus 2006.

In various blue green algae, many phytohormones were detected in concentrations comparable with their content in higher plants. The occurrence of diverse free and conjugated hormones forms substantiates the conjugated hormones forms substantiates the functioning of the complex system of metabolism and activity regulation of these compounds. It has been found that rice seeds presoaked in *Phormidium tenue* improved yield. (Shukla A.C and Gupta 1967). Auxins like 3 indole acetic acid seems to be secreted by the species of *Scytonema*.

Cyanobacteria are considered as biological control agents (Boussiba S; X-Q WLL Ben DOV: A.2000). Experiments carried on *Anabaena*.

Nontoxic forms of cyanobacteria are good sources of food. In aquaculture, a filamentous blue green algae, *Lyngbya* spp act as food for fishes and fry (Colman and Edward 1987) *Spirulina* is eaten in Africa (Lee R.E, 1989)

IV. CONCLUSION:

Blue green algae are of great ecological significance. They are naturally occurring components of aquatic environments. In fact they are essential part of a healthy body of water as they produce oxygen and are themselves a source of food for many aquatic animals. The cosmopolitan nature of cyanobacteria makes them readily available for research. Extensive research on different fundamental and applied aspects of algae has been published. Algal biomass can be used in a variety of applications such as improvements in soil components, as a food, as it contains number of valuable constituents such as vitamins, minerals, proteins, phytohormones, enzymes etc. We have to understand the hidden potential of these algae. Due to their ability to produce O₂, cyanobacteria played a pivotal role in changing the composition of the plant's atmosphere. Blue green algae as adapted to exist in most ecosystems including fresh and salty water soils and rocks etc.

These algae play a key role in alkaline reclaiming can be used as a soil binding agent and is used in a variety of commercial products. The mass development of some cyanobacteria's is capable of fixation of atmospheric N₂ like nitrogen fixing bacteria.

Effective utilization of cyanobacteria's bio fertilizers will not only provide economic benefits but also improve and maintain soil fertility and sustainability in natural ecosystem.

Nevertheless, blue green algae have great potential and their use will extend to new areas in near future.

REFERENCES

- [1]. De Pk, The role of blue green algae in Nitrogen fixation in rice fields ,Proc ROY soc London,127 B (1939)121-139.
- [2]. Spoehr HA Milner HA.The chemical composition of Chlorella:effect of environmental conditions. Plant Physiol.1949;24:120
- [3]. Singh R.N, Reclamation of “usar” lands in India through blue green algae , Nature,**65 (1950)325-326**
- [4]. Shukhla A.C and A.Gupta,1967 .influence of algal growth promoting substances on growth yield and protein contents of rice plants.Nature 213 (5077):744.
- [5]. Mehta V.G and Vaidya BS, Cellular and extracellular polysaccharides of the blue green algae Nostoc, JExp BOT, 113(1978)1423-1430
- [6]. Venkateshwarlu V 1981.Algae as indicators of river water quality and pollution in WHO workshop.Biological indicators and indices of environmental pollution (Hyderabad,OsmaniaUniversity)P.P 93-100.
- [7]. FayP.Nie Blue green, Edward Arnold London 1983.
- [8]. Pignantello J.J.J PorWoll.R.E. Carson; A.Xavier; F.K. Gleason and J.M. word /1983.Structure of the antibiotic cyanobacterin,a chlorin containing Y-Lactose from the fresh water cyanobacterium Syctonemahofmanni, journal of organic chemistry. 48:4035-4038
- [9]. Colman J.A and P. Edwards, 1987.Feeling pathways and Environmental constraints in waste –fed aquaculture balance and optimization. In: Detrius and microbial ecology in aqua-culture, Moriarty,D..J.W and R.S.V.Pullin (eds) ICLARM Conference proceedings 14 pp.240-28.
- [10]. Lee,R.E.1989 Phycology.2ndEd,Cambridge University press. New York.64PP
- [11]. GoyalS.K.Algalbiofertilizer for vitl soil and free nitrogen ,ProcIndNatl.Sci ACAD,B 59(1993) 295-302
- [12]. 14.Boussiba ,S;X-Q Wu: E.Ben DOV; a, Zarka and A. Zariaky 2000 .Nitrogen-fixing cyanobacteria as give delivery system for expressing mosquitocidal toxins of Bacillus thuringiensisspisraelensis Journal of Applied Phycology.12;461-467
- [13]. Nweze. N.O and N. DOMRUFUS,2006.Limnological studies on Nike lake Enugu,Enugu state- the metaphyton and some physic-chemical aspects.Nigerian journal of Botany 19(2): 396-404. 14.Boussiba ,S;X-Q Wu: E.Ben DOV; a, Zarka and A. Zariaky
- [14]. Saadatnia H, riahH.Cyanobacteria from paddy fields in Iran as a biofertilizar in rice plants.Plants soil Environment, 2009; 55(5):207-212.