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Biochemical analysis of some blue-green algae collected from Supaul district of Bihar

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ABSTRACT

The aim of present work was to study the biochemical analysis of six isolates belonging to *Oscillatoria limosa, Anabaena circulans, Nostoc commune, Scytonema crispum, Lyngbya contorta* and *Calothrix fusca* of Blue-green algae collected from Supaul district. It was observed that percentage protein content of *Oscillatoria limosa* was highest (10.2%) while Carbohydrate content and Lipid content was observed highest in *Lyngbya contorta* (Carbohydrate-18.3%, Lipid-14.5%).

Key Words - Carbohydrate, Chlorophyll-a, Protein, Lipid.

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INTRODUCTION

Blue-green algae is a highly success group widely distributed in all kinds of habitat. All heterocyst containing members of Blue-green algae are capable of N_2- fixation. These members are used as Biofertilizer. In rice field water remain logged in which heterocyst containing members of Blue-green algae like *Nostoc, Anabaena, Revularia, Calothrix* grow and fix atmospheric Nitrogen. Several members of Blue-green algae produces antimicrobial substance which inhibit the growth of pathogenic bacteria. Blue-green algae are also used in Bioremediation.

Some members of Blue-green algae are medicinally important. *Spirulina platensis* is a very effective in malnutrition. The solubility of protein produced by *Spirulina platensis* was estimated in water and other solvents. The total protein of this alga was reported as 50-55% while 9.9% was non-protein nitrogen. The *in-vitro* digestibility of this protein was found to be 85% when assayed with pepsin.

The protein content of *Nostoc commune* and *Nostoc flagilleforme* is very high in comparison to sea weeds. Fatty acid composition of *Anacystis nidulans* was investigated at different temperature. The alga contain Palmitic acid, Hexadecenoic acid and Octadecenoic acid. In addition to Protein, Lipid, Starch and Chlorophyll some Blue-green algae produces Cyanotoxin.

MATERIAL & METHOD

Local isolates of *Oscillatoria limosa, Anabaena circulans, Nostoc commune, Scytonema crispum, Lyngbya contorta* and *Calothrix fusca* collected from Supaul district were cultured in BG-11 medium and axenic culture of each isolate was prepared.

Chlorophyll-a, Protein, Carbohydrate and Lipid content of each isolate was estimated.

Chlorophyll Extraction: For the extraction of Chlorophyll-a, algae was harvested from fresh culture and suspended in 90% hot methanol. It was filtered through Whatman filter paper. After the 2nd and 3rd extraction, supernatant were combined

and made up to the known volume. Optical density was measured at 665nm and multiplied by 1390 (extinction coefficient of Richards and Thompson-1952 and modified by Talling and Briver-1963).

Estimation of total Protein: Total protein was estimated by the method described by Lowry *et al.,* (1951). Culture was centrifuged at 7000Xg for 10 minutes and the pellets were suspended in 0.1N NaOH. The content was boiled for 30 minutes, cooled and centrifuged. The supernatant was made up to a known volume. 0.1ml supernatant and 0.9ml distilled water along with 5ml alkaline copper reagent were mixed and allowed to stand for 10 minutes. Finally 0.5ml Folin-Ciocalteau reagent was added. After 30 minutes, absorbance was measured on Spectrophotometer. Bovin serum albumin was taken as blank.

Estimation of Carbohydrate: Carbohydrate was estimated by the method prescribed by Dubois *et al.,* (1956). Culture was centrifuged at 7000Xg for 10 minutes and 20mg pellets were taken in a test tube. Pellets were hydrolyzed with 2ml conc. H_2SO_4 by mixing thoroughly. The developed color was measured at 490nm on a Spectrophotometer. Glucose was used as blank.

Estimation of total Lipid: Total lipid was estimated by the method described by Sato-(1988). The culture was centrifuged at 7000Xg for 10 minutes. 20mg pellets were homogenized with extraction solvent (Chloroform: methanol 2:1 (v/v)) and filtered through Whatman filter paper. The filtrate was vortexed with Sodium sulphate and kept in a pre-weighed bottle. It was kept in dark at room temperature for overnight. The dried extract was re-weighed and total lipid was estimated by subtracting initial weight from the final weight. The amount of total lipid was expressed as mg/gm dry weight.

RESULT

In the present study, biochemical analysis for Chlorophyll-a, Protein, Carbohydrate and Lipid content of six isolates belonging to the genera *Oscillatoria, Anabaena, Nostoc, Scytonema, Lyngbya* and *Calothrix* were estimated. It was observed that percentage protein content of *Oscillatoria limosa* was highest (10.2%) while Carbohydrate content and Lipid content was observed highest in *Lyngbya contorta* (Carbohydrate-18.3%, Lipid-14.5%). The result is mentioned in the below table.

Table: Showing percentage of Chlorophyll-a, Protein, Carbohydrate and Lipid in isolates of Blue-green algae

S. No.	Name of Species	Chlorophyll-a (%)	Protein (%)	Carbohydrate (%)	Lipid (%)
1	*Oscillatoria limosa*	1.01	10.2	12.3	9.4
2	*Anabaena circulans*	1.27	3.5	4.6	2.3
3	*Nostoc commune*	1.56	8.14	16.3	9.5
4	*Scytonema crispum*	1.73	0.9	6.4	10.3
5	*Lyngbya contorta*	1.64	5.4	18.3	14.5
6	*Calothrix fusca*	1.34	4.3	17.5	6.5

CONCLUSION

Several Blue-green algae are rich in Protein and Carbohydrate content. In the present study, biochemical analysis of six isolates belonging to Blue-green algae was estimated. It was observed that percentage protein content of *Oscillatoria limosa* was highest (10.2%) while Carbohydrate content and Lipid content was observed highest in *Lyngbya contorta* (Carbohydrate-18.3%, Lipid-14.5%).

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