



**EFFECT OF DIFFERENT NITROGEN  
CONCENTRATIONS ON THE GROWTH  
PERFORMANCE AND PROXIMATE  
COMPOSITION OF *Nannochloropsis* sp.**

**Md. Shahadat Hossain**

Roll No.: 0119/04

Registration No.: 694

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**A thesis submitted in the partial fulfillment of the requirements for the degree of  
Master of Science in Aquaculture**

**Department of Aquaculture**

**Faculty of Fisheries**

**Chattogram Veterinary and Animal Sciences University**

**Chattogram-4225, Bangladesh**

**June 2020**

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**This is to certify that we have examined the above Master's thesis and have found that is complete and satisfactory in all respects, and that all revisions required by the thesis examination committee have been made**

---

**Dr. Helena Khatoon**  
Supervisor

-----  
**Mohammad Redwanur Rahman**  
Co-supervisor

-----  
**Joyshri Sarker**  
Chairman of the Examination Committee

**Department of Aquaculture  
Faculty of Fisheries  
Chattogram Veterinary and Animal Sciences University  
Chattogram-4225, Bangladesh**

**JUNE 2020**

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## LIST OF ABBREVIATIONS

<b>Acronym</b>	<b>Definition</b>
sp.	Species
KNO <sub>3</sub>	Potassium Nitrate
g/L	Gram per liter
Cells/ml	Cells per milliliter
SGR	Specific Growth Rate
Td	Cell doubling time
Abs	Absorbance
Kcal	Kilocalorie
BFRI	Bangladesh Fisheries Research Institute
CVASU	Chattogram Veterinary and Animal Sciences University
Lab	Laboratory
FAO	Food and Agriculture Organization
PUFA	Poly Unsaturated Fatty Acid
DW	Dry Weight

## ABSTRACT

Microalgae are widely recognized in the aquaculture industries as a source of protein and in the oil industries as a source of biodiesel. *Nannochloropsis* is a promising source of protein and lipid due to its higher growth rate and cellular chemical compositions. Hence, the purpose was to determine the effect of nitrogen concentrations on cell growth and proximate composition of *Nannochloropsis* sp. For the experiment, *Nannochloropsis* sp. was grown in 100 g/L KNO<sub>3</sub> present in Conway medium as the control and in 50 g/L, 75 g/L, 125 g/L, and 150 g/L KNO<sub>3</sub> present in Conway medium respectively to determine stress effects. The culture volume was 1.5 L each. The results showed that the growth of *Nannochloropsis* sp., in terms of cell density and specific growth rate (SGR) was significantly ( $p < 0.05$ ) higher ( $73.65 \times 10^6$ ) ( $0.772 \times 10^6$  cells/day) at high concentration of KNO<sub>3</sub> 150g/L compared to other concentration 50g/L ( $21.93 \times 10^6$  cells/ml;  $0.451 \times 10^6$  cells/day), 75g/L ( $20.93 \times 10^6$  cells/ml;  $0.491 \times 10^6$  cells/day), 100g/L  $29.03 \times 10^6$  cells/ml;  $0.525 \times 10^6$  cells/day and 125 g/L  $56.7 \times 10^6$  cells/ml;  $0.739 \times 10^6$  cells/day) respectively. Protein content of *Nannochloropsis* sp. was significantly high ( $p < 0.05$ ) at higher concentration of KNO<sub>3</sub> (54 % dry weight) followed by 50 g/L (35 % dry weight), 75 g/L (41 % dry weight,) 125 g/L (48 % dry weight) and 100 g/L KNO<sub>3</sub> (47 % dry weight) respectively. On the other hand, lipid content (36% dry weight) was significantly higher ( $p < 0.05$ ) at lower concentration of KNO<sub>3</sub> 125g/L KNO<sub>3</sub> to higher. In case of carbohydrate content there was no significant difference among the different stresses except the higher nitrogen stress (13% dry weight) of 150 g/L KNO<sub>3</sub>. Therefore, the effects of nitrogen concentration have an effective approach to acquire protein, lipid as well as higher cell density.

Key words: Cell density, proximate composition, *Nannochloropsis*, conway media, KNO<sub>3</sub>