



**POTENTIALITY OF *Nannochloropsis* sp. AS
PARTIAL DIETARY REPLACEMENT OF
FISHMEAL ON GROWTH, NUTRITIONAL
PROFILE, PIGMENT, ANTIOXIDANTS AND
BREEDING PERFORMANCE OF GUPPY (*Poecilia
reticulata*)**

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Session: 2020-2021

**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, 2021

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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**

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Acknowledgements

First and foremost, all the praises are for the almighty, **Allah** who bestowed me with the ability and strength to accomplish this MS research work along with the thesis on due time.

I would like to convey my earnest gratitude to my parents who brought me in the light of earth and nursed me with all the facility I need to be succeeded in life.

I sincerely express my intense gratitude to my MS supervisor **Dr. Helena Khatoon** (Assistant Professor & Head, Dept. of Aquaculture, CVASU) for her close supervision, immense support and intellectual guidance during my whole research work.

I would like to have the opportunity to especially thank **Bangladesh Fisheries Research Institute (BFRI)** for funding my research work.

My appreciation and gratitude is extended to **UGC**, Bangladesh for additional funding required to accomplish my research work.

I would like to convey profound gratitude to **Mohammad Redwanur Rahman** (Assistant Professor, Dept. of Aquaculture, CVASU), for his fantabulous support and guidance during execution of field work of my research.

I would like to especially thank **Chattogram Veterinary and Animal Sciences University** for granting me the laboratory facilities required for the research work and also for providing me accommodation facilities at CVASU outreach campus Cox's Bazar.

At the end, I would like to convey my sincere gratitude to Zannatul Nayma, Fardous Ara Mukta, Mohammad Ekramul Haque, Sajjadul Mustaqim, all laboratory attendant and well-wishers who directly or indirectly supported me during the course of this study. Your kindness means a lot to me. May Allah bless you all.

Razia Sultana

June, 2021

List of Abbreviations

Acronym	Definition
sp.	Species
DO	Dissolved Oxygen
ppt	Parts Per Thousand
pH	Power of Hydrogen
%	Percentage
°C	Degree Celsius
°F	Degree Fahrenheit
cm	Centimeter
in	Inch
mg	Milligram
g	Gram
h	Hour
W	Watt
K	Kelvin
ml	Milliliter
L	Liter
N	Normal
lbs	Pound-Mass or Pound
ln	Logarithm
Wt.	Weight
nm	Nannometer
rpm	Rotation Per Minute
v/v	Volume Per Volume
µg/g	Micro-Gram Per Gram
Nmol g ⁻¹	Nano Mole Per Gram
e.g.	Exempli Gratia (For Exemple)
ANOVA	Analysis of Variance

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Abstract

In this study, fishmeal was partially replaced by *Nannochloropsis* sp. to evaluate its effect on growth, survival, proximate composition, pigment, antioxidants, breeding performance and water quality parameters in rearing guppy (*Poecilia reticulata*). Triplicate groups of fifteen uniform sized guppy fries were kept in each rectangular glass tank (20 L) maintaining the male and female ratio to 1:2. In diets, *Nannochloropsis* sp. was incorporated by replacing fishmeal at different levels-0 (control), 5 (N5), 10 (N10) and 15% (N15) and commercial feed (CMF) and fed to the fishes, twice a day at 5% of their body weight for 100 consecutive days. At the end of experiment, random sampling of fishes was done for growth parameter assessment and further laboratory analysis. Results showed that the lipid profile was significantly ($P < 0.05$) higher in 15% inclusion of *Nannochloropsis* sp. whereas there were no significant ($P > 0.05$) differences in protein and carbohydrate content in all groups. However, feed conversion ratio, specific growth rate, average daily growth, length increment and condition factor were relatively similar in all the groups except 15% and commercial feed. The carotenoid content of fin and muscle was significantly ($P < 0.05$) higher in 15% inclusion. In addition, the fish in 15, 10, and 5% inclusions performed significantly ($P < 0.05$) earlier breeding with a higher number of offspring, respectively than the control and commercial feed fed groups. Statistical analysis of the collected data also revealed that there was significant differences among treatments regarding survival and oxidative stress analyzed by hydrogen peroxide and lipid peroxidation assays. Survival rate was significantly ($P < 0.05$) higher in algal feed fed groups (N15, N10, and N5). H_2O_2 was significantly ($P < 0.05$) lower in N15 compared to the other groups whereas lipid peroxidation was lower in both N15 and N10. The addition of *Nannochloropsis* sp. to the feed improved and maintained good water quality during the culture period. In conclusion, results from this study indicate that selected marine microalga can improve reproductive performance through enhancing body coloration and lipid content of fish as well improving their survival rate with higher antioxidant properties might help in production of more hardy culture species for commercial aqua farming.

Keywords: Guppy, *Nannochloropsis* sp., survival, proximate composition, breeding performance, carotenoid, oxidative stress