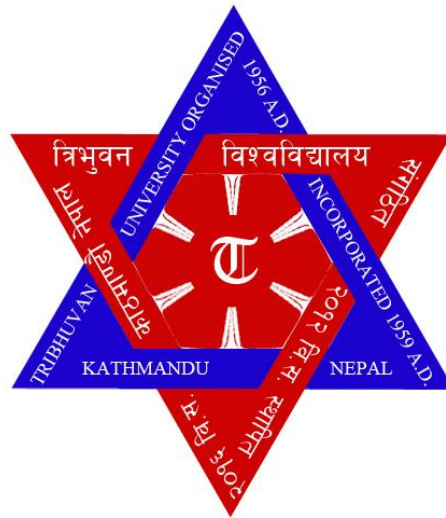


**INTENSIFYING THE MICROBIAL ACTIVITY TO DEVELOP THE
SUSTAINABLE TROUT (*Oncorhynchus Mykiss* Walbaum, 1792)
CULTURE**



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Submitted to

Central Department of Zoology
Institute of Science and Technology
Tribhuvan University
Kirtipur, Kathmandu
Nepal
February, 2018

DECLARATION

I hereby declare that the work presented in this thesis has been done by myself, and has not been submitted elsewhere for the award of any degree. All sources of information have been specifically acknowledged by reference to the author(s) or institution(s).

Date.....

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Suresh Chandyo

RECOMMENDATIONS

This is to recommend that the thesis entitled “INTENSIFYING THE MICROBIAL ACTIVITY TO DEVELOP THE SUSTAINABLE TROUT (*Oncorhynchus Mykiss* Walbaum, 1792) CULTURE” has been carried out by Suresh Chandyo for the partial fulfilment of Master’s Degree of Science in Zoology with special paper Fish and Fishery. This is his original work and has been carried out under my supervision. To the best of my knowledge, this thesis work has not been submitted for any other degree in any institutions.

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LETTER OF APPROVAL

On the recommendation of supervisor “Prof. Dr. Kumar Sapkota” this thesis submitted by Suresh Chandyo entitled “INTENSIFYING THE MICROBIAL ACTIVITY TO DEVELOP THE SUSTAINABLE TROUT (*Oncorhynchus Mykiss* Walbaum, 1792) CULTURE” is approved for the examination and submitted to the Tribhuvan University in partial fulfilment of the requirements for Master’s Degree of Science in Zoology with special paper Fish and Fishery.

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CERTIFICATE OF ACCEPTANCE

This thesis work submitted by Suresh Chandyo entitled “INTENSIFYING THE MICROBIAL ACTIVITY TO DEVELOP THE SUSTAINABLE TROUT (*Oncorhynchus Mykiss* Walbaum, 1792) CULTURE” has been accepted as a partial fulfilment for the requirements of Master’s Degree of Science in Zoology with special paper Fish and Fishery

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LIST OF ABBREVIATIONS

Abbreviated form	Details of abbreviations
ADB	Asian Development Bank
ADG	Average daily weight gain
ATP	Adesino tri phosphate
C	Carbon
Cl	Chlorine
df	Degree of freedom
DHA	Docosaheanoic acid

DO	Dissolved oxygen
EC	Electric conductivity
EPA	Eicosapentaneic acid
F	F-value
FAO	United Nation Food and Agriculture Organization
FCR	Feed conversion ratio
FRD	Fisheries Research Division, Godawari, Lalitpur, Nepal
ha	Hector
HUFA	Highly unsaturated fatty acid
JICA	Japanese international cooperate agency
K	Potassium
mt	Metric tone
MS	Mean square
N	Nitrogen
Na	Sodium
NADH	Nicotina adenine dihydrogen
P	Phosphorous
pH	Potentia hydrogenii
PHA	Polyhydroxyalkanoates
SAARC	South Asian Association for Regional Co-operation
SS	Sum of square
TAN	Total Ammonia Nitrogen
UNWFP	United Nation World Food Programme
UNDP	United Nations Development Programme
\$	U.S. Dollar

Abstract

The salmonid fish requires higher amount of protein in diet that comes from non-commercial fish. The protein metabolism cause higher ammonia excretion and higher amount of oxygen is consumed. This causes water pollution, biosecurity and many environmental impacts. The addition of soluble carbohydrate in culture medium enhance the heterotrophic microbial activities, that minimize the ammonia contain of culture medium. Also the low level of ammonia in trout culture causes the higher growth without increase in feed consumption.

The fish was stocked at rate of 25 in each bucket of 15 lit capacity supplied with 43 ± 2.5 ml/sec of water. The one group was treated with sucrose solution keeping C: N 15:1. The fish were feed pelletized standard shrimp formulated (45% protein) three times a day and buff liver once a day. Triplicates were maintained for each treatment.

In the study, we found that the average water temperature was 16.5°C , DO was 5.48 ± 0.1 mg/l and alkalinity was 161.17 ± 7.62 mg/l of CaCO_3 that lie with in suitable range. The hardness and pH was rises in culture water but also lies with in suitable range. The TAN, phosphate, nitrite and nitrate was rise in control however in treatment significantly ($P < 0.05$) reduce. The TAN arise from 0.4091 ± 0.0772 mg/l to 0.4487 ± 0.0424 mg/l and the phosphate arises from 13.8 ± 2.2 $\mu\text{g/l}$ to 17.2 ± 1.2 $\mu\text{g/l}$ in control. However, TAN reduced to 0.2578 ± 0.0741 mg/l and phosphate reduced to 12.3 ± 1.1 $\mu\text{g/l}$. The nitrite and nitrate decrease from 0.108 ± 0.008 mg/l to 0.1022 ± 0.015 in control and to 0.0925 ± 0.006 mg/l of nitrite and nitrate. Also in growth performance, the fish growth was significantly ($P < 0.01$) higher in treatment than control. The mean weight gain in control was 2.31 ± 0.05 g and in treatment was 2.69 ± 0.07 g in 45 days.

The variations in water quality due to heterotrophic bacterial consumption particularly DO and alkalinity was lies with in suitable range. The reduction in toxic ammonia and phosphate contribute in sustainable aquaculture. Such reduction cause better growth and less water exchange in trout culture with using aerator. The reduction of phosphate prevents eutrophic condition. The stable water quality causes less susceptible of disease. Moreover the outlet does not harm water shed region aquatic life.

The heterotrophic growth was rapid that are not washout from cultural medium. The pH is varies but lies with in required limits. Also the hardness of water was loss but not significantly to the standard limits.

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