



Kerala State Council for Science, Technology and Environment

Dr. Anilkumar C
Scientist EII & Head
Science Education Division, KSCSTE

29-10-2015

12/SPS55/2015/KSCSTE

Dear Madam,

Sub:- Financial assistance from KSCSTE for student project reg.

Ref:- Your application received under Student Project scheme

This is to invite your attention to the reference cited and to inform that the project proposal titled "An investigation on the pollution and its impact on the biodiversity of phytoplankton in Tirur-Ponnani River, Malappuram District, Kerala" submitted by Dr. Tessy Paul P, Associate Professor, Dept. of Botany, Christ College, Iringalakkuda, Thrissur -680125 as PI and Ms. Sreenisha KS as student investigator has been approved. An amount of ₹10,500 is sanctioned by the Council. The budget estimate of the project will be as detailed below.

SL.NO.	ITEMS	AMOUNT(₹)
(1)	Consumables	4000
(2)	Travel	3000
(3)	Research Literature	500
(4)	Others	3000
	Total	10500

The PI has to submit the signed 'Terms and Conditions' and the date of start of the project may be intimated to the Council. On completion of the project you should submit one hard copy and a soft copy of the final report (in pdf to spkscste@gmail.com), audited Statement of Expenditure and Utilization Certificate counter signed by the Head of the Institution for releasing the grant. The format for final report, SE & UC can be downloaded from www.kscste.kerala.gov.in.

Thanking you,

Yours sincerely,

Anilkumar C

To:

Dr. Tessy Paul P Associate Professor, Dept. of Botany, Christ College, Iringalakkuda, Thrissur - 680125

Copy to:

The Principal, Christ College, Iringalakkuda, Thrissur -680125

Ms. Sreenisha KS, Student, Dept. of Botany, Christ College, Iringalakkuda, Thrissur -680125

AN INVESTIGATION ON THE POLLUTION AND ITS IMPACT ON THE BIODIVERSITY OF PHYTOPLANKTON IN TIRUR – PONNANI RIVER, MALAPPURAM DISTRICT, KERALA

STUDENT PROJECT FINAL REPORT

Financial assistance provided by

**KERALA STATE COUNCIL FOR SCIENCE, TECHNOLOGY AND ENVIRONMENT (KSCSTE),
THIRUVANANTHAPURAM**

12/SPS 55/2015/KSCSTE Dated 29th October, 2015

Principal Investigator

**Dr. TESSY PAUL P.
DEPARTMENT OF BOTANY**

Principal Investigator

**SREENISHA K. S.
IV Semester M.Sc. Environmental Science**



**CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA
THRISSUR DISTRICT- 680 125, KERALA, INDIA**

JANUARY 2016

AN INVESTIGATION ON THE POLLUTION AND ITS IMPACT ON THE BIODIVERSITY OF PHYTOPLANKTON IN TIRUR – PONNANI RIVER, MALAPPURAM DISTRICT, KERALA

STUDENT PROJECT FINAL REPORT

Financial assistance provided by:
***KERALA STATE COUNCIL FOR SCIENCE, TECHNOLOGY AND
ENVIRONMENT (KSCSTE), THIRUVANANTHAPURAM***
12/SPS 55/2015/KSCSTE Dated 29th October, 2015

Principal Investigator: Dr. TESSY PAUL. P.
DEPARTMENT OF BOTANY

Student Investigator: SREENISHA K. S.
IV Semester M.Sc. Environmental Science



**CHRIST COLLEGE (AUTONOMOUS), IRINJALAKUDA
THRISSUR DISTRICT- 680 125, KERALA, INDIA**

JANUARY 2016

ABSTRACT

The present study focuses on the pollution and its impact on the biodiversity of phytoplankton in Tirur – Ponnani River, Malappuram District, Kerala, India. The investigation was conducted at the three sites namely Tirur, Thazhepalam and Parapadi of Tirur River, Malappuram District, Kerala which lies between 75° 55' and 75° 54' East longitude and 10° 55' and 10° 54' North latitudes.

The water quality of Tirur River was investigated for a period of six months from January to June 2015. The surface water samples were collected monthly from the three sites of Tirur River and the physico-chemical parameters analyzed were temperature, pH, acidity, alkalinity, total hardness, calcium hardness, magnesium hardness, chloride, salinity, dissolved oxygen (DO), nitrate, sulphate, biochemical oxygen demand (BOD) and chemical oxygen demand (COD) and their correlations were discussed. The species diversity of phytoplankton was also analyzed.

During the present investigation of physico-chemical parameters of the water indicated that the water quality of Tirur River was deteriorated at all the three sites studied during the period of study. The physico-chemical parameters showed distinct seasonal and spatial fluctuations. The pollution was severe during pre-monsoon season due to the lesser river flow and water content. The pollution was minimized during June due to the rainfall. The salinity of water was high in all three sites and the contaminants came from fish market, railway station and other non-point sources of pollution.

57 species of phytoplankton were identified during the period of study from the Tirur River which come under 29 genera belonging to four taxonomic classes. Bacillariophyceae (diatoms) was the major group comprised 39 taxa (68.4%) belonging to 20 genera followed by Cyanophyceae (blue green algae) represented by 14 taxa (24.6%) belonging to 7 genera. Chlorophyceae (green algae) and Euglenophyceae was represented by 2 taxa (3.5%) each belonging to 1 genera each. *Oscillatoria*, *Nitzschia*, *Navicula*, *Chaetoceros* and *Pleurosigma* were the diverse genera found in the study area.

The salinity was higher in Tirur River during the period of study and the diversity of phytoplankton showed a number of marine diatoms during the pre-monsoon season. The class Bacillariophyceae (Diatoms) was dominant group of algae in all three sites of Tirur River throughout the period of study. The present study identified 11 pollution tolerant algal genera and it revealed that the quality of the water was deteriorated at all the selected three sites in the Tirur River and are polluted due to human interventions.

Key words: - Physico-chemical parameters, Tirur - Ponnani River, River pollution, Malappuram District, Kerala.

CONTENTS

Certificate
Declaration
Acknowledgement
Abstract
Contents
List of Tables
List of Figures
List of Plates

Sl. No: Page no:

Chapter 1

INTRODUCTION 01 - 04

- 1.1 Review of Literature..... 02
1.2 Objectives of Investigation 03
1.3 Significance of the Present Investigation 04

Chapter 2

MATERIALS AND METHODS..... 05 - 09

- 2.1 Study area 05
2.2 Analysis of Water Quality Parameters 08
2.3 Biological Analysis of Water Samples 09
2.4 Analysis of the Biodiversity of Phytoplankton 09
2.5 Quantitative Estimation of Phytoplankton 09

Chapter 3

RESULTS AND DISCUSSION..... 10 - 54

- 3.1 Physico-chemical Parameters 10
3.2 Correlation Analysis between Physico-chemical Parameters..... 15
3.3 Analysis of Algal Diversity 21
3.4 Quantitative Estimation of Phytoplankton Abundance 43
3.5 Analysis of Correlation of Phytoplankton Abundance with
Physico-chemical Parameters..... 46
3.6 Analysis of Pollution Tolerant Algal Genera 50
3.7 Impact of Pollution on Phytoplankton 53

Chapter 4

CONCLUSION..... 55 - 56

REFERENCES 57 - 63



KERALA STATE COUNCIL FOR SCIENCE, TECHNOLOGY AND ENVIRONMENT

FORMAT FOR STUDENT PROJECT REPORT (*max. 15 pages*)

1. Project Title: **An investigation on the Pollution and its impact on the Biodiversity of Phytoplankton in Tirur – Ponnani River, Malappuram District, Kerala**
2. File No: **12/SPS 55/2015/KSCSTE Dated 29-10-2015**
3. Name & Address of the student: **Ms. SREENISHA K.S.**
IV Semester, M.Sc. Environmental Science,
Christ College, Irinjalakuda,
Thrissur (Dt.), PIN 680 125
Permanent Address: Sreenilayam (H), Thekkummur (PO)
Tirur – 5, Malappuram (Dt.), PIN 676 105
4. Name & Address of the
Principal Investigator with mobile No. : **Dr. TESSY PAUL P.**
Associate Professor,
Department of Botany,
Christ College (Autonomous),
Irinjalakuda, PIN- 680 125
Mob: 9446233104

Co-Investigator: NIL
5. Broad area of Research: **BOTANY**
6. Specific area: **PHYCOLOGY**
7. Date of Start: **15-01-2015**
8. Total cost of Project: **Rs. 10, 500 /-**
9. **Approved Objectives of the proposal:**
 - Documentation of algae of Tirur – Ponnani River.
 - Analysis of hydrographic parameters
 - Water pollution and its impact on phytoplankton

UTILIZATION CERTIFICATE

Certified that out of Rs.10,500/-..... sanctioned by Kerala State Council for Science, Technology and Environment towards financial assistance for the student project titled '*An investigation on the pollution and its impact on the biodiversity of phytoplankton in Tansa Ponnani River, Malappuram district, Kerala.*' an amount of Rs.10,500/-..... was utilized for the purpose for which it was sanctioned, leaving a balance of Rs. ...*NIL*... at the close of as shown in the Statement of Expenditure annexed.



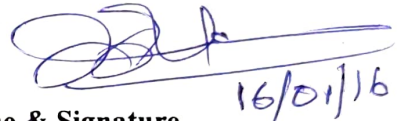
Name & Signature
of Principal Investigator

Dr. TESSY PAUL P.
Associate Professor
Department of Botany
Christ College, Irinjalakuda-680 125



Name & Signature
of Head of the Institution

DR. JOSE V.
PRINCIPAL
CHRIST COLLEGE, IRINJALAKUDA


16/01/16

Name & Signature
of Chartered Accountant

C.A. T.I. JOSEPH, F.C.A.
CHARTERED ACCOUNTANT
IRINJALAKUDA
M No. 200142

Office Seal



KERALA STATE COUNCIL FOR SCIENCE, TECHNOLOGY AND ENVIRONMENT
An Autonomous body of the
Government of Kerala

KSCSTE - Student Project entitled - "An investigation on the pollution and its impact on the biodiversity of phytoplankton in Tirur-Ponnani River, Malappuram District, Kerala" submitted by Dr. Tessy Paul P, Associate Professor, Dept. of Botany, Christ College, Iringalakkuda, Thrissur -680125 and Ms. Sreenisha KS as student investigator - financial assistance - Orders issued.

Council (P) Order No. 197/2016/KSCSTE

Thiruvananthapuram, dated: 15.06.2016

Ref: (1) Decision of the 55th SP Committee dated 11th August 2015 on item No. SP- 55/12
(2) File No: 12/SPS55/2015/CSSTE

ORDER

Kerala State Council for Science, Technology and Environment (KSCSTE) is operating a programme for supporting student projects in Colleges and University Departments. Dr. Tessy Paul P, Associate Professor, Dept. of Botany, Christ College, Iringalakkuda, Thrissur -680125 has submitted a student project with Ms. Sreenisha KS as student investigator for financial assistance. The 55th SP Committee dated 11.08.2015 has sanctioned Rs. 10,500/- (Rupees ten thousand and five hundred only) for the conduct of the above said project. The PI has submitted the final report and financial statements after completion of the project.

KSCSTE has verified the submitted documents and is pleased to accord sanction for the release of **Rs. 10,500/- (Rupees ten thousand and five hundred only)** towards financial assistance for the student project titled "An investigation on the pollution and its impact on the biodiversity of phytoplankton in Tirur-Ponnani River, Malappuram District, Kerala" submitted by Dr. Tessy Paul P, Associate Professor, Dept. of Botany, Christ College, Iringalakkuda, Thrissur -680125. The amount will be released as account payee cheque in favour of **The Principal, Christ College, Iringalakkuda, Thrissur -680125**. The expenditure in this regard will be met from the **Council fund (III) Schemes and Programmes of KSCSTE - Student project scheme**.

The above sanction has been issued under delegated powers of the Council, with the approval of the Director, KSCSTE vide sanction No. 184/DIR/2016-17/KSCSTE dated, 15.06.2016.



Dr. Anilkumar C
Scientist E1I & Head
Science Education Division, KSCSTE

To
The Principal, Christ College, Iringalakkuda, Thrissur -680125

Copy to:
Dr. Tessy Paul P, Associate Professor, Dept. of Botany, Christ College, Iringalakkuda, Thrissur - 680125
Ms. Sreenisha KS, Student, Dept. of Botany, Christ College, Iringalakkuda, Thrissur -680125
The Cash Section to disburse the amount through a/c payee cheque
Administrative Officer, Finance Officer, PS to Executive Vice President, PA to Member Secretary, PA to Director, PA to Contoller of Administration, Auditors file, Stock File/Office Copy.