

AISWARYA. S



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NATIONAL CENTRE FOR EARTH SCIENCE STUDIES


पृथ्वी विज्ञान मंत्रालय, भारत सरकार  
Ministry of Earth Sciences, Government of India  
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PB No. 7250, Akkulam, Thiruvananthapuram-695011, India



23/07/2020

**CERTIFICATE**

This is to certify that the dissertation entitled “GEOCHEMISTRY AND POLLUTION ASSESSMENT OF CHALAKUDY RIVER BASIN” being submitted by **Ms. Aiswarya. S.**, Postgraduate student, Department of Chemistry, S.N. College, Chengannur in partial fulfillment of the requirement for the award of Degree of Master of Science in Chemistry, is the record of the bonafide work carried out under my supervision and guidance in the Crustal Processes Group, **National Centre for Earth Science Studies**, Ministry of Earth Sciences, Govt. of India, Thiruvananthapuram and no part of the dissertation has been submitted in part or in full for any other diploma, degree of any university.

  
23.07.2020  
Dr. A. KRISHNAKUMAR

डॉ. ए. कृष्णकुमार / Dr. A. KRISHNAKUMAR  
वैज्ञानिक, क्रस्टल प्रोसेस ग्रुप / Scientist, Crustal Processes Group  
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आक्कुलम, तिरुवनन्तपुरम-695 011, केरल  
Akkulam, Thiruvananthapuram-695 011, Kerala

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## ABSTRACT

Rivers are the major geological agents in tropical and sub-tropical regions which transport tonnes of sediment from terrestrial environments to the ocean. It transports both anthropogenic and natural materials to the sea. And during the transportation the sediments undergo many physico-chemical changes depending on the terrain characteristics and climatic conditions of the through which the river is flowing. The present study is done in the Chalakudy River basin. 20 samples from different locations of the riverine system are taken for detailed geochemical studies. The geochemical analysis shows the values of geoaccumulation index, contamination factor and pollution load index. From the detailed study of the sampling sites it is concluded that the area is prone to moderate pollution and as a need of an hour steps should be taken to control the pollution. Concentration of major and minor elements compared to that of world average shale value shows that Zr, Sr, Cr and Ba are slightly enriched in the area. Geo accumulation index based on the average value of each element was calculated and it was observed that V, Ni, Zn, Ga, Rb, Sr, Y, Ba, Nd, La, Ce are unpolluted to slightly polluted. From the study of degree of contamination parameter about 75% of the sample locations shows moderate degree of contamination and the remaining 25% shows considerable degree of contamination. And the PLI study gives an idea that about 25% of the location doesn't show any contamination, 45% of the sample sites possess base line level pollution and the remaining 30% indicates progressive deterioration of the site. As per the whole study the river basin is moderately polluted but still the rate can be brought down by taking strict measures to maintain the quality of the river.

**SNEHA HARIDAS**

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**SYNTHESIS OF PLANT MEDIATED GOLD NANOPARTICLES USING  
EMILIA SONCHIFOLIA AND BACOPA MONNIERI LEAVES EXTRACT  
AND EVALUATION OF THEIR ANTIMICROBIAL ACTIVITY**

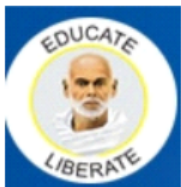
*A Project Report Submitted to the University of Kerala in Partial  
Fulfillment of requirements for the Degree of*

**MASTER OF SCIENCE IN  
CHEMISTRY**

*By*

**(SNEHA HARIDAS  
(Reg No: 63518128014)**

**DEPARTMENT OF CHEMISTRY  
SREE NARAYANA COLLEGE  
CHENGANNUR**



**JULY 2020**

**SREE NARAYANA COLLEGE  
CHENGANNUR**

## **ABSTRACT**

In this study, the phytochemical and antimicrobial activities of two plants of *Bacopa monnieri* (Brahmi) and *Emilia sonchifolia* DC (Muyalchevian) were evaluated due to their high medicinal value. The fresh leaves were extracted with distilled water and GOLD nanoparticles were synthesized. The synthesis of nanoparticles using plant extracts is the most adopted method as green eco friendly production of nanoparticles and also has a special advantage in such a way that the plants are widely distributed easily available much safer to handle and act as a source of several metabolites rich in pharmacological constituents. Using the plant extract phytochemical tests were conducted and confirmed the presence of phytochemicals. The biosynthesized gold nanoparticles were characterized using XRD and SEM. Plant mediated synthesis of metallic nanoparticles is an increasing commercial demand due to the wide applicability in various areas such as electronics, catalysis, chemistry, energy, cosmetics and medicine. This study presents the biological synthesis of gold nanoparticles using plant leaf extracts of *Bacopa monnieri* (Brahmi) and *Emilia sonchifolia* DC (Muyalchevian) as reducing and stabilizing agents. UV-Visible spectroscopy was used to monitor the quantitative formation of Gold nanoparticles. The XRD analysis of gold nanoparticles indicated the formation of crystalline nanoparticles. The antibacterial effect of the as-synthesized gold nanoparticles that were performed against pathogenic bacteria, *Escherichia coli* and *Staphylococcus aureus*, reveal that due to the difference in particle size the samples were not active against the bacteria tested.

## GOPIKA G KRISHNAN

**SREE NARAYANA COLLEGE**

**NEDUVARAMCODE P.O., CHENGANNUR, PIN: 689 508**

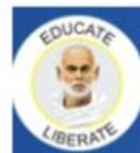
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**Dr.Venu.S**

**Head of the Department**

**Post Graduate Department of Chemistry**



*Date: 20.07.2020*

### **CERTIFICATE**

This is to certify that the thesis entitled "**Green synthesis of silver nanoparticles and its application in photo catalytic dye degradation**" was carried by **Gopika G Krishnan, (Reg No: 23518128007)** student of M.Sc. VI<sup>th</sup> semester, Post Graduate Department of Chemistry, Sree Narayana College, Chengannur in partial fulfillment of the requirement for the award of Degree of Master of Science in Chemistry by the University of Kerala during the year, 2018-2020.

This work has been carried under the guidance of **Dr.Reshmi.R**, Assistant Professor, Post Graduate Department of Chemistry, Sree Narayana College, Chengannur.

Yours sincerely,

**Dr.Venu.S**

## ***ABSTRACT***

The scientific community is searching for new synthesis methods for the production of metallic nanoparticles. Green synthesis has now become a vast developing area of research. The green synthesis of metallic nanoparticles paved the way to improve and protect the environment by decreasing the use of toxic chemicals and eliminating biological risks in biomedical applications. Plant mediated synthesis of metal nanoparticles is gaining more importance owing to its simplicity, rapid rate of synthesis of nanoparticles and eco-friendliness. The present study reports an environmentally benign and unexploited method for the synthesis of silver nanocatalysts using Vitexnegundo (Karinochi), Psidiumguajava (Guava), Myristica Fragrance (Nutmeg) leaves extracts, which are a potential source of phytochemicals. The synthesized nanoparticles are characterized using UV–VIS spectroscopy, SEM, XRD and FTIR. The UV–visible absorption spectra of the silver samples exhibited distinct band centered around 500 nm. The major phytochemicals present in the plant extracts responsible for the formation of silver nanocatalysts are identified using FTIR spectroscopy. The report emphasizes the effect of the size of silver nanoparticles on the degradation rate of hazardous dye, methylene blue. The efficiency of silver nanoparticles as a promising candidate for the catalysis of organic dyes is established in the present study.

GOPIKA SATHYAN K S



DEPARTMENT OF APPLIED CHEMISTRY  
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### CERTIFICATE

This is to certify that the project work entitled: "D- $\pi$ -A fluoroionophores: synthesis and metal binding studies " is an authentic record of the project work carried out by Ms. Gopika Sathyan KS under my supervision in partial fulfillment of the requirements for the award of the degree of Master of Science in Chemistry, and is a record of bonafide work done by her.

Cochin-22,  
15-07-2020

Dr. N. Manoj  
(Supervising Guide)  
Professor  
Department of Applied Chemistry  
CUSAT

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## ABSTRACT

Our work focuses on the synthesis and photophysical properties and metal binding studies of the D- $\pi$ -A Fluoroionophores where barbituric acid act as acceptor group and carbazole as donor moiety. These D- $\pi$ -A molecules have inherent Intramolecular charge transfer characters and thus the electron distribution favors metal binding. In this work we used carbazole- 1,3-dimethyl barbituric acid combination in order to confirm the binding activity of carbazole – barbituric acid which is already worked out, that is, we replaced the N-H bond with N – methyl groups.

We conducted the photophysical studies along with the metal binding studies of the D- $\pi$ -A systems. The Absorption Spectra of carbazole dimethyl barbituric acid conjugate found to have broad absorption band at longer wavelength due to the influence of the heterocyclic acceptor groups. A duplicated metal binding study is conducted for both carbazole – barbituric acid conjugate and carbazole-1,3 - dimethyl barbituric acid conjugate with a series of transition metal salts.

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ARYA BABU



राष्ट्रीय पृथ्वी विज्ञान अध्ययन केन्द्र  
NATIONAL CENTRE FOR EARTH SCIENCE STUDIES  
पृथ्वी विज्ञान मंत्रालय, भारत सरकार  
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21.07.2020

**Dr. K. Anoop Krishnan**  
Scientist & Supervising Guide  
Hydrological Processes Group

### CERTIFICATE

This is to certify that the dissertation entitled “An approach on the evaluation of hydrochemical parameters of Ashtamudi lake” submitted by Ms. Arya Babu, Department of Chemistry, Sree Narayana College, Chengannur in partial fulfillment of the requirement for the award of Master’s Degree in Chemistry of the University of Kerala is an authentic record of the original research work carried out by her under my supervision and guidance at National Centre for Earth Science Studies, Thiruvananthapuram and that no part thereof has been presented before for any degree.

**Dr. K. Anoop Krishnan**  
(Supervising Guide)

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हमारे भविष्य हमारी पृथ्वी के लिए प्रतिबद्ध

## **ABSTRACT**

The life in aquatic system is directly or indirectly depends on the water quality. The alteration of physicochemical parameters of water affects the abundance of biota and their diversity. Ashtamudi backwater has odd value for its hydrological functions and biodiversity. There are reports on the health of this estuary, which are dependent on the nature and quantity of various contaminants and toxic pollutants received by them. The main contaminants are sewage, synthetic organics, petroleum hydrocarbons, pesticides and toxic heavy metals. This is happening mainly due to rapid industrialization and modernization. The recreational role of the estuarine ecosystem is declining at a faster rate due to pollution. The Ashtamudi Lake shows differences in ecological conditions and hydrological factors. Hence an attempt was made to evaluate and confirm how far the hydrological parameters influence the different sites of the lake. physico chemical characteristics of the aquatic system indicate the extent of pollution existing there. Water quality is affected mainly by changes in various physico chemical factors. So it is inevitable to check regularly the quality of water, and thereby adopting necessary steps for the protection of the ecosystem by eliminating the factors responsible for pollution. A periodical survey and monitoring agenda must be a mandate concerned for the conservation of Ashtamudi lake and this study was believed to be a key indicator of pollution hazards on these non-renewable green boundaries. The study encompasses the fact for the need of conservation the lake by evaluating the hydro chemical parameters of water. Hence the present work has been taken up to study the water quality characteristics at selected sites of Ashtamudi Lake, which would help to evolve mitigation and control measures.

**MITHILA.P**

# QUALITY ANALYSIS OF DRUG: AMOXICILLIN CAPSULES

Project report submitted to:  
KERALA UNIVERSITY, TRIVANDRUM  
*In partial fulfillment of requirements for the degree of*  
**MASTER OF SCIENCE IN CHEMISTRY**

By  
**MIDHILA P**

Reg No: 63512818010

Year: 2018-2020



**Sree Narayana College Chengannur**

CHRY 1943  
ASPAZHA, PUTHAM



QUALITY ANALYSIS DEPARTMENT  
KERALA STATE DRUGS AND PHARMACEUTICALS

Under the guidance of:

**SRI SPINWIN**

Under the Co-guidance of:

**Dr. Venu S**

DEPARTMENT OF CHEMISTRY  
SREE NARAYANA COLLEGE, CHENGANNUR

## ABSTRACT

The quality analysis of drugs is of great importance for the efficient treatment and prevention of diseases with minimum side effect. For perfect curing, minimum side effects, better durability of the drugs, it have to satisfy certain requirements. That is the weight variation, dissolution, percentage of content of active ingredient etc. of the drugs should be within a certain range as described in Indian Pharmacopoeia. Challenging tasks like these require sophisticated techniques, dedicated equipment and methods operated by highly skilled staff, often with a good academic background. The project work "Quality Analysis of Amoxicillin Capsules' was conducted in the quality control lab of Kerala State Drugs and Pharmaceuticals Ltd. Alappuzha. Bacterial infections are the second leading cause of global mortality. Considering this fact, it is extremely important studying the antimicrobial agents. Amoxicillin is an antimicrobial agent that belongs to the class of penicillins. Amoxicillin is one of the most commonly used antibiotics in the primary care setting. It is an amino-penicillin, created by adding an extra amino group to penicillin, to battle antibiotic resistance. Amoxicillin covers a wide variety of gram-positive bacteria, with some added gram-negative coverage compared to penicillin. HPLC is the most widely used method for the amoxicillin determination due to its simplicity and low handling price. This involves comparative study of the percentage of active ingredients present in Amoxicillin capsules. Study was carried out under different samples of 500 mg capsules of Amoxicillin.



**SYNTHESIS AND CHARACTERIZATION OF NOVEL COPPER  
AND ZINC COMPLEXES OF EDARAVONE AND ITS  
CARBOXYLIC ACID DERIVATIVE**

PROJECT REPORT

Submitted to the Department of Chemistry,  
Sree Narayana College, Chengannur  
for the partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE

IN

CHEMISTRY

Submitted by  
ATHULYA A  
[ Reg. No: 63518128006 ]

Under the guidance of  
DR. NAVEEN V. KULKARNI  
Department of Chemistry  
Amrita Vishwa Vidyapeetham, Amritapuri





Dr. Naveen V. Kulkarni  
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CERTIFICATE

This is to certify that the project entitled '**Synthesis and characterization of novel copper and zinc complexes of edaravone and its carboxylic acid derivative**' submitted in partial fulfillment of the requirement for the award of the degree of Master of Science in Chemistry to Department of Chemistry, Sree Narayana College, Chengannur done by Ms. Athulya A ( Reg. No: 63518128006 ), is an authentic work carried out by her under my guidance and supervision. The matter embodied in this dissertation has not formed the basis for the award of any Degree/Diploma/Associateship/ Fellowship to the best of my knowledge and belief.

Amritapuri

August 1, 2020. Naveen V. Kulkarni

## ABSTARCT

This dissertation reports the purification and re-crystallization of edaravone (L1), synthesis of a carboxylic derivative of edaravone, viz, 5-oxo-1-phenyl-4,5-dihydro-1H-pyrazole-3-carboxylic acid (L2) and the corresponding copper and zinc complexes of both the molecules. Carboxylic derivative of the edaravone (L2) was synthesized by the KMnO<sub>4</sub> mediated oxidation of edaravone and characterized by CHN analysis and IR spectroscopy. Copper and zinc complexes of both the ligands L1 & L2 were synthesized by reacting the ligands with the appropriate metal precursors in 2:1 stoichiometric ration, under suitable reaction conditions. Complexes of L1 were characterized by C, H, N, Metal and chloride analysis and IR spectroscopy, while for the complexes of L2 we could perform only metal and chloride estimations. Based on the available spectro-analytical data an octahedral coordination geometry was assigned for all the four complexes. Complexes C1 & C2 are envisaged to be isostructural, with the two molecules of the mono dentate neutral ligand (L1) bound to the metal center via pyrazole ring nitrogen and the other four sites are occupied by two hydroxy and two aqua ligands. In the case of complexes C3 & C4, two molecules of the bidentate, monoanionic ligand L2 are predicted to bind the metal center through pyrazole ring nitrogen and carboxylic hydroxy group, forming an approximate planar metallo-cycle. Two water molecules are envisaged to fit in the apical positions. We are awaiting on the other spectral datato confirm the molecular structures of the compounds. After the thorough structural elucidation, potential antioxidant property of all the synthesized compounds will be evaluated. Emphasis will be given to establish the structure activity relationships.



**BIOSYNTHESIS OF PLANT SUPPORTED**  
**SILVER NANOPARTICLES FOR**  
**PHOTOCATALYTIC DYE DEGRADATION**  
**UNDER SUNLIGHT**

*A Project Report Submitted to the University of Kerala in Partial Fulfillment of  
requirements for the Degree of*

**MASTER OF SCIENCE IN CHEMISTRY**

**By**

**Reg No: 63518128002**

**Course code: 635**

**Exam code: 63516403**

**Dissertation code:**



July 2020





### ABSTRACT

The quality analysis of drug has the great importance for the efficient treatment and prevention of disease with minimum side effect. The aim of the project "PHARMACEUTICAL ANALYSIS AND QUALITY CONTROL OF CLOXACILLIN" is the quality analysis of two different samples of cloxacillin. Cloxacillin is an antibiotic useful for the treatment of a number of bacterial infections. This includes impetigo, cellulitis, pneumonia, septic arthritis, and otitis externa. Hence the quality analysis of cloxacillin is very important. For perfect curing, minimum side effects, better durability of the drugs, it have to satisfy certain requirement. That is the weight variation, dissolution, percentage of content of active ingredients etc of the drug should be within a certain range as described in Indian pharmacopeia. Instrumental methods are widely used for the analysis and stability of compound in bulk and pharmaceutical form. The dissolution of drug is important for it's bioavailability and therapeutic effectiveness. Dissolution of cloxacillin capsule is carried out by quick and easy UV-Visible spectrophotometer method.it is based on absorbance of the sample solutions of cloxacillin maximum at 271nm.The assay of drug is carried out by simple, specific, and rapid HPLC method. The objectives of this study include the comparative study of weight variation, dissolution and percentage content of the active ingredients in the two different samples of 250mg cloxacillin capsule

**ANJANA RAJ T**



**Dr. BEENA S.**  
**Assistant Professor**  
**Department of Chemistry**

**05.08.2020**

**CERTIFICATE**

This is to certify that the thesis report entitled “**Poly (Riboflavin) Modified Pencil Graphite for the Simultaneous Electrochemical Determination of Serotonin and Dopamine**” has been carried out by **Anjana Raj T (63518128003)**, under my guidance and supervision at the **Department of Chemistry, Amrita School of Arts & Sciences, Amrita Vishwa Vidyapeetham, Amritapuri, Kollam – 690 525**, as part of the final project work for her master Degree in Chemistry, is an authentic record of the work carried out by her under my supervision and no part of this report has formed the basis for the award of any degree, diploma or other similar titles of any University.

Amritapuri

05.08.2020

**Dr. Beena S.**

**“Poly (Riboflavin) Modified Pencil Graphite for the Simultaneous  
Electrochemical Determination of Serotonin and Dopamine”**

*Dissertation submitted to*

*University of Kerala, Thiruvananthapuram*

*In partial fulfillment of the requirement of the degree of*

*Master of Science in Chemistry*

**By**

**ANJANA RAJ T**

Canadate code: 63518128003

Year : 2018 – 2020



**Department of chemistry**

**Sree Narayana college, Chengannur**

**July 2020**

**KARISHMA. H**



Department of Applied Chemistry  
Cochin University of Science and Technology  
Kochi 682 022, India

**Dr. Suja Haridas**  
Assistant Professor  
Email: sujaharidas123@gmail.com

### Certificate

This is to certify that the thesis entitled "**Perovskite Nanocrystals For Electrocatlytic Applications**" submitted by **Ms. Karishma. H** in partial fulfilment of the requirements for the degree of Master of Science in Chemistry, to the Cochin University of Science and Technology, Kochi-22, is an authentic record of the original work carried out by him under my guidance and supervision. The results embodied in this thesis, in full or in part, have not been submitted for the award of any other degree.

**Dr. Suja Haridas**

(Supervising Guide)  
Dr. SUJA HARIDAS  
ASSISTANT PROFESSOR  
Dept. of Applied Chemistry  
Cochin University of Science & Technology  
Kochi, Kerala

Kochi-22

13/07/2020

## ABSTRACT

Our aim is to observe the Catalytic activity of different composite catalysts based perovskite overall watersplitting. We concentrated our studies into different composites of STO. Hydrothermal method was used to prepare samples like STO, N-STO, STO - BiS, La/N - STO BiS, La - STO BiS, STO - BiS (2 : 1 ).

Electrochemical characterisation studies were employed using glassy carbon as electrode an in an alkaline condition. Cyclic voltametry and linear sweep voltametry is used as electrochemical characterisation. Electrochemical characterisation using bare was also conducted to ensure the enhancement in the catalytic activity of the composites. FT - IR, XRD, SEM were the other characterisation studied. An exceptional enhancement in the performance is observed for the modified STO electrode. The improved current density for the modified electrocatalyst is attributed to the presence of bismuth sulphide. It enhances the surface oxidation kinetics by accepting the charge carriers generated in the perovskite material.

**RESHMA PUSHKARAN**

**PHARMACOLOGY AND ASSAY OF AMLODIPINE TABLETS**

*A Project Report Submitted to the University of Kerala in Partial  
Fulfillment of requirements for the Degree of  
Master of Science in Chemistry*



**August 2020**

## **ABSTRACT**

Aim of the project is to evaluate the pharmacology and assay of amlodipine tablet of two different samples. Pharmacology and assay are of great importance for the efficient treatment and prevention of disease with minimum side effects. Amlodipine besilate is a potent long-acting calcium channel blocking agent used for the treatment of hypertension, congestive heart failure and angina pectoris. For perfect curing, minimum side effects, better durability of the drug, it has to satisfy certain requirements. That is the weight variation, dissolution, percentage of content of active ingredients etc., of the drug should be within a certain range as described in Indian pharmacopeia. An efficient, least time consuming and simple spectrophotometric method for the dissolution of Amlodipine has been used. Dissolution is an important step during preformulation studies because the rate of drug dissolution of a drug will exert a direct impact on bioavailability and drug delivery aspects. The dissolution is based on the ultraviolet UV absorbance maxima at about 239nm wavelength of Amlodipine. In this study a simple and quick assay method using HPLC analysis is used. This involves comparative study of percentage of active ingredient present in amlodipine tablets. Study was carried out in two different samples of 5 mg tablet of amlodipine.



**SREE NARAYANA COLLEGE**

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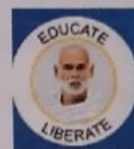
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**Dr.Venu.S**

**Head of the Department**

**Post Graduate Department of Chemistry**



**Date:26.07.2020**

### **CERTIFICATE**

This is to certify that the thesis entitled “**Synthesis And Characterization of Palladium Nanoparticles Using Leaf Extract of Justicia gendarussa and Emilia sonchifolia: Evaluation of Antimicrobial activities**” was carried by **Revathy Krishnan, Reg No: (63518128012)** student of **MSc. IV<sup>th</sup> semester, Post Graduate Department of Chemistry, Sree Narayana College, Chengannur** in partial fulfillment of the requirement for the award of **Degree of Master of Science in Chemistry by the University of Kerala during the year, 2019-2020.**

This work has been carried under the guidance of **Dr. Reshmi. R, Assistant Professor, Post Graduate Department of Chemistry, Sree Narayana College, Chengannur.**

**Yours sincerely,**



## ABSTRACT

The synthesis of nanoparticles using plant extracts is the most adopted method as green ecofriendly production of nanoparticles and also has a special advantage in such a way that the plants are widely distributed easily available much safer to handle and act as a source of several metabolites rich in pharmacological constituents. Plant mediated synthesis of metallic nanoparticles is an increasing commercial demand due to the wide applicability in various areas such as electronics, catalysis, chemistry, energy, cosmetics and medicine. This study presents the biological synthesis of palladium nanoparticles using plant leaf extracts of *Justicia gendarussa* (Vathamkolli) and *Emilia Sonchifolia* (Oricheviyan) as reducing and stabilizing agents. UV-Visible spectroscopy was used to monitor the quantitative formation of palladium nanoparticles. The as-synthesized nanoparticles were characterized by XRD and SEM. The XRD analysis of palladium nanoparticles indicated the formation of crystalline nanoparticles. X-ray diffraction (XRD) spectral results confirmed the face centered cubic (FCC) structure of nanoparticles with high stability and without any impurity. Investigations on the antibacterial effect of the as-synthesized palladium nanoparticles that were performed against pathogenic bacteria, *Escherichia coli* and *Staphylococcus aureus*, reveal that due to the difference in particle size the samples were not active against the bacteria tested. In conclusion, this greener approach toward the synthesis of palladium nanoparticles, using plant leaf material as reducing and capping agent, has many advantages such as ease with which the process can be scaled up, economic viability, environmentally benign and renewable, there is no need to use high pressure, energy, temperature and toxic chemicals.

Keywords: Antibacterial Activity, Biosynthesis, Characterization, Copper Nanoparticles, Surface Plasmon Resonance.

**VISHNUPRIYA M B**

**PHARMACEUTICAL ANALYSIS AND QUALITY CONTROL OF  
CLOXACILLIN**

*A Project Report Submitted to the University of Kerala in Partial  
Fulfillment of requirements for the Degree of*

**MASTER OF SCIENCE IN  
CHEMISTRY**

**By**

**Reg No: 63518128015**

**Exam code: 63516403**

**Course Code:635**

**Dissertation code: CH243(a)**



**August 2020**

**REVATHY VENUGOPAL**

**GREEN SYNTHESIS OF SILVER NANOPARTICLES AND ITS APPLICATION IN  
PHOTOCATALYTIC DYE DEGRADATION USING CHROMOLAENA ODORATA  
AND JUSTICIA ADHATODA**

*A Project Report Submitted to the University of Kerala in Partial Fulfillment of  
requirements for the Degree of*

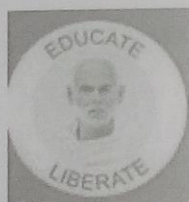
**MASTER OF SCIENCE IN CHEMISTRY**

*By*

(Revathy Venugopal (Reg No: 63518128013,))

**DEPARTMENT OF CHEMISTRY SREE NARAYANA COLLEGE**

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**JULY 2020**

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