

CURRICULUM VITAE
OF
Prof. (Dr.) K. GIRISH KUMAR

Dr.K.GIRISH KUMAR

Professor of Analytical Chemistry
Department of Applied Chemistry
Cochin University of Science and Technology
Kochi 682 022

giri@cusat.ac.in



PERSONAL DETAILS

FULL NAME : **Dr. K. GIRISH KUMAR**
DESIGNATION : **Professor** (Department of Applied Chemistry)
CONTACT NUMBER : +91-484-2575804(office);+91-484-2577813(res)
+91-9847363660 (Cell)
Date of Birth : 23-07-1962
E-mail : giri@cusat.ac.in
drkgirish@gmail.com
RESIDENCE : Kavyam
K K Lane
Toll Junction, Edappally
Kochi-682 024

EDUCATIONAL QUALIFICATION

SSLC	1st Class	Kerala State Board	1977
Pre-Degree	1st Class	Kerala University	1979
B.Sc (Chemistry)	1st Class	Kerala University	1982
M.Sc (Chemistry)	1st Class	Kerala University	1984
Ph.D (Analytical Chemistry)		Kerala University	1989

SERVICE HISTORY

- | | |
|--|-------------------------------------|
| 1. Lecturer in Chemistry
Gandhigram Rural University
Tamil Nadu | 1989 - 1994 |
| 2. Lecturer (Senior Grade)
Gandhigram Rural University
Tamil Nadu | 1994 – 1998 |
| 3. Reader in Chemistry
Gandhigram Rural University
Tamil Nadu | 1998 – 1999 |
| 4. Reader in Analytical Chemistry
Cochin University of Science and Technology
Cochin | 1999 – 2006 |
| 5. Professor
Cochin University of Science and Technology
Cochin | 2006 onwards |
| 6. HEAD, Department of Applied Chemistry
Cochin University of Science and Technology
Cochin | 2007 - 2010
(on Rotation) |

EXPERIENCE

1. ACADEMICS

Over **TWENTY SEVEN** years of teaching experience in Chemistry at post-graduate level at Gandhigram Rural University, Tamil Nadu (1989 - 1999), India and at Cochin University of Science and Technology (1999 onwards), India.

Visiting Professor at Sultan Qaboos University, Muscat, Sultanate of Oman (Fall Semester – Sept. - 05 to Dec. - 05)

2. RESEARCH

Over **THIRTY** years of research experience in Analytical Chemistry.

3. ADMINISTRATION

- **Head, Department of Applied Chemistry, Cochin University of Science and Technology [(2007-2010) (rotation)]**
- **Former Chairman, Board of Studies in Chemistry, CUSAT**
- **Former Member, Senate, CUSAT**
- **Former Member, Academic Council, CUSAT.**

Ph.D. THESIS SUPERVISED (18)

1. G. Devala Rao - “Development of novel spectrophotometric methods for the determination of certain pharmaceuticals”
2. Saji John K. - “Polymeric complexes – Synthesis, characterization and analytical applications”
3. R. Muthuselvi - “Development of some novel reagents for the spectrophotometric determination of certain metals”
4. V. Otchan - “Development of polymeric ligands as novel metal ion removing reagents”
5. Remalakshmy Poduval - “Fabrication of potentiometric sensors for the determination of certain metal ions”
6. Jose P. Kallapparambil - “Synthesis, characterization and application studies of some polymer supported metal complexes”
7. Sareena John - “Fabrication of electrochemical sensors for pharmaceutical analysis”
8. Pearl Augustine - “Development of electrochemical sensors for the determination of certain pharmaceuticals”
9. Beena Saraswathyamma – “Fabrication of potentiometric sensors for the determination of lanthanide ions”
10. Mohanraj. K – “Synthesis and characterization of lanthanide complex of some biologically active ligands”

- 11 Sindhu Issac – “Fabrication of electrochemical sensors for the determination of pharmaceuticals”
- 12 Renjini Joseph - “Fabrication of electrochemical Sensors for Various Pharmaceuticals”
- 13 Sobhana Mathew – “Development of Macrocyclics based Electrochemical Sensors”
- 14 Leena R. – “Chemically modified glassy carbon electrode as sensors for various pharmaceuticals”
- 15 Laina A.L. – “Voltammetric sensors for the determination of pharmaceuticals”
- 16 Theresa C. J. – “Square wave voltammetric determination of various Pharmaceuticals”
- 17 Divya Thomas — “Development of Electrochemical and Fluorescent Sensors ”
- 18 Anuja E. V. – “Novel Electrochemical and Fluorescence Sensors for Food additives and Neurotransmitters”

Ph. D thesis under progress	:	07
M. Phil thesis supervised	:	17
MSc dissertations	:	20

SPONSORED RESEARCH PROJECTS

1. “Methods for the Quality Control of Certain Drugs Using Dibromodimethyl Hydantoin” (**University Grants Commission, Govt. of India** – 1991-1993)
2. “Development of Extractive Spectrophotometric Methods for Determination of Lanthanides at Trace Level” (**University Grants Commission, Govt. of India** – 1996-1998)
3. “Synthesis of Novel Polymeric Complexes – A search for new Membrane Electrode and Ion Exchange Materials” (**Council of Scientific and Industrial Research Govt. of India** - 1999-2002)
4. “Development of Ion Selective Electrodes for the determination of Metal Ions” (**Defence Research and Development Organisation, Govt. of India** – 2003-2007)
5. “Fabrication of Biosensors for the determination of pharmaceuticals” (**Department of Science and Technology, Govt. of India** - Indo-Polish S&T Programme– 2006-2008)
6. “Development of Electrochemical Sensors for the Determination of Pharmaceuticals” (**Defence Research and Development Organisation, Govt. of India** – 2006-2009)

7. “Development of Novel Macrocyclics based Electrochemical Sensors for Metals” (**Kerala State Council for Science, Technology and Environment** – 2010-2013)
8. “Development of Electrochemical Sensors for Food Analysis” (**Defence Research and Development Organisation, Govt. of India** – 2011-2014)
9. Recipient of **UGC ONETIME RESEARCH GRANT (2014)**
10. Development of fluorescent sensors for pharmaceutical and clinical analysis. (**Kerala State Council for Science, Technology and Environment** – 2016-2018)

FIELDS OF RESEARCH

1. Development of enzyme immobilized biosensors and optical sensors based on quantum dots for pharmaceutical analysis.
2. Fabrication of biosensors for determination of pharmaceuticals.
3. Fabrication of electrochemical sensors for determination of metal ions and pharmaceuticals.
4. Development of sensors based on Fluorescence.
5. Development of new Spectrophotometric methods for Pharmaceuticals.
6. Development of methods for trace analysis of metals.
7. Synthesis, characterization and application studies of Coordination complexes including polymeric complexes.
8. Environmental Chemistry and Pollution Monitoring.

CURRENT RESEARCH

Our group is actively involved in the fabrication of different types of potentiometric sensors – plasticized membrane electrodes, carbon paste electrodes and chemically modified carbon paste electrodes. These sensors incorporating different types of ionophores – calixarenes, porphyrins, crown ethers, schiff bases, ion association complex etc are used for the determination of metal ions and drugs. Voltammetric techniques like cyclic voltammetry, differential pulse voltammetry, square wave voltammetry etc. are being carried out in the analysis of drugs and food by modification on the electrode surface using metalloporphyrins, nanomaterials and self assembled monolayers. Enzyme immobilized biosensors and optical sensors / fluorescence

sensors based on quantum dots are the active area of research presently being carried out by our group.

RESEARCH COLLABORATIONS

NATIONAL

Electronics division, CECRI (CSIR), Karaikudi, Tamilnadu, India

INTERNATIONAL

Department of Biosensors, Polish Academy of Sciences, Poland

MEMBERSHIP (Academic and Research Bodies)

1. Member NAAC Peer Team
2. Member Faculty of Science, CUSAT
3. Member Board of Studies in Chemistry, Gandhigram Rural University, Tamil Nadu
4. Member Board of Studies in Chemistry, Amrita Viswa Vidyalyaya - Deemed University, Coimbatore, Tamil Nadu
5. Member Board of Studies in Chemistry, Central University of Kerala, Kasargod
6. Member Board of Studies in Chemistry, Maharajas College, (Autonomous) Ernakulam
7. Member Board of Studies in Chemistry, Vimala College (Autonomous), Thrissur
8. Member, Editorial board, Journal of Biosensors and Bioelectronics, USA
9. Fellow of Indian Chemical Society.
10. Member, Managing Committee, Indian Society for Electro Analytical Chemistry (ISEAC)
11. Member, Executive Committee, Central Instrumentation Centre, M.G. University, Kottayam, India
12. Member, Governing Council, Inter University Centre for Nano Materials and Devices, Cochin University of Science and Technology, Kochi
13. Member, Advisory Committee, Centre for Science in Society, Cochin University of Science and Technology, Kochi
14. Member, Editorial Board, "Science Communicator" Cochin University of Science and Technology, Kochi

15. Member, Research Advisory Committee, Cochin University of Science and Technology, Kochi
16. Member, American Nano Society
17. Member, IQAC, Cochin University of Science and Technology

OTHER ACADEMIC ACTIVITIES

- ◆ Delivered a number of lectures in various colleges and universities.
- ◆ Ph. D thesis evaluator and examination board member of different universities.
- ◆ Served as UGC expert committee member for the selection of Commonwealth fellows.
- ◆ Served/serving as resource person in refresher courses conducted by different universities /colleges.
- ◆ Former member, Board of Editors, International Journal of Chemistry, Canada.

PEER REVIEWER FOR

- Talanta
- Analyst
- Indian Journal of Chemistry
- Indian Journal of Chemical Technology
- Bioresource Technology
- Applied Organometallic Chemistry
- Journal of Applied Polymer Science
- International Journal of Environmental Analytical Chemistry
- Journal of Solid State Electrochemistry
- Sensor Letters
- Drug Testing and Analysis
- Monatshefte für Chemie

SEMINARS/CONFERENCES ORGANISED

1. Co-Convener, National seminar on Newer Vistas in Bio-Active agents, Gandhigram University, Tamil Nadu (1999).

2. Convener, Matcon, Cochin University of Science and Technology (2001).
3. Coordinator, UGC sponsored refresher course for college teachers, Cochin University of Science and Technology (2002).
4. Chairman, National Seminar on Current Trends in Chemistry, Cochin University of Science and Technology (2008).
5. Chairman, International Conference on Materials (MATCON 2010), Kochi, January 2010.
6. Served/Serving as member of organising/ advisory Committee of different conferences/seminars.
7. Convener International Conference on Materials for the Millenium (MATCON 2016), Kochi, January 2016.

OTHER PROGRAMMES ORGANIZED

- ❖ Conducted an all Kerala Chemistry Quiz competition for PG chemistry students in the year 2007 with the support of KSCSTE.
- ❖ Conducted a unique programme “**Magic of Chemistry**” (chemistry made easy) for Govt. and aided school students during 2008 with the support of Science & Technology museum, Govt. of Kerala.
- ❖ Conducted a one day seminar in connection with National Science Day celebrations during 2009 with the support of KSCSTE.
- ❖ Coordinator, **Inculcate programme** of Govt. of Kerala, conducted at CUSAT for 3 years.
- ❖ Coordinated **CSIR- NET National Exam** at Cochin centre for Four Times
- ❖ Chairman, sashthraprathibha matsaram conducted by Swadeshi Science Movement, Kerala for Four times.
- ❖ Convenor, Swadeshi Science Congress, M. G. University, Kottayam 2013.
- ❖ Coordinator, Children’s Science Congress, Navodaya Vidyalaya Samiti Hyderabad Region, 2011.

Social Activities

Secretary, Swadeshi Science Movement, Kerala

Chief Coordinator, **Guinness World Record** Breaking Event “**Largest Practical Science Lesson**” held at IIT Delhi organized by VIBHA, December 7. 2015.

Research Publications (National and International):	89 (list attached)
Research Papers Presented	: 146 (list attached)
Article on General Topics	: 3 (list attached)
Books published	: Plastic Kathayum Karyavum (A book in regional language for popularization of Science)

RESEARCH PUBLICATIONS

Papers published in International and National Journals

1. S. Jesny, S. Menon, **K. Girish Kumar**, Simultaneous determination of guanine and adenine in the presence of uric acid by poly (para toluene sulfonic acid) mediated electrochemical sensor in alkaline medium, *RSC. Adv.*, **6**, 75741 (2016).
2. S. Menon, S. Jesny, U. Sivasankaran, **K. Girish Kumar**, Fluorimetric Determination of Epinephrine: A Green Approach, *Anal. Sci.*, **32**, 1 (2016).
3. S. Menon, A. R. Jose, S. Jesny, **K. Girish Kumar**, A colorimetric and fluorometric sensor for the determination of norepinephrine, *Anal. Methods*, **8**, 5801 (2016); COVER ARTICLE (5729).
4. A. R. Jose, U. Sivasankaran, S. Menon, **K. Girish Kumar**, A silicon nanoparticle based turn off fluorescent sensor for sudan I, *Anal. Methods*, **8**, 5701 (2016)
5. U. Sivasankaran, A. E. Vikraman, D. Thomas, **K. Girish Kumar**, Nanomolar Level Determination of Octyl Gallate in Fats and Oils, *Food Anal. Methods*, **9**, 2115 (2016)

6. S. Sheen, T. Jos, L. Rajith, **K. Girish Kumar**, Manganese porphyrin sensor for the determination of bromated, *J. Food Sci. Technol*, **53**, 1561 (2016)
7. S. Menon, A. E. Vikraman, S. Jesny, **K. Girish Kumar**, “Turn On” Fluorescence Determination of Nitrite Using Green Synthesized Carbon Nanoparticles, *J. Fluores*, **26**,129 (2015)
8. A. E. Vikraman, A. R. Jose, M. Jacob, **K. Girish Kumar**, Thioglycolic acid capped CdS quantum dots as fluorescent probes for the nanomolar determination of dopamine, *Anal. Methods*, **16**, 6791 (2015).
9. D. Thomas, A. E. Vikraman, T. Jose, **K. Girish Kumar**, Kinetic approach in the development of a gold nanoparticle based voltammetric sensor for sudan I, *LWT- Food Science and Technology*, **63**, 1294 (2015).
10. D. Thomas, Z. Rasheed, J. S. Jagan, K. Girish Kumar, Study of kinetic parameters and development of a voltammetric sensor for the determination of butylated hydroxyanisole (BHA) in oil samples, *Journal of Food Science and Technology* **52**, 6719 (2015).
11. A. Thomas, A.E. Vikraman, D. Thomas, **K. Girish Kumar**, Voltammetric Sensor for the Determination of TBHQ in Coconut Oil, *Food Anal. Methods*, **8**, 2028 (2015).
12. T. Jos, A. R. Jose, U. Sivasankaran, **K. Girish Kumar**, Electrochemical Sensing of Tinidazole on Modified Glassy Carbon Electrodes, *J. Electrochem. Soc.*, **162**, B94, (2015).
13. A.E. Vikraman, D. Thomas, S. T. Cyriac, **K. Girish Kumar**, Kinetic and Thermodynamic Approach in the Development of a Voltammetric Sensor for Sunset Yellow, *J. Electrochemi Soc*, **161**, B305 (2014).
14. T. Jos, L.Lonappan, Z. Rasheed, A. E. Vikraman, **K. Girish Kumar**, Voltammetric determination of Guaifenesin on a MWCNT modified Pt electrode. *ECS Electrochem. Lett.*, **3**, B23 (2014).

15. Z. Rasheed, A. E. Vikraman, D. Thomas, J. S. Jagan, **K. Girish Kumar**, Carbon-nanotube-based sensor for the determination of butylated hydroxyl anisole in food samples. *Food Anal. Methods*, **8**, 213-221 (2015).
16. S. Mathew, L. Rajith, L. Lonappan, T. Jos, **K. Girish Kumar**, A lead (II) selective PVC membrane potentiometric sensor based on a tetra azamacrocyclic ligand. *J. Incl. Phenom. Macrocycl. Chem.* **78**, 171 (2014).
17. S. Chandran, L.A. Lonappan, D. Thomas, T. Jos, **K. Girish Kumar**, Development of an electrochemical sensor for the determination of amaranth: a synthetic dye in soft drinks. *Food Anal. Methods*, **7**, 741 (2014).
18. T. Jos, D. Thomas, S. T. Cyriac, M. Jacob, **K. Girish Kumar**, Effect of anionic surfactant on the reduction of Tinidazole at a Gold Nanoparticle modified glassy carbon electrode. *Indo American Journal of Pharmaceutical Research*, **3**, 8434 (2013).
19. T. Jos, L. Lonappan, E. V. Anuja, Z. Rasheed, **K. Girish Kumar**, Diffusion controlled process at an AuNP/Pt electrode surface for the voltammetric determination of TAM. *Journal of Pharmaceutical Research and Development*, **2**, 224 (2013).
20. M. Sobhana, T. Divya, E.V. Anuja, **K. Girish Kumar**, Manganese (II) –Selective Potentiometric Sensor Based on Calix[4]resorcinarene in PVC Matrix. *Frontiers in sensors*, **1**, 74 (2013).
21. D. Thomas, L. Lonappan, L. Rajith, S. T. Cyriac, **K. Girish Kumar**, Quantum Dots (QDs) based fluorescent sensor for the selective determination of Nimesulide. *J. Fluores*, **23**, 473 (2013).
22. A.E. Vikraman, Z. Rasheed, L. Lonappan, L. Rajith, **K. Girish Kumar**, MWCNT modified gold electrode sensor for the determination of propyl gallate in vegetable oils. *Food Anal. Methods*, **6**, 775 (2013).

23. **K. Girish Kumar**, R. Muthuselvi, Determination of trace amounts of Iron(III) with 2-Dithiocarbamate acetic acid in aqueous medium by molecular absorption spectrophotometry. *J.Chem. & Chem.Sci.*, **3**, 155 (2013).
24. T. Jos, S. Issac, R. Joseph, L. Rajith, **K. Girish Kumar**, Electrocatalysis and determination of PAM chloride using carbon nanotube modified gold electrode. *Micro Nano Lett*, **7**, 854 (2012).
25. D. Thomas, L. Rajith, L. Lonappan, S. Issac, **K. Girish Kumar**, Sensitive determination of nitrite in food samples using Voltammetry, *Food Anal. Methods*, **5**, 752 (2012).
26. L. Lonappan, S. Issac, R. Joseph, D. Thomas, **K. Girish Kumar**, Electrochemical studies of TAM using Multiwalled carbon nanotube modified Glassy carbon sensor, *Micro Nano Lett*, **6**, 867 (2011).
27. L. Rajith, A.K Jissy, **K. Girish Kumar**, Ayan Datta, A mechanistic study for the facile oxidation of Trimethoprim on metalloporphyrin incorporated glassy carbon electrode, *J Phys Chem C*, **15**, 21858 (2011).
28. L. Laina, **K. Girish Kumar**, Carbon nanotube based sensor for the differential pulse voltammetric determination of Pyridine -2- Aldoxime Methochloride, *Sensor Lett*, **9**, 541 (2011).
29. R. Joseph, **K. Girish Kumar**, Electrochemical sensing of Acyclovir at a gold electrode modified with 2-Mercaptobenzothiazole-[5,10,15,20- tetrakis (3-methoxy-4-hydroxy phenyl) porphyrinato] Cu (II). *Anal Sci*, **27**, 67 (2011).
30. **K. Girish Kumar**, R. Muthuselvi, N,N'-Bis(2-Aminobenzoyl)ethylenediamine as a Reagent for the Spectrophotometric Determination of Neodymium (III), *Asian J Chem*, **23**, 3620 (2011).

31. L. Rajith, **K. Girish Kumar**, Electroanalysis of Trimethoprim on metalloporphyrin incorporated glassy carbon electrode, *Drug Test Analysis*, **2**, 436 (2010).
32. S. Issac, **K. Girish Kumar**, Voltammetric study of Pyridine-2-Aldoxime Methochloride at poly (p-toluene sulfonic acid) modified glassy carbon sensor and its analytical applications, *Anal Methods*, **2**, 1484 (2010).
33. R. Joseph, **K. Girish Kumar**, Differential pulse voltammetric determination and catalytic oxidation of Sulfamethoxazole using [5,10,15,20- tetrakis (3-methoxy-4-hydroxy phenyl) porphyrinato] Cu (II) modified carbon paste sensor, *Drug Test Anal*, **2**, 278 (2010).
34. **K. Girish Kumar**, P. Augustine, S. John, Novel potentiometric sensors for the selective determination of Domperidone, *J Appl Electrochem.*, **40**, 65 (2010).
35. S. Issac, **K. Girish Kumar**, Voltammetric determination of Sulfamethoxazole at a multiwalled carbon nanotube modified glassy carbon sensor and its application studies, *Drug Test Analysis*, **1**, 350 (2009).
36. R. Joseph, **K. Girish Kumar**, Electrochemical reduction and voltammetric determination of Metronidazole benzoate at modified carbon paste electrode, *Anal Lett.*, **42**, 2309 (2009).
37. B. Saraswathyamma, I. Grzybowska, Cz. Orlewska, J. Radecki, W. Dehaen, **K. Girish Kumar**, H. Radecka, Electroactive dipyrromethene - Cu(II) monolayers deposited onto gold electrodes for voltammetric determination of Paracetamol, *Electroanal*, **20**, 2317 (2008).
38. B. Saraswathyamma, M. Pajak, J. Radecki, W. Maes, W. Dehaen, **K. Girish Kumar**, H. Radecka, PVC supported liquid membrane and carbon paste potentiometric sensors

- incorporating a Mn(III)-porphyrin for the direct determination of undissociated Paracetamol, *Electroanal*, **20**, 2009 (2008).
39. **K. Girish Kumar**, P. Augustine, S. John, J. Radecki, H. Radecka, Fabrication of potentiometric sensors for the selective determination of Ketoconazole, *Anal Lett.*, **41**, 1144 (2008).
40. Priya R. Rao, **K. Girish Kumar**, Manoj C. Narayan, A New method of isolation of isoflavones from *glycine max* (Soya Beans) by complexation technique, *Asian Jour Sci Res.*, **1**, 176 (2008).
41. **K. Girish Kumar**, P. Augustine, S. John, A novel potentiometric sensor for the determination of Nimesulide, *Port Electrochim Acta*, **25**, 375 (2007).
42. **K. Girish Kumar**, S. John, P. Augustine, R. Poduval, B. Saraswathyamma, Mebendazole selective membrane sensor and its application to pharmaceutical analysis, *Anal. Sci.*, **23**, 291 (2007).
43. **K. Girish Kumar**, K. Saji John, Removal of Fe (III) using a polystyrene anchored schiff base, *Env. Chem. Lett.*, **5**, 19 (2007).
44. **K. Girish Kumar**, R. Poduval, S. John, P. Augustine, A PVC plasticized membrane sensor for nickel ions, *Microchim Acta*, **156**, 283 (2007).
45. **K. Girish Kumar**, R. Poduval, P. Augustine, S. John, B. Saraswathyamma, A PVC plasticized sensor for Ni (II) ion based on a simple ionophore, *Anal Sci.*, **22**, 1333 (2006).
46. G. Karthikeyan, K. Mohanraj, K. P. Elango, **K. Girish Kumar**, Synthesis, and spectral characterization of lanthanide complexes with Sulfamethoxazole and their antibacterial activity, *Russ Jour Coordi. Chem.*, **32(5)**, 380 (2006).

47. **K. Girish Kumar**, K. Saji John, Complexation and ion removal studies of a polystyrene anchored schiff base, *React Func Polym.*, **66**,1427 (2006).
48. **K. Girish Kumar**, K. Saji John, C. J. Indira, A chloride ion selective potentiometric sensor based on a polymeric schiff base complex, *Indian J Chem Tech.*, **13**, 13 (2006).
49. **K. Girish Kumar**, P. Augustine, R. Poduval, S. John, Voltammetric studies of Sparfloxacin and application to its determination in pharmaceuticals, *Pharmazie*, **61**, 291 (2006).
50. **K. Girish Kumar**, R. Muthuselvi, Spectrophotometric determination of Chromium (III) with 2-hydroxybenzaldiminoglycine, *J Anal Chem.*, **61**, 28 (2006).
51. **K. Girish Kumar**, K.Saji John, R. Poduval, Polystyrene anchored vanillin schiff base – complexation and ion removal studies, *J Appl Polym Sci.*, **98**, 1536 (2005).
52. **K. Girish Kumar**, S. John, R. Poduval, P. Augustine, Electrochemical determination of terazosin in pure form and in dosage forms, *The Chinese Pharm Jour.*, **57**, 29 (2005).
53. G. Karthikeyan, K. Mohanraj, K. P. Elango, **K. Girish Kumar**, Synthesis and spectral characterization of lanthanide(III) complexes of trimethoprim, *J Chem Res.*, 200 (2004).
54. G. Karthikeyan, K. Mohanraj, K. P. Elango, **K. Girish Kumar**, Synthesis, spectroscopic characterization and antibacterial activity of lanthanide-tetracycline complexes, *Trans Metal Chem.*, **29**, 86 (2004).
55. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, A new spectrophotometric method for the determination of Nitrenpidine, *The Antiseptic*, **98**, 453 (2001).
56. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, Visible spectrophotometric methods for the determination of Sparfloxacin in pharmaceutical formulations, *The Antiseptic*, **98**, 217 (2001).

57. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, Spectrophotometric determination of Cefotaxime sodium in pharmaceutical dosage forms, *The Antiseptic*, **98**, 149 (2001).
58. G. Devala Rao, **K. Girish Kumar**, K. P. R. Chowdary, Spectrophotometric methods for the determination of Cefotaxime sodium in dosage forms, *Indian J Pharm Sci.*, Mar-Apr, 161 (2001).
59. **K. Girish Kumar**, R. Muthuselvi, Spectrophotometric method for the determination of Cobalt with *N,N'*-bis(2-aminobenzoyl)ethylenediamine, *Microchim Acta*, **137**, 25 (2001).
60. **K. Girish Kumar**, R. Muthuselvi, Hydrazine Hydrate as a reagent for the spectrophotometric determination of Nickel(II), *Asian J Chem*, **13**, 337 (2001).
61. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, Spectrophotometric method for the determination of Sparfloxacin in pharmaceutical dosage forms, *Indian J. Pharm. Sci.*, May-June, 230(2000).
62. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, A new spectrophotometric method for the determination of Salmeterol, *The Eastern Pharmacist*, Sept, 107(2000).
63. G. Devala Rao, **K. Girish Kumar**, K. P. R. Chowdary, Spectrophotometric methods for the determination of Nitrendipine, *J. Indian Council of Chemists*, **17(1)**, 32 (2000).
64. **K. Girish Kumar**, K.P.R. Chowdary, G. Devala Rao, Spectrophotometric determination of Salmeterol Xinafoate using diazotised sulphanilamide, *The Antiseptic*, **97(11)**, 402 (2000).
65. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, A new spectrophotometric method for the determination of Nitrenpidine, *The Eastern Pharmacist*, Mar, 117 (2000).

66. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, Spectrophotometric method for the determination of Nimodipine in pharmaceutical dosage forms, *Indian J. Pharm. Sci.*, July-Aug, 317 (2000).
67. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, New spectrophotometric methods for the determination of Nimesulide, *Indian J. Pharm. Sci.*, Mar-Apr, 86 (1999).
68. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, A new spectrophotometric method for the determination of Nitrendipine, *Indian J. Pharm. Sci.*, Nov-Dec, 394 (1999).
69. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, Spectrophotometric determination of Cefotaxime Sodium in pharmaceutical dosage forms, *The Eastern Pharmacist*, Oct, 125 (1999).
70. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, Visible spectrophotometric methods for the determination of Sparfloxacin in pharmaceutical formulations, *The Eastern Pharmacist*, Dec, 121(1999).
71. **K. Girish Kumar**, K. P. R. Chowdary, G. Devala Rao, A new spectrophotometric method for the determination of Nimesulide, *The Eastern Pharmacist*, Sept, 117 (1999).
72. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, New spectrophotometric method for the determination of Nitrendipine, *The Eastern Pharmacist*, Jan., 139 (1999).
73. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, A spectrophotometric method for determination of Nimodipine, *J. Inst. Chemists (India)*, **71**, 222 (1999).
74. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, Determination of Lomefloxacin by using ferric alum reagent, *J. Inst. Chemists (India)*, **71**, 206 (1999).

75. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, Colorimetric determination of Lomefloxacin in dosage forms, *J. Inst. Chemists (India)*, **71**, 78 (1999).
76. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, Spectrophotometric determination of Nitrenpidine, *J. Inst. Chemists (India)*, **71**, 30 (1999).
77. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, New spectrophotometric methods for the determination of Sparfloxacin in bulk and in dosage forms, *Indian Drugs*, **36**, 312 (1999).
78. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, Spectrophotometric determination of Nimesulide using 3-methyl-2-benzothiazolinone hydrazone hydrochloride reagent, *Indian Drugs*, **36**, 185 (1999).
79. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, Spectrophotometric determination of Nitrendipine in pharmaceutical dosage forms, *Indian Drugs*, **35**, 645 (1998).
80. K. P. R. Chowdary, **K. Girish Kumar**, G. Devala Rao, Spectrophotometric method for the determination of Lomefloxacin in dosage forms, *The Eastern Pharmacist*, Nov., 119 (1998).
81. **K. Girish Kumar**, P. A. Gunachithra, I. Anitha, Spectrophotometric determination of Cimetidine in pure form and in dosage forms using Cu^{2+} , *Indian J. Pharm. Sci.*, Mar-Apr, 79 (1997).
82. **K. Girish Kumar**, R. Letha, Determination of Paracetamol in pure form and in dosage forms using *N,N*-dibromo dimethylhydantoin, *J. Pharm. Biomed. Anal.*, **15**, 1725 (1997).
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84. **K. Girish Kumar**, K. Usha Devi, Determination of Sulpha drugs with *N,N*-dibromo dimethylhydantoin, *Indian J. Pharm. Sci.*, Nov-Dec, 235 (1993).
85. **K. Girish Kumar**, R. Jayashree, Determination of Cimetidine in pure form and in dosage forms using *N*-bromosuccinimide, *J. Pharm. Biomed. Anal.*, **11**, 165 (1993).
86. **K. Girish Kumar**, P. Indrasenan, Titrimetric methods for the determination of Vitamin C in some pharmaceutical preparations by use of two *N*-bromoimides, *Talanta*, **37**, 269 (1990).
87. **K. Girish Kumar**, P. Indrasenan, Titrimetric determination of *para*-aminobenzoic acid using *N*-bromophthalimide and *N*-bromosaccharin, *J. Pharm. Biomed. Anal.* , **7**, 627 (1989).
88. **K. Girish Kumar**, P. Indrasenan, Titrimetric methods for the determination of some Sulfa drugs using *N*-bromophthalimide and *N*-bromosaccharin, *Analyst*, **113**, 1369 (1988).
89. **K. Girish Kumar**, C. Mohana Das, P. Indrasenan, Determination of some carbohydrates with *N*-bromophthalimide and *N*-bromosaccharin, *Talanta*, **35**, 651 (1988).

Papers Presented at Seminars/Conferences

1. Evaluation of Kinetic Parameters of Electro Oxidation of Thymine on a Poly (l Glutamic Acid) modified Glassy Carbon Electrode. (Jesny S., and K. Girish Kumar, National Symposium Electrochemical Science and Technology NSEST, IISc Bangalore, July 2016).
2. Electrochemical determination of Uric Acid in alkaline media on a Glassy Carbon electrode modified with poly (p-toluene sulfonic acid). (Shalini Menon, Jesny S.and K. Girish Kumar, National Symposium Electrochemical Science and Technology NSEST, IISc Bangalore, July 2016).

3. A simple and sensitive fluorescent sensor for the determination of Epinephrine (Shalini Menon and K.Girish Kumar, Frontier Areas in Chemical Technologies FACTs 2016, Alagappa University , Karaikudi, March 2016).
4. Glassy Carbon Electrode modified with poly (Glutamic Acid) as a probe for the voltammetric determination of Thymine. (Jesny S. and K. Girish Kumar, Frontier Areas in Chemical Technologies FACTs 2016, Alagappa University , Karaikudi, March 2016).
5. Determination of Nitrite contamination in ground water : A green Approach (Shalini Menon and K.Girish Kumar, Kerala Science Congress, Calicut, January 2016)
6. Voltammetric Sensing of Tamsulosin on Poly(o-phenylene diamine) Modified Gold Electrode (Theresa J. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
7. Electrochemical Deposition of Gold Nanoparticles on Poly (p-Amino Benzene Sulphonic Acid) Film Modified Glassy Carbon Electrode and Voltammetric Determination of Metronidazole Benzoate (Sindhu I. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
8. Carbon Nanotube and Polypyrrole Based Electrochemical Sensor for the Selective Determination of Tamsulosin Hydrochloride (Renjini J. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
9. Electrochemical Distinction of Trimethoprim and Ambroxol on Metalloporphyrin Modified Glassy Carbon Electrode (Leena R. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
10. The Electrochemical Behavior of Amoxicillin Trihydrate at Multiwalled Carbon Nanotube/Platinum Nanoparticle Modified Glassy Carbon Electrode (Laina A. L. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
11. Poly (glycine) Modified Glassy Carbon Electrode for the Voltammetric Determination of Azorubine in Soft Drinks (Zafna R. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
12. Poly (Aspartic Acid) Modified Glassy Carbon Electrode for the Determination of Adenine (Jesny S. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
13. Poly (L-cysteine) Modified Glassy Carbon Electrode for the Determination of Cochineal Red A Soumya T. C. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)

14. MWCNT - Modified Gold Electrode Sensor for the Determination of TBHQ (Ambily T. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
15. A New Chemically Modified Carbon Paste Sensor Based on Schiff's Base for Pr(III) Ion (Beena S. and Girish Kumar K. MatCon2016, CUSAT, Kochi, January 2016)
16. Gold Nano Cluster Based Fluorescence Sensor for the Selective Determination of Norepinephrine (Anuja E. V. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
17. Sensing of Brilliant Blue FCF using Cadmium Sulphide Quantum Dots (Unni S. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
18. Synthesis of Thioglycerol Functionalized Cadmium Telluride Quantum Dot for the Determination of Mercury Ion (Meera J. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
19. A Fluorescent Sensor for the Determination of Sudan 1 (Ammu R. J. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
20. Green carbon nanoparticles for the "Turn On" fluorescence determination of nitrite in milk (Shalini Menon and K.Girish Kumar, MatCon2016, Kochi, January 2016).
21. Development of a Fluorescent Sensor for the Determination of Ferric Ion (Divya T. and Girish Kumar K. MatCon2016, CUSAT , Kochi, January 2016)
22. Electrochemical sensing of Pyridine-2-aldoxime chloride on modified gold Electrodes (Theresa Jos, K. Girish Kumar, Swadeshi Science Congress, Kalady, December 2015).
23. Development of fluorescent sensor for the determination of Butylated hydroxyanisole (Divya Thomas, K. Girish Kumar, Swadeshi Science Congress, Kalady, December 2015)
24. Gold nanocluster based fluorescent sensor for butylated hydroxyanisole (Anuja E.V..K. Girish Kumar, Swadeshi Science Congress, Kalady, December 2015)
25. Poly (L-cysteine) modified glassy carbon electrode for the determination of Cochineal Red A (Soumya T. Cyriac, K. Girish Kumar, Swadeshi Science Congress, Kalady, December 2015)
26. Electrochemical behaviour of Metanil Yellow on a bare gold electrode (Jesny S., K. Girish Kumar, Swadeshi Science Congress, Kalady, December 2015)

27. Poly (p-amino benzene sulfonic acid) modified glassy carbon electrode for the determination of food colorant (Zafna Rasheed, K. Girish Kumar, Swadeshi Science Congress, Kalady, December 2015)
28. Synthesis of determination of Mercury (II) ion in well water using thioglycerol functionalised cadmium telluride quantum dots (Meera Jacob, K. Girish Kumar, Swadeshi Science Congress, Kalady, December 2015)
29. Fluorescence sensor for thedetermination of Sudan dyes(Ammu Rosin Jose, K. Girish Kumar, Swadeshi Science Congress, Kalady, December 2015)
30. Determination of Nitrite Pollution in Soil using Fluorescent Nanoparticles (Shalini Menon, K. Girish Kumar, Swadeshi Science Congress, Kalady, December 2015)
31. Electrochemical sensing of Metronidazole benzoate on a conducting polymer layer of p-TSA on GCE (Theresa C. J., K. Girish Kumar, National Seminar at S.H. Thevara, December 2014).
32. Voltammetric Determination of Octyl Gallate using SAM modified Glassy Carbon electrode, (Unni Sivasankaran, K. Girish Kumar, National Seminar at S.H. Thevara, December 2014).
33. Voltammetric Determination of Sunset Yellow using MWCNT/AuNP Nanocomposite Film Modified glassy carbon electrode, (Anuja. E.V., K. Girish Kumar, National Seminar at S.H. Thevara, December 2014).
34. Development of voltammertic sensor for the determination of allura red using poly (l-cysteine) modified glassy carbon electrode (E.V. Anuja, K. Girish Kumar, Swadeshi Science Congress, Tirur, November 2014)
35. Voltammetric determination of butylated hydroxyanisole (BHA) on poly (L- cysteine) modified glassy carbon electrode (Divya Thomas, K. Girish Kumar, Swadeshi Science Congress, Tirur, November 2014)
36. Colourimetric Sensor for Tetracycline (Soumya T Cyriac, K. Girish Kumar, Swadeshi Science Congress, Tirur, November 2014)
37. Electrochemical sensing of tinidazole on modified glassy carbon electrodes (Theresa Jos, K. Girish Kumar, Swadeshi Science Congress, Tirur, November 2014)

38. Self assembled monolayer modified glassy carbon electrode for the determination of octyl gallate (Unni Sivasankaran, K. Girish Kumar, Swadeshi Science Congress, Tirur, November 2014)
39. Electrochemical sensors (Innovations in Electrochemical Science and Technology, (IEST) NIT-Warangal, December-2013).
40. Study of electrochemical oxidation of sulphite on a gold electrode modified with multi-walled carbon nano-tubes (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
41. Manganese (ii) –selective potentiometric sensor based on calix[4]resorcinarene in pvc matrix (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
42. Development of multiwalled carbon nanotube modified platinum electrode sensor for the voltammetric determination of guaifenesin (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
43. Nanotube modified gold electrode for the determination of pam chloride (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
44. Poly (eriochrome black t) modified electrode for the voltammetric determination of tinidazole (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
45. Cobalt (II) selective pvc membrane electrode based on a new tetraaza macrocyclic ligand (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
46. Development of sensor for amoxicillin trihydrate (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
47. Development of gold nanoparticle based voltammetric sensor for the determination of sunset yellow (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
48. Development of multiwalled carbon nanotube based sensor for sulfamethoxazole (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
49. Gold nanoparticle modified glassy carbon electrode sensor for the voltammetric determination of sudan i in food samples (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
50. Development of poly(bromophenol blue) modified glassy carbon electrode based sensors for the determination of synthetic antioxidant tert-butylhydroquinone (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).

51. Development of poly(o-aminophenol) modified gold sensor for the determination of ceftriaxone sodium (Swadeshi Science Congress, November 2013, M.G. University, Kottayam).
52. Carbon nitride dots based fluorescent sensor for the determination of BHA in food samples. (CTric, Cochin University of Science and Technology, March, 2013, Kochi).
53. Differential pulse voltammetric determination of amaranth using MWCNT (CTric, Cochin University of Science and Technology, March, 2013, Kochi).
54. Electrochemical determination of guaiphenesin on a Pt electrode incorporating the 1-d character of MWNT. (CTric, Cochin University of Science and Technology, March, 2013, Kochi).
55. Development of nanoparticle based sensors for the determination of amoxicillin. (CTric, Cochin University of Science and Technology, March, 2013, Kochi).
56. Electroanalytical method for the determination of a synthetic antioxidant tert-butylhydroquinone. (CTric, Cochin University of Science and Technology, March, 2013, Kochi).
57. Development of gold nanoparticle modified glassy carbon electrode Sensor for the voltammetric determination of sunset yellow. (CTric, Cochin University of Science and Technology, March, 2013, Kochi).
58. Film Modified Electrodes for Voltammetric Sensing of Pharmaceuticals. (RASS – 2013, Gandhigram Rural Institute- Deemed University, February 2013, Tamil Nadu).
59. Propyl Gallate sensing through multi walled carbon nanotube (MWCNT) modified gold electrode (RASS – 2013, Gandhigram Rural Institute- Deemed University, February 2013, Tamil Nadu).
60. A multiwalled carbon nanotube modified gold sensor for the determination of Amaranth. (RASS – 2013, Gandhigram Rural Institute- Deemed University, February 2013, Tamil Nadu).
61. Voltammetric sensor for bromate. (RASS – 2013, Gandhigram Rural Institute- Deemed University, February 2013, Tamil Nadu).
62. Surface modification of gold electrode with multiwalled carbon nanotubes for sulphite sensing. (RASS – 2013, Gandhigram Rural Institute- Deemed University, February 2013, Tamil Nadu).

63. Voltametric determination of tamsulosin on a p(opd)/Au electrode. (RASS – 2013, Gandhigram Rural Institute- Deemed University, February 2013, Tamil Nadu).
64. Sensing through polymeric films - Voltammetric determination of some pharmaceuticals. (ELAC-2013, ISEAC, January 2013, Hyderabad).
65. Nanoparticle based sensor for the quantification of amoxicillin. (ELAC-2013, ISEAC, January 2013, Hyderabad).
66. Development of mutiwalled carbon nanotube modified platinum electrode sensor for the voltammetric determination of guaiphenesin. (ELAC-2013, ISEAC, January 2013, Hyderabad).
67. PAM chloride sensing through mutiwalled carbon nanotube. (ELAC-2013, ISEAC, January 2013, Hyderabad).
68. PB/MWNT composite based sensor for the determination of hesperidin methyl chalcone. (Swadeshi Science Congress, November 2012, Kasaragod).
69. Electrochemical oxidation of Propyl Gallate on a multi walled carbon nanotube (MWCNT) modified gold electrode sensor. (Swadeshi Science Congress, November 2012, Kasaragod).
70. Electrochemical determination of amaranth using multiwalled carbon nanotube modified gold sensor. (Swadeshi Science Congress, November 2012, Kasaragod).
71. TMOPPMn(III) Cl modified gold electrode sensor for the determination of nitrite in food samples. (Swadeshi Science Congress, November 2012, Kasaragod).
72. Development of multi walled carbon nanotube (MWCNT) modified Platinum electrode sensor for the voltammetric determination of BHA (ICBAM, Gandhigram Rural Institute- Deemed University, March 2012, Tamil Nadu).
73. Nanoparticle probe for the detection of Tetracycline (ICBAM, Gandhigram Rural Institute- Deemed University, March 2012, Tamil Nadu).
74. Potentiometric sensor for determination of Fe^{2+} in pharmaceuticals (ICBAM, Gandhigram Rural Institute- Deemed University, March 2012, Tamil Nadu).
75. Quantum dots based fluorescent probe for the selective determination of Nimesulide (Kerala Science Congress, January, 2012, Kottayam)
76. Carbon nanotube modified gold sensor in food analysis- Determination of propyl gallate (Kerala Science Congress, January, 2012, Kottayam)

77. Gold nanoparticle modified electrodes - Development of Sensors for some Pharmaceuticals (ISEAC International symposium cum workshop on electrochemistry, December, 2011, Goa).
78. Fabrication PVC membrane and carbon paste potentiometric determination of Lamivudine and its applications (CTric, Cochin University of Science and Technology, March, 2011, Kochi).
79. Voltammetric behavior of sulfite on a gold electrode modified with multiwalled carbon nanotubes. (CTric, Cochin University of Science and Technology, March, 2011, Kochi).
80. Voltammetric determination of PAM Chloride using PB/MWCNT modified gold electrode. (CTric, Cochin University of Science and Technology, March, 2011, Kochi).
81. Carbon nanotube based sensor for voltammetric determination of Hesperidin methyl chalcone (CTric, Cochin University of Science and Technology, March, 2011, Kochi).
82. Development of a PVC membrane sensor based on metalloporphyrin as ionophore for salicylate ions. (CTric, Cochin University of Science and Technology, March, 2011, Kochi).
83. Voltammetric sensor for the determination of pyrine-2-aldoxime methochloride at 2-mercaptobenzothiazol and multiwalled carbon nanotube modified gold electrode. (CTric, Cochin University of Science and Technology, March, 2011, Kochi).
84. Metalloprphyrin complexes as sensing materials in the electrochemical determination of certain pharmaceuticals (ISEAC International discussion meet on electrochemistry and its applications, February, 2011, Trivandrum).
85. A new PVC membrane sensor for neodymium (III) based on N¹,N²-bis(salicylidine)butane-1,4-diamine. (National Convention of Electrochemists-15, February, 2010, VIT University).
86. Electrochemical behaviour of sulfamethoxazole on a polymalachite green based glassy carbon electrode. (National Convention of Electrochemists-15, February, 2010, VIT University)
87. Development of an AuNP/polyPABSA-modified glassy carbon sensor for the voltammetric determinationof metronidazole benzoate. (National Convention of Electrochemists-15, February, 2010, VIT University).
88. Electrochemical sensor for the determination of acyclovir based on 2-mercaptobenzothiazol-[5,10,15,20-tetrakis (3-methoxy-4-hydroxy phenyl) porphyrinato]

- Cu(II) –modified gold electrode. (National Convention of Electrochemists-15, February, 2010, VIT University).
89. Carbon nanotube based sensor for the differential pulse voltammetric determination of tamsulosin hydrochloride. (1st Kerala Women's Science Congress, August, 2010, Kochi).
 90. Development of poly aniline modified gold electrode sensors for the voltammetric determination of trimethoprim. (1st Kerala Women's Science Congress, August, 2010, Kochi).
 91. Electrochemical sensor for the determination of nimesulide based on AuNP/poly-cystamine modified glassy carbon electrode. (1st Kerala Women's Science Congress, August, 2010, Kochi).
 92. A TMO₂PPMn(III)Cl modified gold electrode sensor for the determination of nitrite in food samples using differential pulse Voltammetry. (1st Kerala Women's Science Congress, August, 2010, Kochi).
 93. Development of voltammetric sensors for lamivudine base on L-Cysteine modified glassy carbon electrode. (MATCON, Cochin University of Science and Technology, January, 2010, Kochi).
 94. Determination of Ambroxol on metalloporphyrin modified glassy carbon electrode using various voltammetric techniques. (MATCON, Cochin University of Science and Technology, January, 2010, Kochi).
 95. A new PVC membrane sensor for samarium. (MATCON, Cochin University of Science and Technology, January, 2010, Kochi).
 96. Voltammetric determination of sulfamethaxazole on modified carbon paste electrode. (MATCON, Cochin University of Science and Technology, January, 2010, Kochi).
 97. Nickel (II) selective potentiometric sensor based on 3, 4- Dimethoxy calix[4] resorcinarene in PVC matrix. (MATCON, Cochin University of Science and Technology, January, 2010, Kochi).
 98. Electrochemical Sensors in Drug Analysis. (National Seminar on Emerging Trends in Pharmaceutical Analysis, February 2009, Vijayawada).
 99. The electrochemical behavior of PAM Chloride at a multiwalled carbon nanotube-nafion modified Platinum electrode. (National Seminar on Emerging Trends in Pharmaceutical Analysis, February 2009, Vijayawada).

100. Characterisation of multiwalled carbon nanotube modified gold electrode and voltammetric determination of PAM Chloride. (National Seminar on Emerging Trends in Pharmaceutical Analysis, February 2009, Vijayawada).
101. Electrocatalytic oxidation of Trimethoprim at [5,10,15,20-tetrakis(4-methoxyphenyl) porphyrinato] Mn (III) chloride modified Glassy Carbon Electrode and its analytical applications. (Frontiers in Chemical Research, December 2008, Mangalore University).
102. Metalloporphyrin based voltammetric sensor for the determination of Metronidazole benzoate. (Frontiers in Chemical Research, December 2008, Mangalore University).
103. Development of poly(p- Toluene Sulfonic Acid) based voltammetric sensor for the determination of PAM- Chloride. (Current Advances in Chemical Science, November 2008, Thevara).
104. Electrochemical sensor for the determination of Tinidazole based on [5,10,15,20-tetrakis(3-methoxy- 4- hydroxy phenyl) porphyrinato] Zn (II) mercaptobenzothiazole modified gold electrode. (Current Advances in Chemical Science, November 2008, Thevara).
105. Development of potentiometric sensors for the selective determination of Ketoconazole and its application to pharmaceutical analysis. (National Seminar on Current trends in Chemistry, Cochin University of Science and Technology, Kochi, India, 2008).
106. Development of a carbon nanotube based voltammetric sensor for the determination of sulfamethoxazole in pure form, dosage forms and in urine sample. (National Seminar on Current Trends in Chemistry, Cochin University of Science and Technology, Kochi, India, 2008).
107. Voltammetric determination of sulfamethoxazole at a bis(2,2'-bipyridyl) Cu(II) complex modified carbon paste electrode.(National Seminar on Current Trends in Chemistry, Cochin University of Science and Technology, Kochi, India, 2008).
108. A Novel Schiff base Modified Carbon Paste Sensor for Samarium. (National Seminar on Current Trends in Chemistry, Cochin University of Science and Technology, Kochi, India, 2008).
109. Development of potentiometric and voltammetric sensors for the determination of ambroxol. (National seminar on sensors and its applications, Trichy , 2007).
111. Development of a carbon nanotube based voltammetric sensor for the determination of Ambroxol in pharmaceutical and urine samples, the 8th International Workshop on

- Biosensors And Bioanalytical μ -Techniques in Environmental and Clinical Analysis, Goa, India, 2007.
112. A Solid State Sensor For Manganese ions (International Seminar on Materials For The Millennium, Cochin University of Science and Technology, Kochi, India, 2007).
 113. PVC Matrix Membrane Sensors for the potentiometric determination of Dextromethopphan (International Seminar on Materials For The Millennium, Cochin University of Science and Technology, Kochi, India, 2007).
 114. Determination of Diclofenac sodium in Pharmaceutical preparations by PVC Membrane and Carbon paste Electrodes (International Seminar on Materials For The Millennium, Cochin University of Science and Technology, Kochi, India, 2007).
 116. Fabrication of Highly Selective PVC Membrane Sensor For Praseodymium (International Seminar on Materials For The Millennium, Cochin University of Science and Technology, Kochi, India, 2007).
 117. Fabrication of a Potentiometric Sensor For The Determination Of Tetracycline (International Seminar on Materials For The Millennium, Cochin University of Science and Technology, Kochi, India, 2007).
 118. Voltammetric Determination Of Ambroxol using Multiwall Nanotube – Nafion Modified Glassy Carbon Electrode (International Seminar on Materials For The Millennium, Cochin University of Science and Technology, Kochi, India, 2007).
 119. Fabrication of a PVC membrane sensor for the determination of nimesulide in pharmaceutical formulation (National Seminar on Frontiers in Chemistry, Cochin University of Science and Technology, Kochi, India, 2006).
 120. Fabrication of a novel tetracycline membrane sensor and its application to pharmaceutical analysis (National Seminar on Frontiers in Chemistry, Cochin University of Science and Technology, Kochi, India, 2006).
 121. Fabrication of a nickel ion sensor (National Seminar on Frontiers in Chemistry, Cochin University of Science and Technology, Kochi, India, 2006).
 122. Fabrication of Lanthanum sensor for water analysis” Presented in an international conference on “The Challenges and Strategies for the sustainability of safe drinking water” (2006) held at Gandhigram Rural Institute, Tamil Nadu.

123. Fabrication of copper sensor for water analysis” Presented in an international conference on “The Challenges and Strategies for the sustainability of safe drinking water” (2006) held at Gandhigram Rural Institute, Tamil Nadu.
124. Nickel (II) selective plasticized membrane potentiometric sensor using a Schiff base (The 6th East Asia Conference on Chemical Sensors, Gulin, China, 2005).
125. Differential Pulse Voltammetric Determination of Sparfloxacin in Pure Form and in Dosage Forms (National seminar on Emerging Trends and New Vistas in Chemistry, Calicut University, Kerala, 2005).
126. Fabrication of a Novel Potentiometric Sensor for the Determination of Terazosin (National seminar on Emerging Trends and New Vistas in Chemistry, Calicut University, Kerala, 2005).
127. Fabrication of a Novel Potentiometric Sensor for the Determination of Terazosin (National seminar on Emerging Trends and New Vistas in Chemistry, Calicut University, Kerala, 2005).
128. A novel Manganese selective plasticized membrane sensor using a Schiff base as ionophore (National seminar on Emerging Trends and New Vistas in Chemistry, Calicut University, Kerala, 2005).
129. Synthesis, Structural Characterization and Anti-inflammatory activity of Lanthanide (III) complexes of Diclofenac sodium. (National Symposium on Currents Trends in Inorganic Chemistry, Cochin University of Science and Technology, Kochi, India, 2004).
130. Metal-iodate: A chromogenic reagent for the determination of Nimesulide. (National Seminar on ‘Recent Research Trends in Drug Delivery Systems’ at the Andhra University, Vishakapatnam, Andhra Pradesh, India, 2001).
131. Determination of Cefotaxime Sodium in dosage forms by spectrophotometry. (National Conference on Materials for the new millennium, Cochin University of Science and Technology, Kochi, India, 2001).
132. Spectrophotometric determination of meloxicam in pharmaceutical formulations. (National Conference on Materials for the new millennium, Cochin University of Science and Technology, Kochi, India, 2001).

133. Synthesis and characterization of polymeric complexes of transition metals. (National Conference on Materials for the new millennium, Cochin University of Science and Technology, Kochi, India, 2001).
134. Estimation of Nimesulide in dosage forms by colorimetric. (International Seminar on Analytical Techniques in Monitoring the Environment held at Sri Venkateswara University, Tirupati, Andhra Pradesh, India, 2000).
135. Spectrophotometric determination of salmeterol xinafoate in dosage forms with Ferric nitrate reagent. (19th Annual Conference of Indian Council of Chemists, Shimoga, Karnataka, India, 2000).
136. Visible spectrophotometric method for the determination of Cefotaxime Sodium in dosage forms. (19th Annual Conference of Indian Council of Chemists, Shimoga, Karnataka, India, 2000).
137. Spectrophotometric determination of Cefotaxime sodium in dosage forms. (National Seminar on Newer Vistas in Bio-active Agents held at Department of Chemistry, Gandhigram Rural Institute, Gandhigram, TamilNadu).
138. Colorimetric determination of Lomefloxacin in bulk and in dosage forms. (18th Annual Conference of Indian Council of Chemists, Jalgaon, India, 1999).
139. Spectrophotometric determination of salmeterol xinafoate using diazotised sulphanilamide. (18th Annual Conference of Indian Council of Chemists, Jalgaon, India, 1999).
140. Spectrophotometric estimation of Nimodipine in pharmaceutical formulations. (50th Indian Pharmaceutical Congress and 17th FAPA Congress, Mumbai, India, 1998).
141. Use of Chemical Pesticides – Impact on Food Safety. (National Workshop on Food Security at Gandhigram, India, 1998).
142. Spectrophotometric determination of Nitrendipine in Pure Form and Dosage Forms with methyl benzothiazolinone hydrazone hydrochloride. (17th Conference of Indian Council of Chemists, India, 1998).
143. Spectrophotometric determination of Nickel (II) using Hydrazine Hydrate. (16th Conference of Indian Council of Chemists, Mangalore, India, 1997).
144. Determination of Ranitidine in Pure Form and Dosage Forms using *N,N*-dibromo dimethylhydantoin. (33th Annual Convention of Chemists, Coimbatore, India, 1996).

145. Titrimetric determination of Paracetamol with *N*-bromophthalimide and *N*-bromosaccharin. (Nehru Centenary Science Seminar, Trivandrum, Kerala, India, 1990).
146. Titrimetric determination of Vitamin C present in various pharmaceutical preparations. (25th Annual Convention of Chemists, Calcutta, India, 1988).

ARTICLES ON GENERAL TOPICS

1. K. Girish Kumar, Poly Aromatic Hydrocarbons: A Future Threat in Air Pollution, *Science India*, **8(6)**, (2005).
2. K. Girish Kumar, A Paper on Fluorosis, *Jalatharangam*, Sept., **13**, (2002), Published by Kerala River Protection Council.
3. K. Girish Kumar and I. Anitha, A paper on Food Colours, *Mathrubhumi Daily (Malayalam)*, (1991).

■ CUSAT conducts a talent hunt for the country's future scientists

Back to the basics

KRISHNA KUMAR K.E. |
DC
KOCHI, FEB. 22

It was a day to cherish for a group of bright eighth standard students from across the State when they got an opportunity to do scientific experiments and fire away questions to an IAS officer.

"We were on a journey to an entirely different world that begins with atoms and extends all the way up to the Antarctica Sea. The session with Swagath Bhandari IAS, Assistant Collector, Ernakulam, was really motivational. It was an eye-opener when she told us how she chose her career and overcame the hurdles," said Atul Raj, student of HSS Srikrishnapuram, Palakkad.

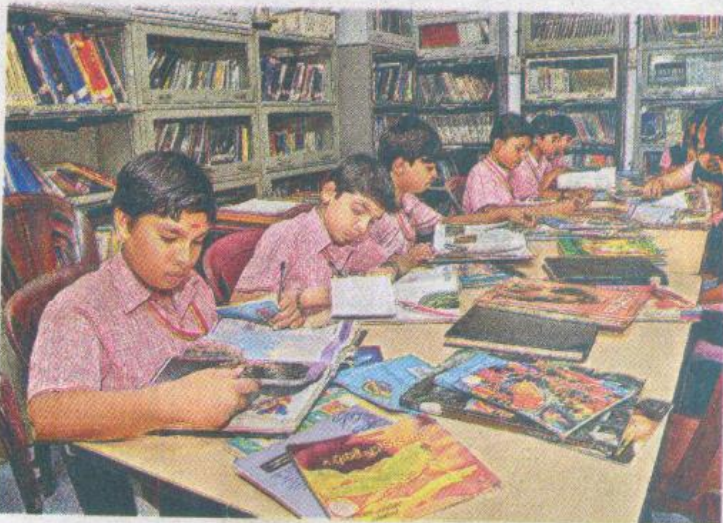
He was among the 60 students selected for 'Inculcate 2012' held at CUSAT campus in Kochi after a state-wide competitive exam held by the Kerala State Science and Technology Museum (KSSTM).

The idea was to spot talent in basic sciences early and mould them by offering scholarships at school-level.

"Nowadays, only a few among the bright students opt for courses other than medicine or engineering. So the programme is an attempt to attract talented students to basic sciences," Dr Girish Kumar K, Professor, Department of Applied Chemistry, CUSAT, said.

A total of 20,000 students sat for the exam that tested their knowledge in basic sciences and 300 of them came out trumps.

"They were divided into five groups of 60 before they attended the talent pruning camps at five universities including CUSAT. Each university will select 50 students and provide them a monthly stipend of ₹750 till they pass the 12th standard exam. Mentors will be allotted to them to help



Students during the training in basic science as part of the Inculcate 2012 programme in CUSAT, Kochi. Sixty students from across the state took part in the programme.



Dr Girish Kumar. K

them excel in their chosen field," Kumar said.

Swagath Bhandari termed the interaction "vibrant" and observed that the kids were really curious about the happenings around them.

"I asked them to choose a career according to their capability and aptitude and cultivate the habit of reading," she told *Deccan Chronicle*.

"One student asked me why I chose civil service to which I replied that my idea was to serve the poor. He then said there were so many other ways to serve the poor," she



said, smiling.

The children virtually had a peep into the polar region, thanks to the lecture by Dr A.A. Mohammed Hatha, Associate Professor, Department of Marine Biology, CUSAT.

The students had the rare opportunity to familiarise themselves with the life and culture of the Arctic region.

The students also had the opportunity to do experiments in chemistry, physics, mathematics and biotechnology laboratories and understand the principles behind

them.

A quiz programme on basic sciences was another session that they enjoyed.

"I was really thrilled to know about distinct bacteria and virus in biotechnology, working of simple pendulum in physics, fun problems in mathematics. I had the shock of my life when I learned about the adulterants that can get into our body and was amazed to see artificial sun setting in the chemistry lab," said Aiswarya M.V, an eight standard student from Kozhikode.

Hunt for the most talented

■ 60 students selected for 'Inculcate 2012' held at CUSAT campus in Kochi

■ A state-wide exam held by the Kerala State Science and Technology Museum

■ Idea was to spot talent in basic sciences early and mould them by offering scholarships at school-level.

Biosensors for quality control

Biosensors are fast becoming an important tool in research and commercial applications as they can identify specific targets in the human body and environment



simply science

have caught the interest of the industry because of their remarkable ability in detection, experimental simplicity and low cost. The Department of Applied Chemistry at Cusat has been working on electrochemical sensors to detect metal ions and drugs in the human body.

Working on research projects funded by the Defence Research and Development Organisation (DRDO), the team has made biosensors to detect metal ions and drug residues. "Clinical trials will be done later by the funding agency. We have handed over the technology to the DRDO," said K Girish Kumar, professor and head, Department of Applied Chemistry, Cusat.

"When we finished 'Fab-

rication of potentiometric sensors for the determination of metal ions' for DRDO, we got the next project, 'Development of electrochemical sensors for the determination of pharmaceuticals', which has been completed," he said.

The team had an international collaboration with the Polish Academy of Sciences, a bilateral research programme of Department of Science and Technology (DST).

Girish says that the electrochemical sensors group plans to take up active research on enzyme immobilised biosensors and develop new Volta metric sensors for checking the quality of food in the market.

"Our ultimate aim is to develop disposable sensors," he said.

Sudha Nambudiri
sudha@expressbuzz.com



WITH most people becoming conscious and aware of the quality of food, water and medicine, biosensors have started to play an important role in our lives. They are fast becoming an important tool in research and commercial applications as they can identify specific targets in the human body and environment.

Glucose monitoring is familiar to most of us. Researchers are now working on remote sensing of air-

borne bacteria in bio-warfare, detection of pathogens, determining levels of toxic substances before and after bioremediation, routine blood urine analysis, drug residues in food and the human body.

While human senses provide essential information about our close environment, researchers are looking for new sensors that will give us an analysis of the food we eat, the water we drink and the air we breathe. This requires novel chemical sensors, molecular recognition and signal transduction.

Electrochemical sensors



The New Indian Express

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മരുന്നിലെയും ഭക്ഷണത്തിലെയും പദാർത്ഥങ്ങളുടെ അളവ് കണ്ടുപിടിക്കാൻ പുതിയ സെൻസറുകൾ

എൻ.പി. ഹരിദാസ്

കളമേഴ്സി: മരുന്നും, ഭക്ഷണവും, ശീതള പാനീയങ്ങളും എന്നിവയിലടങ്ങിയിരിക്കുന്ന വിവിധ പദാർത്ഥങ്ങളുടെ അളവ് കണ്ടെത്തുന്നതിനുള്ള സെൻസറുകളുമായി കൊച്ചി സർവകലാശാല: ശീതള പാനീയത്തിലെ രാസമാലിന്യത്തിന്റെ അളവ് മുതൽ ശരീരം ആഗിരണം ചെയ്യുന്ന മരുന്നിന്റെ അളവ് വരെ കണ്ടെത്താൻ ഇതുവഴി കഴിയും.

ഒരു പദാർത്ഥം എത്ര അളവുണ്ടെന്ന് കണ്ടുപിടിക്കാനുള്ള രാസപരമായ രീതിയാണ് കെമിക്കൽ സെൻസറിലൂടെ ചെയ്യുന്നത്. കെമിക്കൽ സെൻസറുകളിൽ തന്നെ ഇലക്ട്രോ കെമിക്കൽ സെൻസറുകളിലാണ് കൊച്ചി സർവകലാശാല പ്രാധാന്യം കൊടുത്തിരിക്കുന്നത്. കൊച്ചി ശാസ്ത്ര സാങ്കേതിക സർവ

കലാശാല (കുസാറ്റ്) യിലെ അഡ്വൈസ് കെമിസ്ട്രി പ്രൊഫസർ ഡോ. കെ. ഗിരിഷ് കുമാറിന്റെ നേതൃത്വത്തിൽ 15 പേരുള്ള സംഘമാണ് സെൻസറുകൾ വികസിപ്പിച്ചെടുത്തത്.

കേന്ദ്ര സർക്കാറിന്റെ ഡിഫൻസ് റിസർച്ച് ഓർഗനൈസേഷൻ കേരള സ്റ്റേറ്റ് കമ്മിറ്റി ഓൺ സയൻസ് ടെക്നോളജി ആൻഡ് എൻവൈറോൺമെന്റ് എന്നിവയുടെ സാമ്പത്തിക സഹായത്തോടെയാണ് സെൻസറുകൾ വികസിപ്പിച്ചെടുത്തത്.

ലോഹങ്ങളുടെയും ഹാർമസ്വപ്പിക്കലുകളുടെയും മറ്റും അളവ് നിർണയിക്കാനുള്ള 60-ഓളം സെൻസറുകളാണ് വികസിപ്പിച്ചെടുത്തിട്ടുള്ളത്.

മരുന്നും കഴിച്ച ഒരു രോഗിയുടെ മൂത്രം പരിശോധിച്ചാൽ ശരീരം ആഗിരണം ചെയ്യാതെ പുറത്തുള്ള മരുന്നിന്റെ

അളവ് ഇത്തരം സെൻസർ ഉപയോഗിച്ച് കണ്ടെത്താനാവും. ഇതുവഴി ശരീരത്തിൽ എത്ര മരുന്നും ആഗിരണം ചെയ്തിട്ടുണ്ടെന്ന് അറിയാനാകും.

നിലവിലുള്ള സംവിധാനങ്ങൾ ഉപയോഗിച്ച് വിവിധ പദാർത്ഥങ്ങളുടെ അളവ് കണ്ടെത്തുന്നതിനേക്കാൾ വളരെ കൃത്യമായ ചെലവിൽ സെൻസറുകൾ ഉപയോഗിച്ച് ഇവ കണ്ടെത്താനാകും.

ഏകദേശം ഒരു കണ്ടെത്തലിന് 5000 രൂപയേ ചെലവാകുകയുള്ളൂവെന്ന് ഡോ. ഗിരിഷ് കുമാർ പറഞ്ഞു.

നിലവിൽ ലോഹങ്ങളുടെ അളവ് കണ്ടെത്തുന്നതിന് ആമിക് അബ്സോർബ്ഷൻ സ്പെക്ട്രോമീറ്റർ പോലുള്ള ഉപകരണങ്ങൾ ഉപയോഗിച്ചാണ്. ഈ ഉപകരണത്തിന് മാത്രം 20 ലക്ഷത്തോളം വിലയുണ്ട്. ഇതുപയോഗിച്ചുള്ള പരിശോധനയ്ക്ക് വേറെയും ചെലവുകൾ വരും.

പരിശീലനം ലഭിച്ച ആളുകൾക്ക് ലാബിൽ തന്നെ ഉണ്ടാക്കിയെടുക്കാൻ പറ്റുന്നതാണ് ഈ സെൻസറുകൾ.

ചോക്ലേറ്റിൽ എത്രമാത്രം നിക്കൽ ഉണ്ടെന്ന് കണ്ടുപിടിക്കാനുള്ള നിക്കൽ സെൻസർ, വെള്ളത്തിലെ ഘന ലോഹങ്ങളെ കണ്ടുപിടിക്കുന്നതിനുള്ള സെൻസറുകൾ തുടങ്ങിയവയും ഉണ്ട്.

ഹാർമസ്വപ്പിക്കൽ അനാലിസിസിന് ഭാവിയിൽ വ്യാപകമായി ഉപയോഗിക്കാവുന്ന വിവിധ സെൻസറുകൾ വികസിപ്പിച്ചെടുത്തവയിൽ പെടും. മരുന്നുകളുടെ ഗുണനിലവാര പരിശോധനയ്ക്ക് ഭാവിയിൽ ഇത്തരം സെൻസറുകൾ ഉപയോഗിക്കും.

പലതരത്തിലുള്ള ആൻറി ബയോട്ടിക്സുകൾ, വേനസംഹാരികൾ തുടങ്ങിയവയുള്ള സെൻസറുകളും വികസിപ്പിച്ചെടുത്തവയിലുണ്ട്.