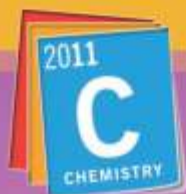


CHEMISTRY

IN SRI LANKA



International Year of
CHEMISTRY
2011



MAY 2011 VOLUME 28 - NO. 2

The Tri Annual Publication of the
Institute of Chemistry Ceylon
ISSN 1012-8999

7th Convocation of the College of Chemical Sciences



Prof. M D P De Costa, President, I.Chem.C. declares the convocation open.



Prof. J N O Fernando, Dean, CCS delivering Dean's Report.



Dr. Neville Reed, Chief Guest delivering Convocation Address



Parents and relatives



Invited Guests



Mr. K R Dayananda

Awards for yeoman service for Educational activities in an honorary capacity



Ms. Dilmani Warnasuriya



DLTC Diplomates



Mr. R Loorthuraja receives the Shireen Jayasuriya Gold Medal for the best performance



Graduate Chemists

Chemistry in Sri Lanka

ISSN 1012 - 8999

The Tri-Annual Publication of the Institute of Chemistry Ceylon

Founded in 1971, Incorporated by Act of Parliament No. 15 of 1972

Successor to the Chemical Society of Ceylon, founded on 25th January 1941

Vol. 28 No. 2

May 2011

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Theme for the year -

"Chemistry Education for the Well Being of Society"

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Outline of our Institute

The Institute of Chemistry Ceylon is a professional body and a learned society founded in 1971 and incorporated by act of Parliament No. 15 of 1972. It is the successor to the Chemical Society of Ceylon which was founded in 1941. Over 50 years of existence in Sri Lanka makes it the oldest scientific body in the country.

The Institute has been established for the general advancement of the science and practice of Chemistry and for the enhancement of the status of the profession of Chemistry in Sri Lanka. The Institute represents all branches of the profession and its membership is accepted by the government of Sri Lanka (by establishment circular 234 of 9-3-77) for purposes of recruitment and promotion of chemists.

Corporate Membership

Full membership is referred to as corporate membership and consists of two grades: **Fellow (F.I.Chem.C.)** and **Member (M.I.Chem.C.)**

Application for non-corporate membership is entertained for four grades: **Associate (former Graduate) (A.I.Chem.C.)**, **Licentiate (L.I.Chem.C.)**, **Technician (Tech.I.Chem.C.)** and **Affiliate Member**.

Revision of Membership Regulation

All Special Degree Chemists can now apply directly to obtain **Associate (Graduate) Membership**. Three year B. Sc. Graduates (with an acceptable standard of Chemistry) can

- directly become **Licentiate**
- obtain corporate membership in a lesser number of years.

Tech.I.Chem.C.

Those who have passed the DLTC examination or LTCC examination or have obtained equivalent qualification and are engaged in the practice of Chemistry (or chemical sciences) acceptable to the Council are entitled to the designation **Tech.I.Chem.C.**

Members/Fellows are entitled to the designation of **Chartered Chemist (C.Chem.)** on establishment of a high level of competence and professionalism in the practice of chemistry and showing their commitment to maintain their expertise.

All corporate members (Members / Fellows) are entitled to vote and become Council/ Committee members whether Chartered Chemists or not.

Membership Applications

Any application for admission to the appropriate class of membership or for transfer should be made on the prescribed form available from the Institute Office.

Current Subscription Rates

Fees should be paid on 1st of July every year and will be in respect of the year commencing from 1st July to 30th June

Fellow	Rs. 1200
Member	Rs. 1200
Associate	Rs. 900
Licentiate	Rs. 750
Technician	Rs. 500
Affiliate	Rs. 500
Membership for Life	Rs. 10000

Entrance Fee

All the grades	Rs. 500
Processing Fees*	Rs. 200
Processing Fee for Chartered Chemist designation	Rs. 1000
Institutional Members	Rs. 2500

*per application for admission/transfer to any grade

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Council 2010/2011

President	: Prof. M D P De Costa
President Elect	: Prof. S Sotheeswaran
Vice President	: Prof. S Mohandas
Immediate Past President	: Prof. S P Deraniyagala
Hony. Joint Secretaries	: Ms. M N K de Z Goonatilleke Mr. M R M Haniffa
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Hony. Editor	: Dr. (Ms) Sujatha Hewage
Hony. Asst. Editor	: Dr. (Ms) Chatu Sirimanne
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Chairman/Academic Board	: Prof. J N O Fernando
Hony. Secretary for Educational Affairs	: Ms. P M Jayasinha
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Secretary, A & EP Committee	: Prof. (Ms) P A Paranagama
Chairman, Board of Trustees	: Prof. H D Gunawardhana

Elected Members

Prof. (Ms) Janitha A Liyanage	Prof. Sudantha Liyanage
Dr. (Ms) Nandani Ediriweera	Ms. Sakunthala Tennakoon
Dr. K D P Hemalal	Dr. A A Punya Keerthi
Prof. (Ms) R D Wijesekera	Dr. Rohan Perera
Mr. K R Dayananda	Dr. (Ms) S S Iqbal

Editorial and Publicity Committee

Dr. (Mrs) S Hewage (Editor)
Dr. (Ms) C Sirimanne (Asst. Editor)
Prof. (Ms) R D Wijesekera
Prof. S Mohandas
Prof. S Sotheeswaran
Dr. K P D Hemalal
Dr. R Senthilnithy

CHEMISTRY IN SRI LANKA

Chemistry in Sri Lanka is a tri-annual publication of the Institute of Chemistry Ceylon and is published in January, May and September of each year. It is circulated among the members of the Institute of Chemistry and students of the Graduateship/DLTC course and libraries. The publication has a wide circulation and more than 1500 copies are published. Award winning lectures, abstracts of communications to be presented at the annual sessions, review papers, activities of the institute, membership news are some of the items included in the magazine.

The editor invites from the membership the following items for publication in the next issue of the Chemistry in Sri Lanka which is due to be released in September 2011.

- Personal news of the members
- Brief articles of topical interests
- Forthcoming conferences, seminars and workshops
- Latest text books and monographs of interest to chemists

All publications will be subjected to approval of the 'Editorial and Publicity Committee' and the Council of the Institute of Chemistry Ceylon.

Further, prospective career opportunities for chemists, could be advertised in Chemistry in Sri Lanka at a nominal payment. The editor welcomes from the members suggestions for improvement of the publication.

Chemistry in day to day life

Prof. S Mohandas

Vice President, Institute of Chemistry Ceylon



A knowledge in chemistry is essential to study other science subjects and therefore chemistry is considered as the central subject in science. In this material world, everybody wants to know the composition and properties of matter and the changes taking place in the matter. As the solid ice melts, the liquid water appears and as the liquid changes into gas, vapour appears. These are physical changes with different inter molecular attractions but the water molecules remain the same. Rocks, minerals and water on the earth, gases in the atmosphere and sun, moon and other planets are all made up of atoms, molecules, ions or compounds. Plants and animals grow from the chemicals on earth environment. Soil minerals and gases help plants to grow and plants in turn help animals to grow. A thorough understanding of the composition of earth minerals, constituents of plants and animals help in the growth of living organisms.

The Nobel prizes are being awarded for three scientific disciplines namely chemistry, physics and medicine. The international scientific community has recognized that these three disciplines would be responsible for the advancement of mankind and technological areas such as Engineering, Agriculture and Medicine. The discipline biology is the application of chemistry and physics. One good example on this is that the structure of DNA was discovered by physicists and chemists. Out of all areas of science, chemistry has

constantly sought to improve quality of life. Future challenges in chemistry will emerge from different areas of chemistry such as biological chemistry, material chemistry, process chemistry, modeling chemistry or computational chemistry. Many applications of these fields are yet to be conceived.

Global developments and the globalizations of science have torn down the traditional barriers that hitherto existed between chemistry and allied sciences. The periphery of chemistry will increasingly overlap with several other disciplines, bringing into focus the need for a multidisciplinary approach where scientists of different disciplines will pool their resources and expertise and join hands and march forward together in the relentless search for a better tomorrow.

Chemistry plays a very important role in the understanding of materials around you in day to day life. Toothpaste, soaps and detergents we use in wash rooms, food, water and drugs we consume, lipsticks, nail polish, hair dye and other make up items, colouring agents, dresses, metals in cooking utensils to aeroplanes and satellites, gold, silver and other ornaments, plastics, fibres, rubber and products, glass, cement, paint, etc around us are materials which could be understood more by the knowledge of chemistry. This knowledge is essential to have a good understanding of the items indicated thereby making it easy to use them. Chemistry therefore is the source that assist in making the day to day life and life on this earth comfortable.

Revised (increased) Benevolent Fund Benefits from Sept. 1st 2010

- Long life Benefits: Rs. 10,000 (over 70)/ Rs. 15,000 (over 75)/Rs. 20,000 (over 80)
- Critical illness benefits (upto Rs. 50,000)
- International travel for conferences (upto Rs. 50,000) provided a paper is being presented
- Balance 50% of Tuition fees of any member's child following the Graduateship Programme (Since 50% concession is already by CCS, this will amount to a 100% waiver)

Any member who has paid membership fees for life (after 3 years of such payment) OR any visiting academic/academic support member who automatically contributes 5% of his honorarium to the Benevolent Fund, are entitled for these benefits. All members are advised to pay the membership fee for life and become beneficiaries. The existing Benevolent Fund scheme has been withdrawn from September 1st.

Institute of Chemistry Ceylon Fortieth Annual Sessions and Seventieth Anniversary Celebrations 2011

Inauguration of the 40th Annual Sessions, Institute of Chemistry Ceylon

Thursday, June 16th 2011

Venue: Sri Lanka Foundation Institute, Colombo

- 8.00 a.m. Arrival of Members and Guests
- 8.30 a.m. Ceremonial Procession of the Council Members
- 8.35 a.m. Inauguration of the 40th Annual Sessions by Traditional Lighting of Oil Lamp and National Anthem
- 8.45 a.m. Welcome Address
Professor M. D. P. De Costa, President, Institute of Chemistry Ceylon
- 8.50 a.m. Presidential Address, "Chemistry and Society"
Professor M. D. P. De Costa, President, Institute of Chemistry Ceylon
- 9.15 a.m. Address by the Chief Guest - "Better Living through Chemistry?"
Professor J. A. Pincock, Dalhousie University, Canada
- 9.30 a.m. Address by the Guest of Honour
Mr. Chandima Perera, Head of Beverages & Vice President, John Keells Holdings PLC
- 9.45 a.m. Presentation of Awards, Prizes and Certificates
Distinguished Services Award - Professor Sujatha Hewage
IChemC Gold Medal - Mr. N M S Hettigedara
Long Service Award - Ms. H L A Champanie
Graduateship Examinations in Chemistry, Scholarships, Prizes and Awards
All Island Interschool Chemistry Quiz Contest
- 10.00 a.m. Invited Speech - "From rocks to community health – Tracing the chemical pathways of an element"
Professor C. B. Dissanayake, Director, Institute of Fundamental Studies, Kandy.
- 11.00 a.m. Vote of Thanks
Professor S. Sotheeswaran, President Elect, Institute of Chemistry Ceylon
- 11.10 a.m. Tea
- 11.30 a.m. Close of Ceremony
- 11.35 a.m. Annual General Meeting of Corporate Members of the Institute of Chemistry Ceylon
- 12.30 p.m. Lunch for Corporate Members attending the Annual General Meeting



sponsored by Ceylon Cold Stores (PLC)

Chief Guest at the 40th Annual sessions - Professor James A Pincock



Professor James A Pincock joined the Dalhousie University, Canada in 1973 and served as Assistant Professor, Associate Professor, Professor and retired from service in 2008. He is currently an Adjunct Professor, Dalhousie University.

He graduated with a BSc Honours (First Class) in Chemistry from the University of Manitoba in 1965. His postgraduate research was on "The mechanism of bromine addition of acetylene" at the University of Toronto and received his PhD in 1970. He was a post doctoral fellow at the University of Wisconsin (1970-72) and University of Western Ontario (1972 – 73). At Wisconsin he worked under Professor Howard Zimmerman.

His undergraduate and postgraduate teaching mainly involved organic chemistry, physical organic chemistry and photochemistry. He received several awards for excellence in teaching. He has supervised many BSc, MSc and PhD research students and his research work was centered on "Mechanistic Organic Photochemistry". From 1975 – 2011 he continuously received grants to continue with his research interests.

He held the position of Departmental Chair in 2005-07 and he served in many university committees. He was the Editor (2001-05) for Physical Organic Chemistry section of the Canadian Journal of Chemistry. He is a fellow of the Chemical Institute of Canada and held the positions; Organic Division Treasurer (1981), Organic Division Chair (1982), Elected Fellow (1985), Organic Division Programme Organizer (1990) and Symposium Organizer (2006).

Message from the Guest of Honour

Chandima Perera, Head of Beverages, Vice President JKH



Elephant House being a truly Sri Lanka company; is proud to be the main sponsor of 40th Annual session and the 70th Anniversary elaboration of the institute of chemistry opening ceremony with EGB(Elephant House Ginger Beer).

"Elephant House Ginger Beer" is a unique and popular carbonated soft drink developed in Sri Lanka over 115 years ago (Original Recipe Since 1896). "Elephant House Ginger Beer", popularly known as "EGB", is the only natural Ginger Beer in the local market, and has maintained that quality throughout the years giving the consumers a beverage with a unique natural distinctive taste. The product is made using natural ginger extracts which is sourced from local farmers.

We feel that an event of this caliber will further enforce EGB's unique identity as a product which has a natural ingredient and its brand association with food which has been built over the years. We congratulate the Institute of Chemistry Ceylon on its 70th Anniversary and we wish them all the very best.

Cover Page

This flag bearer educational programme has continued to make immense progress over the past year. The 28th batch of 75 Graduate Chemists who are passing out at today's convocation includes 70 first timers who entered the programme four years ago in 2006. This number exceeds last year's record first time output of 57 Graduate Chemists. This batch has had an increased number of optional courses available for study, an increase made possible by conducting additional courses on week days as well. While our total output over 28 batches has increased to 739, the annual average output over the four year period (2007-2010) has increased from around 50 almost 70.

See pages 28-32.

Institute of Chemistry Ceylon Awards

Distinguished Service Award 2011 - Dr Sujatha Hewage, C.Chem., FIChemC



Dr Sujatha Hewage, Chartered Chemist, had a distinguished record of academic service to the Department of Chemistry and Faculty of Science, University of Colombo for over 40 years and retired as a Professor in 2010.

She was the Head, Department of Chemistry for about 8 years and contributed immensely to the development of the department. During her tenure as the Head, two new academic programmes were introduced and successfully implemented for undergraduates. They were the Special Degree programmes in Biochemistry & Molecular Biology, and Pharmacy. The latter, was the first B.Sc Degree programme in Pharmacy in Sri Lanka. She was also instrumental in commencing the M.Sc programme in Chemistry Education at the University of Colombo.

Dr Hewage is an active member of both SLAAS and Institute of Chemistry Ceylon. She is a Life Member of SLAAS and was the President of Section E2 in 2003.

Dr Hewage has been a member of the Institute of Chemistry Ceylon since the early 1970's and is a Fellow of the Institute from 1993 onwards. She has held several positions at the Institute: From 1991 – 1993 and 2009 – 2010, she was the Secretary, International Affairs and from 1996 – 1998 and 2010 to date, the Editor. She was the Chairperson of the Training Seminars/Workshops Committee in 2004 – 2005 and several seminars of topical interest were organized by her. She has been a member of the Council continuously since 2003. Currently, she is a member of the House & Finance and Admissions & Ethical Practices Committees. She also serves as an external examiner for the Graduateship Programme in Chemistry. As President of the Institute of Chemistry in 2005 – 2006, she organized the Theme Seminar for the Annual Sessions under the topic “Research in Chemical Sciences – Outlook & Prospects for the Future” at which seven foreign experts presented their research work. A seminar on “Safety of Food & Beverages in International Trade” was also organized jointly with the European Union. A foreign expert, Prof. Michiel van Schothorst was invited to conduct the seminar.

In recognition and appreciation of her long and dedicated services to the progress of the Institute of Chemistry Ceylon, the Council unanimously decided to award Dr Sujatha Hewage, the “Distinguished Service Award”.

IChemC Gold Medal 2011- Mr. N. M. S. Hettigedera, C.Chem., FIChemC



We recognize Mr. N.M.S. Hettigedera, Chartered Chemist for rendering his yeomen service in an honorary capacity and richly contributing to the progress of activities of the Institute of Chemistry Ceylon. Graduated in 1991, he is a founder member of the Student Association and the Alumni Association of Graduate Chemists of the IChem C from 1987. He is an elected member of the Council since 1994. He serves as the Joint Secretary since 2004 and Hony. Treasurer since 2008.

Mr. Hettigedera's contribution to the promotion and advancement of chemical sciences by taking charge of activities of the International Year of Chemistry 2011 (IYC 2011) with great vigor and enthusiasm are commendable, amongst which the inauguration of IYC 2011 in Sri Lanka, CHEMEX 2011, issue of IYC postal stamp and the 'Avurudu Asiriya' cultural Programme were the highly successful major events which will go to the history of the Institute. IChem C recognizes his contribution through the award of IChemC Gold Medal.

His dedication and attitude of positive approach towards various issues ultimately ending up with enormous success is surprising and unimaginable. This quality which is rare among most of us has undoubtedly elevated him to the present positions he is holding in various Institutions. He is indeed an example and role model for all CCS Graduate Chemists to emulate by not forgetting one's academic parent.

contd. to page 7

Long Service Award 2011 - Ms. H. L. Anoma Champanie



Ms. H. L. Anoma Champanie joined the Institute of Chemistry Ceylon in 1990 as a Trainee Accounts Clerk. In 1998 she was promoted to the position of Senior Accounts Assistant. In 2008 she assumed duties of the post of Assistant Accounting Officer and, after a period of two years excellent service she undertook the post of Accounting Officer in which she continues to discharge her duties with great responsibility, dedication and to the entire satisfaction of the Institute.

Having an uninterrupted service record of 21 years at the Institute of Chemistry Ceylon, Ms. Anoma Champanie handles all the accounting work such as maintaining cash books, ledgers, journals and other vital financial records with great efficiency. She contributes her knowledge and experience to the accounting activities of the College of Chemical Sciences too, while assisting in the maintenance of the accounts of the International Year of Chemistry 2011 (IYC 2011). One could observe her diligently working at the Institute's office checking the vouchers and purchase orders, entering the accounts, arranging the payment of salaries of the staff and, meticulously as well as accurately handling all the related financial records. She has the responsibility of preparing final accounts of the Institute until they are submitted to the Auditors, which she accomplishes with punctuality and utmost efficiency. The work so far carried out by her on these important financial aspects had been praiseworthy and highly commendable.

From the inception, the accounting work of the Institute was conducted manually where she had a heavy load of routine work to handle. After the introduction of electronic system in 2010 she was responsible for reorganizing and modernizing the accounting system and making it more efficient thus greatly benefitting the Institution's financial, administrative and management functions. Her unmatched experience in handling all types of complex accounting work is undoubtedly an asset to the Institute.

Ms. Anoma Champanie's honesty, integrity and her great dedication to the work of the Institute are highly commendable and exemplary. Ability to work under pressure is a special quality she has acquired during her service. In view of the excellent accounting skills and capabilities, hard work, loyalty, sincerity and dedication to the advancement of the Institute, the Council unanimously decided to recognize Ms. Anoma Champanie's 21 years long uninterrupted and praiseworthy service and present the Long Service Award to her. We wish every success in Anoma's future endeavors.

'CHEMEX 2011' Educational Exhibition & Trade Fair

CHEMEX 2011 Exhibition & Trade Fair held at BMICH from 27th- 30th January 2011 was successfully concluded accruing much benefits, especially to the younger generation of the country. Around 200,000 people consisting of school children, university students, businessmen, industrialists, academics and the general public visited the Exhibition. While there were more than 100 exhibition stalls various educational and entertainment programmes were also conducted. A commemorative stamp was also issued for the celebration of the IYC 2011. Photographs appear on pages 11 & 12.

'Avurudu Asiriya' Cultural programme

Being a joint effort of the Steering Committee of the National Secretariat (IYC 2011) Sri Lanka and the Social Affairs Committee of the IChemC, 'Avurudu Asiriya' Cultural programme was held on the 3rd of April 2011 at *Janakala Kendraya*, Battaramulla with the participation of more than 600 people including members of Institute of Chemistry, local and foreign visitors, family members, students and children. It was indeed a unique opportunity for all the staff members and Sinhala, Tamil and Muslim students as well as their family members to come, relax and enjoy together. Photographs appear on page 25.



Theme Seminar (Sponsored by Unilever Sri Lanka)

Photochemistry for the Wellbeing of Society

Venue: Sri Lanka Foundation Institute, Colombo 07

Time: 8.30 am – 4.30 pm

Date: June 17, 2011

Programme

8.30 am	Registration
8.50 am	Lighting the oil lamp
9.00 am	Welcome Address Professor M.D.P. De Costa <i>President, Institute of Chemistry Ceylon</i>
9.05 am	Introduction to Photochemistry Professor M.D.P. De Costa <i>President, Institute of Chemistry Ceylon</i>
9.30 am	Organic Photochemistry: a Personal History Professor J.A. Pincock <i>Department of Chemistry, Dalhousie University, Canada</i>
10.15 am	Photochemistry of Solar cells Professor O.A. Ileperuma, <i>Department of Chemistry, University of Peradeniya, Peradeniya</i>
11.00 am	Tea
11.30 am	Presentation Mr. Asanga Ranasinghe <i>Managing Director, Unilever Sri Lanka</i>
11.45 am	Photochemical Sensors Dr. R. Senthilnithy <i>Senior Lecturer, South-Eastern University, Oluvil</i>
12.30 pm	Industrial Photochemistry Professor Pradeep Jayaweera <i>Department of Chemistry, University of Sri Jayewardenepura, Nugegoda</i>
1.00 pm	Lunch
2.00 pm	Photochemistry in Medicine Dr. Ranil de Silva <i>Department of Anatomy, University of Sri Jayewardenepura, Nugegoda</i>
2.30 pm	Photochemistry in Nanotechnology Professor Nalin De Silva <i>Department of Chemistry, University of Colombo, Colombo 03</i>
3.00 pm	Tea
3.30 pm	Photochemistry in the Atmosphere Professor K.R.R. Mahanama <i>Head, Department of Chemistry, University of Colombo, Colombo 03</i>
4.00 pm	Discussion
4.30 pm	Vote of thanks

Technical Session 1

Venue: Sri Lanka Foundation Institute, Colombo 07

Time : 1.30 p.m. – 4.30 p.m.

Date: June 16, 2011

Chairperson: Professor S Sotheeswaran

Time	Title	Authors
1.30 pm – 1.50 pm	Gene activity relationship study of <i>Bacillus thuringiensis</i> of Sri Lankan strains against diptean, lepidopteran and coleopteran eests	R. Samarasekera, D.A.S. Siriwardhana, M.L. Peiris, O.V.D.S.J. Weerasena, I.S. Weerasinghe and D. Ahangama
1.50 pm – 2.10 pm	Antimicrobial activity of <i>Ficus benghalensis</i> in cosmetic application	N.Y. Elias, R.L.C. Wijesundera, S. Kathirgamanathar and A. Perera
2.10 pm – 2.30 pm	Dhilirolide A: A putative meroterpenoid isolated from cultures of the phytopathogenic fungus <i>Penicillium purpurogenum</i>	E.D. de Silva, D.R. Jayanetti and R.L.C. Wijesundera
2.30 pm – 2.50 pm	Analysis of BTEX as petroleum pollutant indicators in ground and surface water by head space sampling and gas chromatography flame ionization detection	S.D.M. Chinthaka, S.P. Deraniyagala and K.A.N.K. Manatunga
2.50 pm – 3.05 pm	Production of biodiesel from waste palm oil	S. Sotheeswaran, P.P.A.M.S.I. Ratnayake and U.S.K. Weliwegamage
3.05 pm – 3.30 pm	TEA	
3.30 pm - 3.45 pm	Effect of storage and cooking on the antioxidant properties of unconventional Leafy Vegetables	Sukumal Wimalasena and K.S.U. Ratnayake
3.45 pm – 4.00 pm	A New Branched Fatty Acid from Insecticidal Sri Lankan isolate of <i>Hirsutella thompsonii</i>	R. Samarasekera, D.A.S. Siriwardhana and M.H.N. Arunashanthi
4.00 pm – 4.15 pm	Comparative study of the antioxidant properties of <i>Armillaria</i> sp. (edible wild mushroom) with the cultivated mushroom <i>Pleurotus</i> sp.	Sukumal Wimalasena and N.M.R. Shashikala
4.15 pm – 4.30 pm	Comparison of the antioxidant potential of a cup of instant black tea with that of an organoleptically equivalent cup of brewed black tea	A.M. Abeysekera, T.S.R. Mudalige, U.G. Chandrika and A.K.E. Goonetilleke

Technical Session 2

Venue: Adamantane House, Institute of Chemistry, Rajagiriya

Time : 9.00 a.m. – 11.30 a.m.

Date: June 18, 2011

Chairperson: Professor S Mohandas

Time	Title	Authors
9.00 am – 9.15 am	Chemical and microbial analysis of municipal drinking water from various regions of greater Colombo area	S.P. Deraniyagala, Rasu Loorthuraja and Chamal De Silva
9.15 am – 9.30 am	Determination of copper (II) by EDTA titrimetry using a seed extract of <i>Areca catechu</i> as a metallochromic indicator	H.D. Gunawardhana and M.R. Ranga Prabath
9.30 am – 9.45 am	Development of a novel colorimetric method to determine iron (III) in water using ethyl acetoacetate	S.P. Deraniyagala, A.S.K. Kankanamge, R.M. Suranga and M. Rajapaksha
9.45 am – 10.00 am	Alkaline lipase from rubber seed kernel: Its stability and fatty soil cleaning efficiency under various storage conditions	M.K.B. Weerasooriya and A.A.N. Kumarasinghe
10.00 am – 10.30 am	TEA	
10.30 am – 10.45 am	The efficacy of essential oil of <i>Plectranthus zeylanicus</i> plant against <i>Callosobruchus maculatus</i> (F.)	P.A. Paranagama, B.A.H.E. Balachandra and P.U. Pathirathna
10.45 am – 11.00 am	Aspartic protease inhibitory activity of <i>Anacardium occidentale</i>	S. Rajapakse and A. Herath
11.00 am – 11.15 am	Mononuclear aromatic compounds from lichens are potent urease inhibitors	V.M. Thadhani, Veranja Karunaratne and Iqbal M. Choudhary
11.15 am – 11.30 am	Comparison of the oral hypoglycaemic activity of the decoctions of <i>Munronia pinnata</i> prepared by two methods in healthy wistar rats	T.S. Suresh, S.D. Hapuarachchi and W.T.P.S.K. Senerath

Deans Emergency Fund

The Deans Emergency Fund was established to provide financial relief to G I C students in case of emergency. The Institute of Chemistry Ceylon welcomes donations to this fund from members, students and well wishers.

CHEMEX2011

INTERNATIONAL YEAR OF CHEMISTRY

Educational Exhibition & Trade Fair

1st Day - 27.01.2011



2nd Day - 28.01.2011



3rd Day - 29.01.2011



4th Day - 30.01.2011



Technical Sessions : A - 01

Gene activity relationship study of *Bacillus thuringiensis* Sri Lankan strains against dipteran, lepidopteran and coleopteran pests

¹D A S Siriwardhana, ¹R. Samarasekera, ¹M.L. Peiris, ²O V D S J Weerasena, ³I S Weerasinghe, ⁴D Ahangama

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Bacillus thuringiensis (*Bt*), a gram positive bacterium, contains insecticidal *cry*, *cyt* and *vip* genes which produce toxins against dipterans, lepidopterans and coleopterans. The development of non-chemical pesticides such as biological is a priority over chemical insecticides and this has led to an intensified research on new microbial strains with enhanced insecticidal activity against a wide spectrum of insects. The objective of the present study was to compare and evaluate the insecticidal activity of *Bt* with their molecular characteristics and molecular weight profile of crystal proteins to establish the Gene-Activity Relationships (GAR's). Plasmid DNA of *Bt* was extracted and *cry*, *cyt* and *vip* gene compositions were determined by PCR. Molecular weight profiles of crystal proteins were determined by SDS-PAGE analysis. Insecticidal activities against mosquito larvae and cabbage pests were determined by following the WHO and leaf-dip bio-assay, respectively.

Although the insecticidal activity of *Bt* have been well established, such studies on local *Bt* strains have not been previously reported except in the authors ongoing work. Composition of *cry* proteins determines the insecticidal activity of *Bt* against dipteran, lepidopteran and coleopteran pests. Therefore a strong gene-activity correlation can be evaluated between the type of *cry* genes and insecticidal activity. In this study, the highest mosquito larvicidal activity was observed for *Bt* AB67, AB125 and AB172. These possessed dipteran toxic *cry* genes, *cry4*, 10 and 11 and also *cyt1* gene to enhance the activity. The second highest mosquito larvicidal activity was observed for *Bt*, AB59, AB63, AB142, AB155, AB160 and AB165 and expressed *cry4*, *cry10* and *cry11* genes, but not *cyt1* gene. The absence of *cry11* gene in *Bt*, AB58, AB107, AB110, AB115, diminished the mosquito larvicidal activity but *cry4* and *cry10* genes helped to retain the activity. This indicates that the expression of *cry11* gene is required to enhance the activity. However, the absence of *cry4D* gene remarkably reduced the

larvicidal activity in *Bt*, AB58, AB63, AB142, AB155 and AB165. *Cry4* gene could be one of the key gene for the dipteran toxicity, because even in the absence of subtypes of *cry4* (*cry4A* and *cry4A2*) *Bt* AB67 exhibited comparatively higher activity. The presence of cytolytic genes, *cyt1* and *cyt2*, enhanced the dipteran toxicity in *Bti* and *cyt1* gene in *Bt*, AB67 and AB125. These data highlighted that, *Bt* with similar *cry* gene profiles always showed similar activity against both mosquito larvae.

The highest lepidopteran insecticidal activity of *Bt* AB125 against *P. xylostella* and *A. ipsilon* is due to the presence of *cry2* and *cry9* genes. The highest insecticidal activity of *Bt* AB142 against *C. eriosoma* is characteristic to the presence of *cry1* gene.

Similarly, it can be predicted that *Bt* AB2 which possess *cry* genes 2 and 9, may have higher insecticidal activity against above insects than that of *Bt* AB142. It is also noted that *cry9* gene always exist with *cry1* or *cry2* genes. The reduction of insecticidal activity due to the absence of *cry2* gene in AB1 and AB142, may retain by the presence of *cry9* and *vip3A* genes. Therefore, it can be predicted that any *Bt* containing *cry1*, *cry2* and *cry9* genes will exhibit high insecticidal activity against lepidopteran pests.

Bta and *Btt* exhibit activity against certain coleopteran pests, *Leptinotarsa decemlineata*, *Phaedon cochleariae* due to the expression of *cry3*, *cry7* and *cry8*. Therefore, it can be predicted that *Bt*, AB58, AB107 and AB110, which express *cry3*, *cry7* and *cry8* genes can exhibit high activity against coleopterans.

This study provided clear indications for GARs of dipteran and lepidopteran active *Bt* isolates and genetic characteristics towards enhancing insecticidal activity and also to predict the insecticidal activity of *Bt* isolates against coleopterans prior to undertaking bio-assays.

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Antimicrobial and dermatotoxicity studies of *Ficus benghalensis* extracts

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Antimicrobials of plant origin have enormous therapeutic potential and are effective in the treatment of infectious diseases. *Ficus benghalensis* is used in Ayurveda treatment and has been reported to have hypoglycaemic, hypotensive, antitumour, antiallergic, anti-inflammatory, antimicrobial and antioxidant effects ^[1]. Available literature shows that the antimicrobial study of *Ficus benghalensis* has not been carried out in Sri Lanka and it is important to screen this plant for new antimicrobial substances to develop effective and less toxic therapeutic agents in dermal applications. Allergic contact dermatitis is a condition where the patches of dermatitis develop when the skin reacts against a specific substance and the patch testing may help to identify the exact cause.

The antimicrobial activity of methanol extracts of aerial root, bark and leaf, were screened using Agar disc diffusion method against five bacterial species (*Bacillus subtilis*, *Streptococcus* sp., *Staphylococcus aureus*, *Escherichia coli*, and *Klebsiella pneumonia*) and four fungal species (*Aspergillus niger*, *Corynespora cassicola*, *Colletotrichum gloeosporioides* and *Candida albicans*). **Whatman filter paper disc (5mm) was used for the disc diffusion method.** The different concentrations of extracts (3 µl each) were incorporated into the disc. All three plant part extracts inhibited the growth of gram positive bacteria as well as gram negative bacteria. Among the tested microbial strains bacteria were found to be more sensitive than fungi. The methanol extract of aerial root is the most promising against *Escherichia coli*. The aerial root extract showed higher inhibitory activity against *Aspergillus niger* compared with bark and leaf extracts. Methanol extracts of aerial root and leaf are potent against *Candida albicans*. The aerial root extract is active against *Bacillus subtilis*, *Streptococcus* sp. and *Staphylococcus aureus* under all concentrations when compared with the control. The methanol extract of aerial root and bark is most promising against *Escherichia coli*.

Aerial root and bark were extracted with methanol and the solvent was evaporated in the rotary evaporator (<50°C). The crude extract was mixed with 60-120 mesh silica gel and suitable solvent to prepare the dried powder and it was subjected to vacuum liquid chromatography. The gradient solvents starting from n-Hexane, 50% CH₂Cl₂/hexane, 100% CH₂Cl₂, 50%

MeOH/CH₂Cl₂, 100% MeOH, 50% H₂O/MeOH and 100% H₂O (200 ml each) was used and the fractions were collected separately and the solvent was evaporated. The fractions 50% MeOH/CH₂Cl₂ fraction (0.4 mg/disc) and 100% MeOH (0.4 mg/disc) from the aerial root and bark extracts were effective against *Escherichia coli* while the fraction 100% CH₂Cl₂ (0.4 mg/disc) was effective against *Staphylococcus aureus*. In contrast, all the fractions of bark extract except 50% H₂O/MeOH (0.04 mg/disc) had improved inhibition on *Klebsiella pneumonia* than the control DMSO. The 50% CH₂Cl₂/hexane fraction of bark extract (0.4 mg/disc) showed promising inhibitory activity against both the bacterial strains *Bacillus subtilis* and *Staphylococcus aureus*.

Plant based therapeutic preparations are cyclically returning to complement dermatologic therapy. The dermatotoxicity of *Ficus benghalensis* fractions of aerial root and bark was investigated in wistar rats by applying them to the skin of the rats and observed for the presence of erythema, oedema and any allergic reactions. The patch test results showed there is no significant toxic effect on dermal application. Therefore this plant can be used to discover bioactive natural products that may serve as leads in the development of new dermal and pharmaceuticals that address unmet therapeutic needs.

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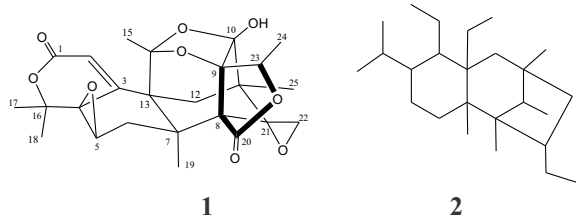
Dhilirolide A: A putative meroterpenoid isolated from cultures of the phytopathogenic fungus *Penicillium purpurogenum*

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Chemical investigation of laboratory cultures of the phytopathogenic fungus *Penicillium purpurogenum*, isolated from infected mature fruits of *Averrhoa bilimbi* (commonly known as 'bling' in Sinhalese) led to the isolation of dhilirolides A (**1**), a highly functionalized secondary metabolite with a putative meroterpenoid biogenetic origin. *P. purpurogenum* was grown on potato dextrose agar for five days at room temperature and after the fungal mycelium was scrapped off the agar surface the solid agar medium was cut into small pieces and extracted with EtOAc.



Concentration of the EtOAc extract *in vacuo* gave a red solid that was subjected to a series of solvent/solvent partitioning steps. The CH₂Cl₂ soluble materials were next fractionated by sequential application of Sephadex LH 20 chromatography, flash C18 reversed phase chromatography and reversed-phase HPLC to give a pure sample of dhilirolide A (**1**: 5.2 mg).

The structure of the dhilirolide A was determined by the interpretation of spectroscopic data (including HRESIMS, UV and ¹H/¹³C/gCOSY/gHSQC/gHMBC/ROESY NMR data) and was confirmed by single crystal x-ray diffraction analysis.

Dhilirolide probably has a meroterpenoid biogenesis and have the unprecedented carbon skeleton, which we have named dhilirane (**2**). Dhilirolide A exhibited antibacterial activity against *Pseudomonas aeruginosa* in a standard disc assay (MIC 50 mg/disc).

Analysis of BTEX as petroleum pollutants in ground and surface water by head space sampling and gas chromatographic analysis

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Organic compounds in ground water are known public health and environmental hazards. Benzene, Toluene, Ethyl Benzene and Xylene (BTEX) make up one of the main groups of soluble organic compounds which are naturally occurring aromatic petroleum components found in ground water. As a result of the refining processes, BTEX end up largely in some gasoline and petroleum products. Spills and deliberate addition of petroleum products such as gasoline, diesel fuel, lubricating and heating oils are amongst the most common ground and surface water contaminating pathways of BTEX. These aromatic compounds are classified as either proven or suspected carcinogen. When released to the aquatic environment, BTEX components first could associate with soil and rock particles. They eventually find their way into ground

and surface water by surface water runoff. The persistence of these compounds in groundwater depends on various physical, chemical, environmental, and geological factors. The aim of this study is to make a preliminary understanding of fate and distribution of BTEX compounds around a vehicle service station. This study would also help to understand their occurrence in water resources such as dug wells, canals and paddy fields. The ground water was sampled from various dug wells located around the service station. Surface water was sampled from different points at the canal where the effluent from the service station has been discharged. Head space sampling coupled with gas chromatography-flame ionization detection (HS-GC-FID) was used as analytical method.

The optimized temperature for the Head Space Sampling was found out equilibrating a known mixture of BTEX at different temperatures and was found out to be 65 °C. Therefore 65 °C was selected as working head space temperature. The study found that in most locations, benzene contaminant level was several folds higher than maximum contaminant level established by the U.S. Environmental Protection Agency (USEPA). Toluene and Xylene were also found in higher levels in both ground and surface waters. However, it was found that levels are below the relatively higher maximum contaminant level imposed by USEPA. The downstream contaminant levels in the canal were found to be higher than that of

the upstream levels. The contaminant levels in well water samples did not significantly vary with time. It is also found that the contaminant levels in dug wells do not show direct correlation with the distance from the point source (service station) indicating some geological and environmental factors affect the contaminant levels in dug wells. It is interesting to find that contaminant levels in closed dug wells were significantly higher than that in open dug wells. This indicates biological processes significantly effects the contaminant levels in dug wells. thus it is strongly suggested that dug wells in such a area should be kept open for the minimization of these organic contaminants.

Technical Sessions : A - 05

Production of biodiesel from palm oil

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The main focus of this study was to convert straight and waste palm oil into a more usable, environmental friendly product, biodiesel, using a simple, inexpensive method.

Biodiesel is the alkyl ester of fatty acids, made by the transesterification of oils or fats, from animals or plants with short chain alcohols such as methanol and ethanol. Glycerine is consequently, a by product from biodiesel production.

The prepared palm oil biodiesel met the American Society of Testing and Materials (ASTM) standards, accepted by the Ceylon Petroleum Corporation of Sri

Lanka. We also studied the influence of reaction time with percentage yield, the GCMS analysis confirmed the presence of major fatty acids in authentic palm oil in the prepared biodiesel.

The research showed that biodiesel obtained under optimum conditions from straight and waste palm oil was of good quality and could be used as a diesel fuel which is considered as a potential use of palm oil. In addition, bio-energy could be renewed and environmental recycling process could be maintained potentially, using biodiesel.

Technical Sessions : A - 06

Effect of storage and cooking on the antioxidant properties of unconventional leafy vegetables, *Dregea volubilis* and *Costus speciosus*

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Antioxidant properties of leafy vegetables consumed in other countries have been reported but those of unconventional leafy vegetables consumed in Sri Lanka are not reported. Further, studies on antioxidant properties are mainly on those of raw leafy vegetables. The present study reports the antioxidant properties of two unconventional leafy vegetables namely *Dregea volubilis* (Sinh. Kiri aguna) and *Costus speciosus* (Sinh. Thebu)

Antioxidant properties with respect to total phenol

content, flavonoids, reducing power, total antioxidant capacity and radical scavenging activity were determined by using Folin Ciocalteus reagent, aluminum chloride, reduction of potassium ferricyanide, molybdenum (VI) and DPPH radical scavenging activity respectively. The antioxidant properties were studied on the fresh leaves, those stored in a refrigerator at 4°C for three days and the leaves cooked as salad (Sinh. Mallum) before and after refrigeration. Analysis was carried out in quintuplet

and for each analysis pooled out leaves from five bundles was used. The results were statistically analyzed by MINITAB – one way ANOVA and Tuckey's pairwise comparison ($p < 0.05$).

Content (edible leaves) of phenol (mg/100g catechin equivalents), flavonoids (mg/100g catechin equivalents), reducing power (mg/100g ascorbic acid equivalents), DPPH radical scavenging activity (mg/100g ascorbic acid equivalents), total antioxidant capacity (mg/100g ascorbic acid equivalents) for the raw *D. volubilis* leaves were 801.4 ± 7.0 , 714.2 ± 4.5 , 363.7 ± 4.0 , 22.0 ± 2.2 and 98.0 ± 0.9 respectively while those of *C. speciosus* were 354.1 ± 4.1 , 291.2 ± 2.4 , 161.6 ± 3.1 , 22.1 ± 0.3 and 66.8 ± 0.3 respectively, indicating that *D. volubilis* have better antioxidant properties than *C. speciosus*.

Percentage decrease in the content of total phenol,

flavonoids, reducing power, total antioxidant capacity and radical scavenging activity of refrigerated, cooked without refrigeration and after refrigeration were respectively 9.1, 33.6, 40.7; 28.3, 32.7, 35.3; 6.7, 24.4, 27.7; 7.3, 91.8, 94.1; 36.2, 79.6, 81.6 for *D. volubilis* while those for *C. speciosus* were 6.4, 10.4, 16.0; 5.9, 15.5, 19.3; 8.8, 70.0, 78.2; 6.3, 82.4, 86.4 and 2.8, 75.7, 78.1.

Hence, fresh leafy vegetables have to be eaten raw to obtain the maximum benefit from the antioxidant activity as storage under refrigeration as well as cooking results in the deterioration of compounds responsible for antioxidant activity. Further, it was observed that it is advantageous to consume leafy vegetables mixed with spices (*i.e.* mallum) as the antioxidant activity of the ingredients used enhances the total activity of the salad consumed.

Technical Sessions : A - 07

A new branched fatty acid from insecticidal Sri Lankan isolate of *Hirsutella thompsonii*

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Mosquito larvicidal activity of *Hirsutella thompsonii* was identified against *Culex quinquefasciatus* and *Aedes aegypti*. Previous studies have led to the isolation and characterization of bioactive compounds from *Hirsutella* including cyclohexadepsipeptide, Hirsutellide A, Hirsutellones, phomalactone, Hirsutellin A and Cytochalasin Q. The objective of this study was to identify and characterize chemical compounds from mosquito larvicidal active extracts of *H. thompsonii*.

Ethyl acetate extract of mycelium obtained from broth culturing in Beer-must, sugar media exhibited high larvicidal activity against *Cx. quinquefasciatus* and *Ae. aegypti*. Column chromatography of ethyl acetate extract followed by recrystallization led to the isolation of compound **1** (54.3 mg) in 6.19% yield.

¹³CNMR and DEPT spectral data revealed that compound **1** contained 63 carbons which were identified as 3 methyl, 60 methylene, 2 methine and 2 quaternary carbons. The integrations of ¹HNMR spectrum showed that 131 protons were present in six different chemical environments. The ¹HNMR spectrum showed olefinic proton at δ 5.32 (H-15 and H-16, $J = 1.5$, m). The DEPT spectra supported for 2 olefinic carbons at δ 130.0 (C-15) and 129.7 (C-16). The HMQC spectral data supported the connection of protons at 5.32 with carbons at 130.0 (C-15) and 129.7 (C-16). The peaks at 29.7 and 29.6 were assigned to C-14 and C-17 carbons and this was

supported by HMBC and HMQC couplings.

A quartet at δ 1.9 in ¹HNMR spectrum was assigned to protons of C-14 and C-17 carbons.

The integration of the signal at δ 0.86 in ¹HNMR spectrum accounts for 9 methyl protons, suggesting presence of three methyl groups. The ¹³C and DEPT spectrums showed, signals at δ 14.1 confirming the methyl carbons at C-39, C-52 and C-63. The HMBC spectrum indicated the coupling of methyl signal at 0.86 to the carbons at 22.6 (C-51) and 31.9 (C-50). Direct couplings between protons at 0.86, 1.23 and 1.27 with carbons at 14.0 (C-52), 22.6 (C-51) and 31.9 (C-50), respectively were observed in HMQC spectrum. The multiplicity of methyl protons at 0.86 (t) suggested that these are attached to CH₂ carbon. The ¹³CNMR signal at 29.6 (C-27) in DEPT spectrum indicated the existence of a quaternary carbon and HMBC correlations confirmed its attachment to three CH₂ groups.

The ¹³CNMR and DEPT spectra denoted a quaternary carbon at 179.5 (C-1) suggesting a presence of carbonyl group and its location was confirmed from the HMBC and HMQC correlation from protons at 2.3 to C-1 and C-2 and 1.6 to C-2 and C-1. The ¹H-¹H COSY spectral data confirmed this fragment *i.e.* vicinal coupling of the C-2 methylene protons at 2.3 with those at 1.6. A well define triplet in ¹HNMR spectrum of the molecule at δ 2.3 further confirmed the connection of C-2 to C-3 carbons.

Presence of methylene carbons at C-3 to C-13, C-18 to C-26, C-28 to C-38, C-40 to C-51 and C-53 to C-62 were well supported by bunch of proton signals at δ 1.2 – 1.26 and carbon signals at δ 22 – 30 and their connectivities by HMQC and HMBC spectrums.

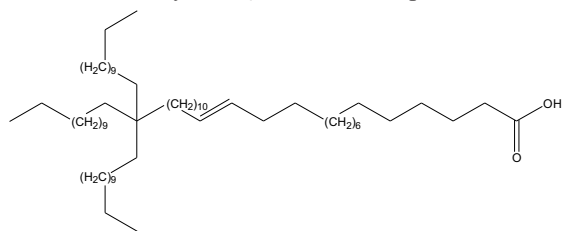


Figure 1: Structure of compound **1**

The HMBC spectrum was used to build the final

structure by connecting the partial fragments. Comparison of the ^1H , ^{13}C , COSY, HMQC and HMBC spectral data of *cis*-15-tetracosenoic acid (SDBS No.1679HSP-49-776) with those of compound **1** showed that spectral data of compound **1** has a close resemblance with those of *cis*-15-tetracosenoic acid except for the signals due to quaternary carbon. Based on all spectral information the structure of compound **1** was proposed as (E)-27,27-didodecylnonatriacont-15-enoic acid with the chemical formula of $\text{C}_{63}\text{H}_{124}\text{O}_2$.

Technical Sessions : A - 08

Comparative study of the antioxidant properties of *Armillaria sp.* (edible wild mushroom) with the cultivated mushroom *Pleuterous sp.*

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Mushrooms are considered to be a good source of phenolic antioxidants. In Sri Lanka a large number of edible mushrooms are found. These are consumed by rural people. The antioxidant properties of mushrooms grown in other countries such as Portugal, India and Italy have been studied but not on the wild mushrooms grown in Sri Lanka. The present study compares the antioxidant properties of the wild edible mushroom *Armillaria sp.* with those of the cultivated *Pleuterous sp.*

Antioxidant properties of the methanolic extract with respect to content of total phenol content, free phenol, flavonoids, reducing power, total antioxidant capacity and radical scavenging activity were determined by using Folin Ciocalteus reagent, aluminum chloride, reduction of potassium ferricyanide, molybdenum (VI) and DPPH radical scavenging activity respectively. The total phenol content was determined using a refluxed methanolic-HCl extract. Analysis was carried out in quintuplet and for each analysis pooled out leaves from five bundles

was used. The results were statistically analyzed by MINITAB – one way ANOVA and Tuckey's pairwise comparison ($p < 0.05$).

The results of the present study indicated that *Armillaria sp.* had a high content of free phenol (53.8 ± 3.0 mg/ 100 g catechin equivalents) and total phenol (160 ± 7.3 g/ 100 g catechin equivalents), flavonoids (98.9 ± 8.5 mg/ 100 g catechin equivalents) than *Pleuterous sp.* where free phenol content was 11.5 ± 0.2 mg/ 100 g and total phenol content was 30 ± 0.4 g/ 100 g and flavonoid content (47.0 ± 2.4 mg/ 100 g). Reducing power (64.9 ± 1.0 as ascorbic acid equivalents), DPPH radical scavenging power (13.1 ± 0.1 mg/ 100 g as ascorbic acid equivalents) and antioxidant capacity (93.3 ± 5.9 mg/ 100 g as ascorbic acid equivalents) as measured using Mo(VI) were higher in *Armillaria sp.* than those in *Pleutoroius sp.* The results of the present study show that the wild edible mushroom, *Armillaria sp.* is a better source of antioxidant than *Pleuterous sp.* and is a good source of antioxidant for rural population of Sri Lanka.

Comparison of the antioxidant potential of a cup of instant black tea to an organoleptically equivalent cup of brewed black tea

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There is a growing interest in dietary health supplements, and tea can be an important source of dietary antioxidants, with its associated health benefits such as reduced risk of cardiovascular disease and cancer. Instant tea is becoming increasingly popular as a beverage. The manufacturing processes for instant tea could bring about chemical changes in tea, and possibly reduce its health giving properties.

The concentration of a hot solution of instant tea powder which is organoleptically equivalent to a standard cup of brewed tea (ISO 3103) was determined by a thirty member sensory panel. The characteristics chosen were strength, flavour, colour, brightness and overall acceptability. The total phenols and total flavonoids contents of the equivalent instant and brewed tea beverages were determined using the Folin Ciocalteu assay and the aluminium chloride colorimetric assay respectively. The antioxidant potential of the two tea beverages were determined by the scavenging of the 2,2-diphenyl-1-picrylhydrazyl radical.

A brewed tea beverage prepared by steeping 2 g of black tea in 200 ml of freshly boiled water for 3 minutes was found to be organoleptically equivalent to a beverage of instant tea prepared by dissolving 0.30 g of

instant tea in freshly boiled water. The total phenols and total flavonoids contents of a cup (140 ml) of instant tea (105.7 ± 0.7 mg Gallic acid equivalents (GAE) and 8.5 ± 0.8 mg Quercetin equivalents (QE) respectively) were found to be much lower than those of a cup of organoleptically equivalent brewed tea (265.0 ± 3.8 GAE and 30.0 ± 0.4 mg QE respectively). However, the values obtained for the antioxidant potential (% DPPH scavenged) of brewed and instant tea were very similar (89.7 ± 0.1 and 88.7 ± 0.3 respectively). This is an unexpected finding implying that instant tea contains substances other than phenolics and flavonoids possessing radical scavenging activity. These could be transformation products of phenolics and flavonoids generated during the process of manufacturing instant tea which includes an alkaline oxidation step. The implication of this finding for the *in vivo* anti oxidant potential of instant tea, and the chemical changes that take place during the manufacture of instant tea, merit detailed investigation.

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Chemical and microbial analysis of municipal drinking water from various regions of greater Colombo area

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Clean drinking or potable water is a basic human need. Therefore the quality of drinking water is a powerful environmental determinant of health and the assurance of drinking water safety is a foundation for the prevention of water borne diseases.

Colombo is the largest city of Sri Lanka. Municipal drinking water made available in Greater Colombo is obtained from precious natural resources after subjecting to various water treatment processes.

According to our literature review, there has been no published report concerning the heavy metals, bacteria and other possible contaminants in municipal water for Greater Colombo area in the recent past. Hence this study was undertaken to assess important chemical and microbiological parameters from various locations of Greater Colombo area. The chemical parameters investigated were Pb, Cd, Ni, Cr, Mn (heavy metals), K, Na, Fe, and Mg and microbiological parameters were

coliform and *Escherichia coli*. In each location the municipal water was collected on three different days at regular intervals. The sampling for cation analysis and microbial analysis was carried out separately.

The parametric values were set in accordance with the World Health Organization guidelines for drinking water quality and Sri Lanka standard. The chemical analysis was performed by Atomic Absorption Spectroscopy (GBC 933AA) equipped with graphite furnace (GBC GF3000) and auto sampler (GBC PAL 3000). The microbiological analysis was performed by using the multiple-tube fermentation (MTF) technique.

Among the 49 samples which were collected for

microbiological analysis from 7 areas in Greater Colombo, 11 samples were contaminated with *coliform* with levels not exceeding the maximum amount as stipulated in SLS guidelines (specification for potable water, bacteriological requirement SLS 614: part 2, 1983) one sample was contaminated with fecal matter (*E.coli*). The concentrations, obtained for heavy metals and some other ions from the 21 samples which were collected from 7 areas from Greater Colombo, were below both the health based guideline of WHO and SLS. Considering all of these experimental results, it can be concluded that, the majority of municipal water available is suitable for drinking based on the parameters tested.

Technical Sessions : A - 11

Determination of Copper(II) by EDTA titrimetry using a seed extract of *Areca catechu* as a metallochromic indicator

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An indicator used in complexometry (EDTA titrimetry¹) exhibits a complex formation with the metal ion of interest associated with a shift in the wavelength of maximum absorption² of the indicator. Based on the fact, the properties of the indicator (the *Areca catechu* / Areca nut seed extracts); the acid dissociation constant (K_{in}) and the formation constant of the metal indicator complex (K_{Min}) were determined mainly by absorption spectroscopic data and colour changes observed during the process.

The behaviour of the pigment of the seed extract of *Areca catechu* under different pH conditions was examined and the acid dissociation constant (K_{in}) of the *Areca catechu* pigment was determined to be $2.512 \times 10^{-9} \text{ mol dm}^{-3}$. The complex forming ability of the *Areca catechu* pigment with Cu^{2+} ions was investigated and it was revealed that *Areca catechu* pigment extracts exhibited complex formation with Cu^{2+} ions at pH 9.5. The conditions of employing *Areca catechu* as an indicator in EDTA titrimetry were optimized until a sharp end point³ was obtained. The *Areca catechu* extracts exhibited a sharp end point colour change from bluish violet to yellowish green in the titration of Cu^{2+} with EDTA.

The stoichiometry of Cu^{2+} and *Areca catechu* pigment was determined as 1:1 and the stability constant (K_{Min}) of the Cu^{2+} - indicator complex was calculated to be $1.92 \times 10^{14} \text{ mol}^{-1} \text{ dm}^3$ using mole ratio method^{4,5} and Jobs method⁶. Finally the interferences from foreign metal ions such as Ca^{2+} , Co^{2+} , Fe^{2+} , Fe^{3+} , Mg^{2+} , Mn^{2+} , and Ni^{2+} were investigated in the use of *Areca catechu* pigment as a metallochromic indicator

in Cu^{2+} - EDTA titrations. The Fe^{2+} and Fe^{3+} ions did not interfere at pH 9.5. The tolerance limits for metal ions; Ca^{2+} , Co^{2+} , Mg^{2+} , Mn^{2+} , and Ni^{2+} generally exceed 1: 100 molar ratio of foreign metal ion to Cu^{2+} ion. The interference from Ca^{2+} and Mg^{2+} ions were masked by adding excess F^- and CO_3^{2-} ions respectively to the medium.

Acknowledgement:

Authors wish to thank the Department of Chemistry, University of Colombo for facilitating with Laboratory space, chemicals and equipment.

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Technical Sessions : A - 12

Development of a colorimetric method to determine iron(III) in water using ethyl acetoacetate

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A new colorimetric method for the determination of ferric ions using ethyl acetoacetate as the ligand is described. It forms a red complex with ferric ions with an absorption maximum in the UV-Visible spectrum 490 nm with a molar extinction coefficient estimated to be 1850 L mol⁻¹ cm⁻¹. The interference of several anions that are likely to be present in natural water was determined. Accordingly, anions investigated such as nitrate, sulphate, carbonate, bicarbonate, and nitrite did not interfere but chloride, fluoride, phosphate and

hydroxide do. The temperature dependence of the absorbance of this complex was determined over a temperature range 18 °C to 40 °C and the results show that there is no significant effect of temperature on this method. The calibration plot for the complex showed that Beer Lambert's law is obeyed with linearity R₂ of 0.9993. The minimum and the maximum detection limit under experimental conditions of the method are 6 ppm and 30 ppm respectively.

Technical Sessions : A - 13

Alkaline lipase from rubber seed kernel: Its stability and fatty soil cleaning efficiency under various storage conditions.

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Lipases (triacyl glycerol acyl hydrolases EC 3.1.1.3) constitute a group of enzymes defined as carboxyesterase which hydrolyse long chain acylglycerols at the lipid water interface. Lipases occur mainly among bacteria, fungi, plants and animals. In addition to playing an important role in fat metabolism, lipases have been found to have numerous applications in food, cosmetics, detergent, and pharmaceutical industries. In detergent industry lipases are used as lipid stain digesters.

Removal of fatty soiling of textile fabrics is a major problem, in detergent industry. Current cleaning method which involves the saponification at high temperature cost energy and affects the wear and tear of textile fibers. In this regard, lipase preparations which are active at ambient temperatures and compatible with detergent formulations, appear to be more effective, economical and safer to use in detergent industry.

One such enzyme was extracted from rubber seed kernel (*Havea brasiliensis*) and partially purified by fractionating with (NH₄)₂SO₄. Enzyme was purified up to 3.06 fold with 67 % recovery. Only half of the enzyme fraction was freeze dried and other half left as it is. (without freeze drying) Portion of the freeze dried fraction was stored at 4 °C and other portion stored at room temperature. Similarly portion of the unfreeze dried fraction (fraction which left without freeze

drying) was stored at 4 °C and rest of the unfreeze dried fraction was stored at room temperature. Stability and fatty soil cleaning efficiency of the all 4 enzyme fractions (freeze dried and unfreeze dried fractions stored at 4 °C and room temperature) were tested for a period of 24 weeks.

Enzyme samples stored at room temperature maintain its lipase activity and 100 % cleaning efficiency up to 16 weeks. Beyond that time limit, enzyme activity and fatty soil cleaning efficiency was found to be very poor. Lipase samples stored at 4 °C were remained active and maintained 100 % cleaning efficiency even at the 24th week. Stability and fatty soil cleaning efficiency of freeze-dried and unfreeze-dried sample behave similarly implying freeze-drying doesn't make any positive or negative contribution to the stability or to the cleaning efficiency of the enzyme. Finally, freeze dried and unfreeze dried enzyme fractions stored at 4 °C were more stable than the fractions stored at room temperature and maintained 100 % cleaning efficiency even at the 24th week. These findings suggest lipase preparations of rubber seed kernel can be safely stored at room temperature at least for 4 months and exhibit requisite life span for use as a potential additive in detergent formulations.

The efficacy of essential oil of *Plectranthus zeylanicus* plant against *Callosobruchus maculatus* (F.)

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The bruchid, *Callosobruchus maculatus* (F.) causes major losses during the storage of cowpea seeds [*Vigna unguiculata* (L.)Walp.] in Sri Lanka. Essential oil isolated from *Plectranthus zeylanicus* plant was tested for potential insecticidal activity against *C. maculatus*. The major constituents of the essential oil of *P.zeylanicus*, p - cymene (3.55%), β caryophyllene (0.24%), geranyl acetate (9.3%), and geraniol (7.2%) were identified by the retention time in gas chromatography studies. The adults of *C. maculatus* were susceptible to both fumigant and contact toxicity of *P. zeylanicus* plant oil. In the fumigant toxicity assay LC_{50} value of 0.927g/L was obtained. LC_{50} value of 0.010g/L was obtained for the contact toxicity of *P.*

zeylanicus plant oil. Oviposition and F_1 adult emergence were significantly inhibited by *P. zeylanicus* plant oil at concentration higher than 0.001g/L in both contact toxicity and fumigant toxicity. The analysis of olfactometer bioassay and choice chamber bioassay revealed the repellent effects of the oil of *P. zeylanicus* plant. Oil repelled adult *C. maculatus*, making more bruchids to found in the control bottles than oil treatments. The results obtained for control and ethanol in olfactometer bioassay were not significantly different from each other indicating that the use of ethanol has no effect on insect repellency.

Aspartic protease inhibitory activity of *Ancardium occidentale*

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Natural inhibitors of serine, cysteine and metalloproteinases have been isolated from plants, animals and bacteria and characterized. However, relatively few studies have been reported on natural inhibitors of aspartic proteinases. Aspartic proteinases participate in a variety of physiological processes and their activities are associated with onset of pathological conditions such as hypertension, inflammation and gastric ulcers. Recently aspartic proteinases have become enormously important since two aspartic proteinases, human immunodeficiency virus proteinase and malarial parasite proteinase are targeted as key therapeutic intervention points in the treatment of AIDS and malaria, respectively.

Ten grams of bark of *Ancardium occidentale* was chopped using a mortar and pestle and dissolved in 50 ml of distilled water. Inhibitory assay was carried out by incubating the enzyme with crude extract and determining the remaining activity. Porcine pepsin and denatured bovine hemoglobin were used as the aspartic proteinase and substrate, respectively. Thermal stability of the inhibitor in crude extract was studied by incubating the extract at different temperatures and determining the remaining activity. DEAE cellulose,

CM cellulose and $(NH_4)_2SO_4$ precipitation were used to partially purify the inhibitor.

Significant inhibitory activity (60%) was detected in water extracts of the *A.occidentale* bark. The activity did not change significantly during incubation at 4°C for 2 weeks. But the activity drastically reduced when incubated at room temperature and 37°C for 2 weeks. More than 80% of the inhibitory activity of the crude extract was recovered after dialysis using membranes with a 12 kDa molecular weight cut off point. Considerable inhibitory activity was not obtained for eluted fractions for DEAE cellulose and CM cellulose columns. Ammonium sulfate at 10% -70% saturation resulted in precipitation of inhibitor/s. The stability of resultant inhibitor precipitated at 70% $(NH_4)_2SO_4$ saturation is comparable to that of crude extract.

This assay procedure provided the quantitative measurement of the inhibitory activity for the inhibitor/s present in the bark extract. More than 80% remaining inhibitory activity was retained after complete dialysis with the 12 kDa membrane. This implies that inhibitor/s present in the sample is/are macromolecule/s presumably a protein/s with a

molecular mass greater than 12 kDa. The thermal stability of crude extract and partially purified inhibitor by 70% ammonium sulfate precipitation was similar at 4°C. The low stability at temperatures beyond 4°C and the dialysis experiment strongly support the

proteinaceous nature of the inhibitor/s present in the bark extract of *A. occidentale*. Further purification is necessary in order to characterize and elucidate the structure of the inhibitor/s.

Technical Sessions : A - 16

Mononuclear aromatic compounds from lichen are potent urease inhibitors

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Activity of urease (urea amidohydrolase) has been shown to be an important virulence determinant in the pathogenesis of many clinical conditions, which are detrimental for human and animal health as well as for agriculture.

Lichens have a prolonged history of being used as medicinal herbs. In traditional medicine of Iceland a lichen *Cetaria islandica* is used to treat gastro intestinal ailments.

Various phenolic compounds have been reported to show urease inhibitory activities. Lichens are a rich source of phenolic compounds. However urease inhibitory activity of these phenolic compounds has not been investigated. Thus the aim of this study was to isolate the phenolic compound from lichens and test their urease inhibitory activity. Several mononuclear phenolic compounds were isolated from the lichen *Parmotrema grayana* and *Roccella montagnei*. The isolated compounds ((1)-(6); figure 1) were screened for in-vitro urease inhibitory activity.

The reaction mixture comprised of urease enzyme 1 unit (E.C. 3.5.1.5) (*Bacillus pasteurii*), the substrate urea (55 µl, 100 mM), and test compounds (5 µl, 1 mM). Ammonia production due to the urease activity was

measured by the indophenol method. Upon addition of phenol reagent (phenol and sodium nitropruside) and alkali reagent (NaOH and NaOCl), the increase in absorbance at 630 nm was measured. Thiourea was used as the positive control.

Interestingly, all the simple aromatic compounds namely orcinol (1), orsellinic acid (2), methyl orsellinate (3), methyl haematommate (4), methyl-β-orcinol carboxylate (5), and montagnetol (6), showed very good inhibition against the enzyme urease when compared to the standard thiourea which showed IC₅₀ value of 21.0 ± 0.01. The mononuclear aromatic compound orsellinic acid (2) had an IC₅₀ value of 4.5 ± 0.14, which was several fold lower than the standard whereas, IC₅₀ value of orcinol (1) was 11.2 ± 0.2 and of methyl -β-orcinol carboxylate (5) was 14.5 ± 0.4, which were almost half of the standard thiourea.

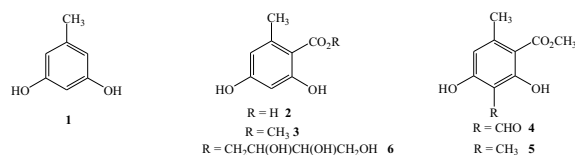


Figure 1. Structures of compounds which showed potent urease inhibitory activity

Technical Sessions : A - 17

A preliminary study on the oral hypoglycaemic activity and dose dependence of a decoction of *Munronia pinnata*.

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The decoction preparation (*kwatha kalpana*) is a widely used medicinal preparation in the ayurvedic medical system in Sri Lanka and detailed descriptions are present in all *samhithas* regarding its preparation, amount of water, reduction in volume of liquid etc. Though *Munronia pinnata* (*Meliaceae*) is not described in the ayurvedic textbooks, ayurvedic and traditional

physicians have been using this plant as a powder and decoction for fever, dysentery, diabetes and skin diseases, as a substitute for *Swertia chirata*, Family – Gentianaceae which is not available in Sri Lanka and at the same time is prohibited to be imported from India.

A study was conducted at the Department of Biochemistry and the Animal House of the University

of Sri Jayewardenepura to determine the oral hypoglycaemic activity of a decoction of *Munronia pinnata* and to study the dose dependence. Ethical clearance was obtained from the Ethics Committee (No 474/09).

The decoction was prepared according to conventional (D_1) method using the '*patha ata eketa sindaweema*' (reduction of eight volumes to one) with collected *Munronia pinnata* whole plants. To determine whether the decoctions possesses any hypoglycaemic effect, healthy adult male Wistar rats, 8 weeks of age and weighing 150.0 -225.0 g were divided randomly into Test and Control groups (n = 8 in each). Test group was given 2.5 ml of the D_1 at a dose of 1.0 g/kg body weight as a single dose orally via a Sondi needle. The animal dose corresponded to the normal therapeutic dose administered to adult humans as calculated on the basis of relative surface areas of humans and rats (Paget, 1996). The control group was given distilled water (2.5 ml each). A solution of glucose (3 g / kg) was administered after ½ h and blood was drawn after 90 minutes and the serum glucose concentration was measured by the glucose-oxidase method. **To determine the dose dependence effect of D_1 , on the blood glucose level in the Healthy rats, four different doses were selected as a single dose (0.64 g, 0.96 g, 1.28 g, 1.6 g per kg) for the dose curve.** Rats were randomly divided into five groups named Control, Test 1, 2, 3 and 4. The same protocol described above was followed for the Test and Control groups and serum glucose concentrations were determined.

The results were analyzed in the Microsoft Excel

and $p < 0.05$ was considered as statistically significant.

The mean serum glucose concentration in the Test group was 4.5 mmol /L and it was 6.4 mmol / L in the Control group, when the decoction was given at a dose of 1 g/ kg. There was a 24.8 % ($p < 0.0003$) reduction in the glucose concentration of Test group compared to the Control group.

In the dose curve study, serum glucose levels in the Test groups 1, 2, 3 and 4 respectively were 5.8 ± 0.56 , 5.3 ± 0.22 , 4.9 ± 0.59 and 4.4 ± 0.47 mmol/ L. The serum glucose concentration of control group was 6.7 ± 0.67 . It was noted that all the tested doses except the dose of 0.64 g/ kg showed a statistically significant reduction ($p < 0.01$) in the serum glucose concentration levels compared with control group. The highest percentage reduction (34.0 %) in the serum glucose concentration was given by the dose of 1.6 g per kg.

The results indicate that the decoction prepared by the conventional method exerts oral hypoglycaemic activity in healthy Wistar rats. The hypoglycaemic effect increases in a dose-dependent manner. Further studies are being done to determine the effect in diabetic rats.

Acknowledgement: Financial assistance from the University Grant Commission, Sri Lanka Research Grant -2008 (UGC/ICD/045).

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International Conference on Chemical Sciences, 20-22 June 2012 at Waters' Edge at Battaramulla & SLFI, Colombo

The major aim of the conference will be to discuss how chemistry meets the global challenges of clean air, safe water, healthy food, dependable medicine from plants, and how chemical education imparted to our students achieve the UN millennium development goals. The conference will, therefore, bring together chemists, environmentalists, food scientists, educationists and other scientists on a common platform to exchange ideas and discuss the role of chemistry research in national development. For more details and dates for submission of abstracts, please see the conference bulletin number 1 at the Institute web site: www.ichemc.com. Leading Sri Lankan expatriate chemists and well-known overseas and local chemistry researchers will deliver keynote addresses.

A highlight of this conference will be the poster sessions which will attract prizes for the best posters.

For more details, write to Dr Ms Lakshmi Arambewela (Secretary/Conference Secretariat, Adamantane House, 341/22 Kotte Road Rajagiriya) (email: lakshmi.arambewela@gmail.com).

Avurudu Asiriya - Cultural Programme on April 3



Mr. N M S Hettigedara, Chairman B/C delivering welcome address



Aluth awurudhu food table



Ladies from Police cultural team playing Raban



Performance of Lionel Ranwala Cultural Foundation





NATURAL GINGER BEER FROM SRI LANKA



ALL ISLAND INTERSCHOOL CHEMISTRY QUIZ CONTEST-2010/2011

The preliminary written paper of the All Island Interschool Chemistry Quiz contest 2010/2011 was held on 13th November 2010 for year 13 students. Second round of the competition was held at the Adamantane House on 21st January 2011. Four (4) schools were selected for the final round which was held on 27th January at BMICH during CHEMEX 2011 exhibition and trade fair.

The results of the All Island Interschool Chemistry Quiz contest are as follows. The Prizes and trophies for winners will be awarded at the 40th Annual Sessions of the Institute of Chemistry Ceylon which will be held on 16th June 2011 at the Sri Lanka Foundation Institute.

Best Student in Each Province (Based on Preliminary Written Paper)

Province	Name	School
Western Province	L.H.P. Kodithuwakku	Royal College, Colombo 07
Central Province	N.M. Herath	Trinity College, Kandy
Southern Province	Sandamali K. Arachchige	G/ Southlands College, Galle
	Malinda Gunawardena	G/ Southlands College, Galle
Sabaragamuwa Province	M.M.M. Rizmy	KG/MW/Zahira College, Mawanalla
North Western Province	I. Ihsana	P/Presidents Science College, Puttalam
Uva Province	V.P. Hewageegana	B/Bandarawela M.M.V. Bandarawela
Eastern Province	M.N. Fathima Sumaliya	KM/Maruthamunai Shams Central College, Kalmunai
Northern Province	Tharmakul Asingam Nissanthan	J/Hartly College, Jaffna

Best Individual Performances (Based on Preliminary Written Paper)

First	Tharmakul Asingam Nissanthan	J/Hartly College Jaffna
Second	L.H.P. Kodithuwakku	Royal College, Colombo 07
	E.M.S. Dharshani Ekanayaka	Maliyadeva Balika Vidyalaya, Kurunegala
Third	D.J. Senarathya	Ananda College, Colombo 10
	Sandamali K. Arachchige	G/Southlands College, Galle
	Malinda Gunawardena	G/Southlands College, Galle
	Aranee Balasundaram	J/Vembadi Girls High School, Jaffna

Winners :	Challenge Shield Donated by Mr N M S Hettigedara	Royal College, Colombo 07
	L.H.P. Kodithuwakku	N.M. Senevirathna
	H.U. Illangakoon	R.S. Kodithuwakku
	H.P.B. Gunawardhana	M.N.M. Afsar

1st Runners up:	Challenge Shield Donated by Link Natural Products Ltd	Ananda College, Colombo 10
	D.J. Senarathya	G.P. Jayasiri
	C.M. Singhabahu	D.S. Saputhanthri
	A.D.R. Janasinghe	C.T.W. Malwipathirana

Seventh Convocation of the College of Chemical Sciences

Convocation Address

How we promote Chemistry to a public audience

Dr. Neville Reed, *BSc (Leicester), PhD.(Oxon), C Chem., C Sci.,
FRSC, Managing Director, Science, Education, Industry, Royal Society of Chemistry*



It is a great privilege to be here today and I am honoured to address the 7th Annual Convocation of the College of Chemical Sciences of the Institute of Chemistry, Ceylon.

Over the past twenty years I have been to Sri Lanka on several occasions, three times on business and, after my first business trip, I returned for a fabulous holiday that I will never forget. This is a beautiful country, with such friendly people and an exciting future.

The Royal Society of Chemistry (RSC) is proud of its association with the Institute of Chemistry Ceylon. For over 30 years the RSC has supported the Institute's examinations and through the local members of the RSC, we have worked together to support the promotion and appreciation of chemistry in this country and beyond.

The RSC shares in your pride at the achievement of your students in Sri Lanka and across the world. It is a great tribute to so many people, some of which are with us today in this room, that the Institute has grown in size and stature, with its own building in such a relatively short space of time. I pay tribute to the vision of those present at the start of this endeavour and can see that their expectations have been matched by the achievements to date and it is incumbent on everyone in this room to ensure the continued success of the venture.

On behalf of the RSC's President, David Phillips, the RSC's Council, staff and our 47 000 members, I am delighted to bring you greetings and our congratulations on your achievements. We look forward to each of you contributing to the development of chemistry and the associated sciences in the years ahead. And for those who will stop the study of chemistry at this point you will find that what you have learnt will serve you well in whatever role you finally choose and, of course, I am sure that you will always maintain your interest in the subject – and promote chemistry and its study and appreciation whenever possible.

This is a special year for the global chemistry community. 2011 is the UN International Year of Chemistry. It is a great opportunity for the chemistry community to showcase our subject in our own locality, our country, our region and, of course, to work together globally.

All of us in this room know what a great subject chemistry is. We know that chemistry lies at the heart of solving the great environmental issues that we face. It will be chemistry and its application that will address the many diseases that afflict people across the world. And it will be the results of chemistry that will ensure water quality and a secure food supply for the global population. It will be chemistry that will improve the quality of our lives and drive prosperity – however we chose to measure it.

But in a few countries, some people have forgotten the importance of chemistry or science in general. It may be that the local chemistry community has not reminded people enough. Some key influencers – politicians, civil servants, teachers, business leaders – to name some groups, may not have listened well enough, or have been persuaded that science is not important. If this was the case, the recent global discussions on climate change will have reminded people of how important science is.

The importance of our science is not forgotten in every country. From a UK perspective I was interested to read of a study that showed that interest in science (and as it happens, engineering) at school was inversely proportional to the GDP of that country – while the popularity of science itself remains high. Students in countries with a lower GDP value pursue careers in science more than students in countries with a higher GDP. Maybe this shows that higher GDP countries school students are dismissing the importance of science in some way and many of us are trying to address this issue with activities aimed at schools and the public, as well as targeting the key influencers in our country or group of countries.

What I would like to do now is share with you some of the work that the RSC has done in the media to promote chemistry. The RSC has tried lots of things to capture the public interest – promoting science, culture and many fun things. It may come across as 'light hearted' but the RSC is very careful to strike the 'right' balance between serious matters and fun. We measure our success in many ways – including the monetary value of buying the same media coverage.

I was delighted to see reports of your activities to celebrate the International Year of Chemistry here in Sri Lanka. Your proposed stamp to celebrate the International Year of Chemistry was a great idea and

something that we found almost impossible to do in the UK – in fact it was impossible, perhaps that says something about the challenge that we face! And I have, with pride, your calendar on the wall in my office.

As part of the global chemistry community everyone has a role to play in promoting our profession and our subject. We must continually remind ourselves that as chemists we must conduct ourselves appropriately at all times. We must treat others with respect and be dignified in all of our actions. We must carry out our duties to the best of our abilities; do them safely, with respect for the environment and society at large. We must strive to represent our results and findings in a clear communicable way so others can repeat our work or understand its implications, even if they are not scientists. We must uphold the highest professional standards and be ethical at all times.

We must also spend some time giving something back to the system that has produced us. This means that we should look to help teach and encourage the next generation. We should help develop the chemistry profession by talking about what we do and why we do it. We should support organisations such as the

Institute of Chemistry Ceylon to ensure that it can continue its work for the next generation. Membership of your Professional Body is really important - it shows your commitment to professional values and the upholding of standards, and the desire to nurture the current and future generation of chemists.

In this year, the International Year of Chemistry, we should make a special effort to ensure that the maximum number of people possible know that chemistry is important to every aspect of our daily lives. That it is a fun subject although it can be a challenging subject at times. But as you have shown by your recent achievements chemistry is always rewarding.

I salute your achievements and I congratulate each and every one of you on your success. You are a member of a great Sri Lankan institution which I know will share in your personal successes and continue to support chemistry in this wonderful country. Now that you all belong to the global chemistry community, I hope that you continue to be successful and that every one of you fulfils your potential in your chosen career.

(The report of the Honorary Dean/CCS presented at the 7th Convocation held at Galadari Colombo on 24.02.2011)

Another year of progress in professional chemical education leads the College into the International Year of Chemistry - 2011



It is with an ever increasing sense of accomplishment, pride and satisfaction that I present to you the Annual Report of our work subsequent to the Sixth Convocation held on 22nd January 2011 at Hilton Colombo.

May I at the very outset thank all my academic colleagues and staff for their very kind support and assistance which has enabled our forward march as we entered the International Year of Chemistry.

Graudateship Programme in Chemistry

This flag bearer educational programme has continued to make immense progress over the past year. The 28th batch of 75 Graduate Chemists who are passing out at today's convocation includes 70 first timers who entered the programme four years ago in 2006. This number exceeds last year's record first time output of 57 Graduate Chemists. This batch has had an increased number of optional courses available for study, an increase made possible by conducting additional courses on week days as well. While our total output

over 28 batches has increased to 739, the annual average output over the four year period (2007-2010) has increased from around 50 almost 70.

It has indeed being our joy and pleasure to observe our students involved in their studies and numerous other extra curricular activities at Adamantane House on practically every day of the year. Week-day practical classes are now conducted much more frequently while some final year students involve themselves on research studies throughout the week.

A record number of 171 new students registered as the 33rd intake and had the ceremonial inauguration on the 16th of January with retired Government Analyst Mr. E.G. Somapala present as Chief Guest. Pressure to join the programme was so intense since the release of A/L results, that we suspended all forms of advertisement in the press and elsewhere over the preceding month in order to avoid numbers increasing beyond our capacity. This unprecedented demand for admission is largely due to the well known splendid performance of most of our passed out Graduate Chemists, whether in higher education or in employment as well as the satisfactory commendation our programme obtains amongst the wider public from

our own students. The continuing popularity of our programme is also due to its low cost (even lower than that of most conventional private secondary schools in Sri Lanka) and our continued ability to complete the four year programme with no delays whatsoever. We also are able to offer lectures by a wide ranging array of expert lecturers as well as offer a number of alternative courses. We have increasing numbers of students also registering for parallel University programmes but they are able to complete such University Programmes only at least one year later. I wish to mention that children of Institute members now have their tuition fees completely waived off if they register for any of our educational programmes.

While we welcome such developments, we are increasingly constrained by the lack of adequate space in Adamantane House to cater to the needs of the two formal educational programmes we have been conducting over the past four decades. It is therefore hoped that we will soon be able to obtain buildable unoccupied land so that the problem could be ameliorated. Meanwhile steps are already in hand to construct a five storey building on part of the balance portion of land available to us at the Adamantane House premises.

The new course structure and course content which came into operation in 2005, coincidentally with our shift to Adamantane House has now been in operation for six years. A revision of the course content and perhaps the structure as well is now imperative and is under development and will come into effect from level 1 when the 34th Batch is admitted in 2012. A major change would comprise the introduction of post A/L Physics Course units (4 credits) for the basic programme at level 1 & 2.

Diploma in Laboratory Technology in Chemistry (DLTC)

Our pioneering formal education programme which commenced in 1973 still continues to be the only such middle level tertiary programme in any of the basic science areas in Sri Lanka. The 38th batch commenced the programme on November 2010 at a ceremony at which the Chief Guest was Mr NMS Hettigedera, Graduate Chemist (1991). The 36th batch who received their Diplomas today numbers 46 and has raised the total number of technicians/ technologists produced so far to 746. After a lapse of a few years, we have re-introduced specialization in the second year of their study and those who pass out today have accordingly specialized in either Industrial and Food Chemistry or Chemical Laboratory Technology. Since moving the entire programme from Aquinas College to our own premises in 2005, the average number passing

out has increased to 40 from an earlier 20; those who pass the DLTC are permitted to register for the Graduateship Programme as an alternate qualification to that of three A/L passes. Those who do well with an Honours Pass are given a concession in the tuition fees for the first two years of the Graduateship Programme.

Fourth Research Session

The Fourth Annual Research Session was held on 30th October 2010 enabling students from the 28th batch to present their research study results formally as part of their examination process. The Chief Guest on this occasion was Prof Anna Gudmundsdottir from the University of Cincinnati, USA.

Recruitment of Academic Staff to the College on a Full Time/Part Time/Contract Basis

Senior Professors

We are glad to have been able to obtain the services of **Professor H.D. Gunawardhana** as a part time Senior Professor for three days per week since he retired from the University of Colombo on 1-10-10. He will deliver the fourth inaugural Professorial Oration on Monday 14th March.

Professor S. Sotheeswaran continues on a full time basis as Senior Professor and has also assumed duties as Head of the Faculty from October 2010 in succession to Professor S. P. Deraniyagala, who completed his two year sabbatical appointment with us. Professor Dayal De Costa completed his one year sabbatical appointment with us in July 2010 but continues as Academic Laboratory Co-ordinators.

The Council has also appointed me as an Honorary Professor (with a one day per week commitment at Adamantane House) from 1-10-10.

Full Time Academics/Senior Lecturer

We are extremely happy to now have with us full time academics on contract, two of our own Graduate Chemists who passed out in 2001 and returned to Sri Lanka recently after obtaining their PhD from the University of York namely **Dr Rudran Parthipan** and **Dr Rathika Kandiah**.

Dr Vinitha Thadhani is now with us on a full time (contract) basis as Senior Lecturer. **Dr Sisira Welivegamage** who was the first academic to be appointed to the CCS in March 2005 continues as a Senior Lecturer up to date.

Accordingly, I am glad to report that there are now (at Adamantane House) seven academics of whom five are full-time. We look forward to recruiting more academic staff, both young and old, provided they are of the required quality and meet our other requirements. Salary scales of all Academic Staff were

revised substantially for the very first time with effect from 1st January 2011.

Training Seminars/Workshops Organized by the CCS

These included

- 1) Seminar on the quality of Ceylon Tea held on 26-02-2010
- 2) Seminar on Green Chemistry on 24-03-10
- 3) Seminar for A/L teachers to meet the challenges of the new Chemistry syllabus on 24-25 May 2010

Extra-Curricular Activities

Amongst the extra curricular activities conducted by the College over the past year were the **Inter Level Debating Competition** for the fourth time on 14-11-10. Level 3 was placed first with level 4 second and Level 2 second.

The **Inter University Debating Competition** conducted for the **second** time attracted five university teams which together with the CCS team participated in a very keen contest on February 2010. Colombo University emerged as winners while our CCS team tied up with University of Sri Jayawardenapura for the second place.

The **third** Inter University Debating Competition was held as part of the CHEMEX-2011 exhibition on 30.01.10. Seven Teams including the University of Jaffna participated. The University of Colombo was once again placed first followed by the University of Sri Jayawardenapura with our CCS Team and the University of Kelaniya in third place.

The Student Association conducted a number of events during the year and these included the Student Talent Quiz Aura, Fresher's Social, Sports Day, Vesak Bana & Bakthi Gee, Nawarathri Festival, Annual Christmas Party and the Blood Donation Campaign.

Recognition of two Chartered Chemists for rendering yeoman service in an honorary capacity and richly contributing to the success of the CCS (Educational) programmes in an exemplary and noteworthy manner.

Continuing with our three year old tradition to recognize such honorary services at the Annual Convocation, the Council has on the recommendation of the Academic Board decided to recognize today **Ms Dilamani Warnasuriya** and **Mr K. R. Dayananda**, (their citations will be read by Dr (Ms) Nirmala Peiris and Mr N.M.S Hettigedera who will describe the contributions made by them). While congratulating the two of them for obtaining recognition of the invaluable services rendered may I add that Mr. K.R.

Dayananda is the second of our Graduate Chemists to earn such recognition, the first having been Mr P M Jayasinha last year.

The manner and form in which we are recognizing their services is perhaps insufficient and inadequate. However, may I express the hope that such formal recognition annually will be an inspiration to others as well to come forward and contribute more and more of their expertise, talents and time towards the continuing success of our educational activities.

In this connection I wish to once again make an earnest appeal to all members and in particular our own alumni to take on the task of carrying out the numerous tasks that are necessary to enable an Institute such as ours to prosper and enhance its services to the membership as well as the public. The 739 Graduate Chemists who have passed out represent about 57 % of our total membership. Our alumni simply cannot afford to forget their academic parent. Unless they take a greater interest and provide the necessary honorary services, it will not be possible to continue the invaluable services that are being rendered by our Institute and the College in furthering the profession of Chemistry.

Chamikara Wijesinghe Graduateship All Round Award

I am extremely glad to report that Mr Chamikara Wijesinghe who was the Student Association President, 2008/2009, and passed out as a Graduate Chemist at our Sixth Convocation last year has on his own initiative donated a sum of Rs 50,000 to present up to three awards to students with good academic record (GPA>3.25) who have also participated significantly in extra curricular activities conducted by the College, Institute and the Student Association. The awards are intended to encourage student involvement in such activities and as a spin off measure such involvement could also lead to involvement in honorary activities after becoming alumni.

The first set of Chaimakara Wijesinghe Graduateship All Round Awards is being presented at today's convocation. We extend our heartiest congratulations to the awardees.

Theme for the Current Council Year 2010/11

Following on last year's unprecedented dedication of the year 2009/2010 to our own Graduate Chemists and the very meaningful symposium we had during the annual session on "Moulding Chemical Education for National Development in Sri Lanka", this years's theme is on a related matter-"Chemical Education for the Well-

being of Society". Increasing emphasis on Chemical Education brings the matter clearly to focus and to the surface. Professional Chemical Education has in fact been one of the primary focal issues throughout the four decade life time of the Institute of Chemistry Ceylon. It emphasizes in no small measure the role of Chemical Education in the Knowledge Based Society.

International Year of Chemistry 2011

In fact Chemical Education is going to play an important role in many of our activities in this International Year of Chemistry. I wish to once again express my deep gratitude and appreciation of the innovative and ground breaking role played by our own Graduate Chemist Mr N M S Hettigedera in chairing the IYC steering committee and planning IYC activities for the year which commenced with CHEMEX 2001 Exhibition and Trade Fair on the theme "Wonders of Chemistry" at the BMICH four weeks ago. The work done by Mr. Hettigedera in this respect has given us great pride and I wish to hold him as a role model for our alumni, many of whom are not giving much support.

The College gave maximum human resource and other support for IYC activities and the CHEMEX-2011 Exhibition with our Academic and Academic Support staff giving their utmost co-operation. The College also organized the IYC Raffle 2011 to collect funds towards IYC activities and I am glad to report that a sum of approximately rupees 4 million should become available for this purpose from raffle proceeds. CCS Students in large number played many roles at CHEMEX-2011. About 250 students were involved in various activities both academic (educational stalls, practical demonstrations, chemistry magic, debating competition etc, as well as non academic (recreational, drama, orchestra). I am extremely proud and happy about the ready support extended by our students in huge numbers to make CHEMEX-2011 a resounding success. What was most disheartening to me was the relative absence of many of our members including even some members of the Academic Board to even view this memorable Exhibition and Trade Fair.

We must build up on the foundation that we have laid and use the expertise available amongst our membership as well as the human resources available amongst our students to carry forward with increasing vigour the numerous other activities that have been

planned. This is the golden opportunity to make the profession of Chemistry much more known and recognized by publicizing the centrality and versatility of chemistry. We must continue to work hard to achieve the goals of IYC and UN millennium goals and enhance the wider public appreciation of Chemistry and the Chemical Sciences. The great importance of Chemistry in our day to day life has to remain constantly in the public domain.

Acknowledgement

I wish to acknowledge with grateful thanks the receipt of some more scholarships and prizes over the past year. These include

Dr Dilanjan & Ms Gowri Soysa Scholarship from Ms PLA Soysa

Prof Jayantha Welihinda Prize for Biochemistry from Dr J. Welihinda

Pincock Prize for Photochemistry from Prof. M D P De Costa

A P de Silva Prize for Chemical Sessions for Prof. M D P De Costa

Denzil and Christabel Fernando Commemoration Prize for Agro Industries from Professor J N Oleap & Mr Mandrupa Fernando

Prof. Paul & Rune Sharp Prize for Fundamentals of Chemical and Process Engineering from Prof. Paul Sharp

Egodawatte G Somapala Prize for Food Chemistry from Mr. E G Somapala

I wish to take this opportunity to thank once again the very large number of persons many of whom are our own members who continue to support the work of the College as academics, examiners and teaching assistants, whether full time, part time or visiting and also provide financial support and assistance as and when the need arises. The continued support extended by them together with the very ready help and co-operation we get from the entire staff of the Institute and the College (now numbering about forty) are essential for our forward march. This is particularly relevant and important in this unique International Year of Chemistry. Let us echo and re-echo the global IYC theme **Chemistry-our life, our future**

Emeritus Professor J N O Fernando
C.Chem., C.Sci., F.I.Chem.C., FRSC

PUBLICATIONS OF THE INSTITUTE OF CHEMISTRY CEYLON

Monograph	Title	Author	Price
01	Textile Fibers	Mr T Rajasekeram	Rs.50/-
02	Principles of Food Preservation	Prof U Samarajeewa	Rs.75/-
03	Biotechnology	Prof C P D W Mathew	Rs.75/-
04	Recombinant DNA Technology	Prof J Welihinda	Rs.75/-
05	Natural Toxins in Foodstuffs	Prof E R Jansz & Ms A S Perera	Rs.50/-
06	Fat Soluble Vitamins	Prof E R Jansz & Ms S Malavidana	Rs.50/-
07	Nucleic Acid and Protein Synthesis	Prof J Welihinda	Rs.75/-
08	Extraction of Energy from Food	Prof J Welihinda	Rs.50/-
09	Corrosion of Materials	Dr A M M Amirudeen	Rs.75/-
10	Vitamin C-Have all its mysteries been Unravalled ?	Prof E R Jansz & Ms S T C Mahavithanage	Rs.75/-
11	*Environmental Organic Chemistry (second edition)	Prof S Sotheeswaran	Rs.150/- (US \$3)
12	Enzyme Kinetics and Catalysis	Prof (Mrs) S A Deraniyagala	Rs.100/-
13	Insecticides	Prof (Mrs) Sukumal Wimalasena	Rs.95/-
14	Organotransition Metal Catalysts	Dr S P Deraniyagala & Dr M D P De Costa	Rs.75/-
15	Some Important Aspects of Polymer Characterization	Dr L Karunanayake	Rs.75/-
16	*Hard & Soft Acids & Bases	Prof (Mrs) Janitha A Liyanage	Rs.65/-
17	Chemistry of Metallocenes	Dr Sarath D Perera	Rs.65/-
18	Lasers	Dr P P M Jayaweera	Rs.65/-
19	*Life and Metals	Prof (Mrs) Janitha A Liyanage	Rs.75/-
21	*Silicones	Prof Sudantha Liyanage	Rs.65/-
22	*Pericyclic Reactions: Theory and Applications	Dr M D P De Costa	Rs.65/-
23	NMR Spectroscopy	Dr (Mrs) D T U Abeytunga	Rs.65/-
24	Industrial Polymers	Dr L Karunanayake	Rs.75/-
25	Inorganic NMR Spectroscopy	Prof K S D Perera	Rs.65/-
26	Mosquito Coils and Consumer	Ms D K Galpoththage	Rs.100/-
27	Atomic Absorption Spectrometry	Dr K A S Pathiratne	Rs.100/-
28	Iron Management on Biological Systems	Dr (Ms) R D Wijesekera	Rs.100/-
29	Nutritional Antioxidants	Prof. (Mrs) Sukumal Wimalasena	Rs.100/-
30	*f-Block Elements	Prof Sudantha Liyanage	Rs.65/-

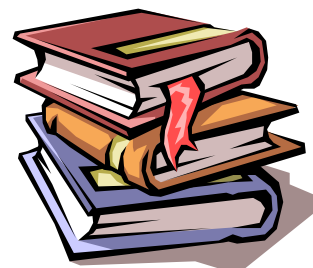
* - Second Edition /new print published on popular demand

CCS Publications

01	Functional Group Analysis in Organic Chemistry	Prof A A L Gunatilake	Rs. 175/-
02	Zinc Metalloproteins	Prof (Ms) R D Wijesekera	Rs. 175/-

General Publications

- ★ **Chemist & The Environment** (Rs.300/-)
- ★ **Infrastructure Support Services for Industrial Development** (Rs.200/-)
- ★ **Chemical Industries in Sri Lanka – Part II** (Members: Rs. 200/-, Non-members: Rs.275/-)
- ★ **Proceedings of the Workshop on the Technological aspects of the Production & Processing of Essential oils in Sri Lanka** (Rs.100/-)
- ★ **Proceedings of the Training Seminar on Towards a Cleaner Industrial Environment in the New Millennium** (Rs.150/-)
- ★ **A-Level Chemistry Facts, Patterns & Principles by Dr. Seetha I Rodrigo** (Rs.1500/-)
- ★ **Proceedings of the Prof R S Ramakrishna Memorial Training Seminar on Modern Analytical Methods**(Rs.200/-)
- ★ **Historical Accounts of the Educational Activities (1972 - 2004)** (Rs.350/-)
- ★ **Proceedings of the Training Seminar cum Workshop on Sampling, Statistics and Standardization in Chemical Analysis and Environmental Management** (Rs.150/-)
- ★ **Polymer Industries of Sri Lanka** (Rs. 200/-)
- ★ **Industry & Environment** (Rs. 200/-)
- ★ **Herbal Medicine Phytopharmaceuticals and Other Natural Products: Trends and Advances** (Rs. 500/-)
- ★ **Chemistry in Sri Lanka** (Rs. 150/-)





RSC NEWS

THE ROYAL SOCIETY OF CHEMISTRY SRI LANKA SECTION

1. Membership

According to the records sent to us from the parent body, a breakdown of the membership is as follows:-

Category	Abbreviation	Number
Fellow Life Member.	F E L	05
Fellow C Chem.	F C C	09
Member	M E M	26
Associate Member	A M E	12
Affiliate Member	A F F	01
Affiliate /Under Graduate. A F U		02
Total Membership as at March 2010		55

2. Committee of Management

The following were elected to the Committee at the 49th Annual General Meeting held on 23rd July 2010.

Chairman	- Mr. R M G B Rajanayake
Vice Chairman	- Dr. M P Deeyamulla
Chairman Elect	- Prof. Sudantha Liyanage
Hony. Secretary	- Mr. I M S Herath
Hony. Treasurer	- Prof. W S Fernando
Committee Members	- Dr. Positha Premaratne Mr. W A P Silva Mr. S Perasiriyan Mr. W J P D Jayalath
Hony. Auditor	- Prof. L G Chandrasena

3. Committee Meetings

There were 11 Committee Meetings held during the period, June 2009 to July 2010. The venue of these meetings was the office of the Royal Society of Chemistry SL Section at the S L A A S Headquarters. These meetings were held to discuss the R S C SL Section's, new plans and strategies with regard to organizing the activities for the year 2008/2009 and thereafter.

4. Activities

4.1 Contributions to Activities of the Institute of Chemistry, Ceylon

(a) Full page advertisement of "Chemistry in Sri Lanka".

(b) Annual Dinner

(c) Award for the Best Performance at the Graduate ship Examination in Chemistry Part II Theory Examination

(d) Annual Sessions

4.2 Inter - University Chemistry Competition, 2010/2011

4.3 All - Island Inter School Chemistry Essay Competition 2010/2011

4.4 Book donation at North Central Province.

4.5 Teacher training workshop.

4.6 Popular lectures.

4.7 Donation of teaching and learning resources for chemical society of selected University.

4.8 Newton A. Dias Weerasinha Memorial Scholarship

4.9 Book donation programme

4.10 Writing monographs by few committee members

4.11 Industrial visit

4.12 Web Site

The members are reminded of the web site of our Section, the address of

which is as follows:

www.rsc.org/Membership/Networking/InternationalSections/Sri Lanka/index.asp.

I M S Herath
Hony Secretary

