Convention Society for Ethnopharmacology, India

National Seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to Tinospora cordifolia"

&

September 07-08, 2019

Organized by:



School of Natural Product Studies Jadavpur University, Kolkata, India www.jaduniv.edu.in

[RUSA 2.0 Program, Jadavpur University]

Supported by:



National Medicinal Plant Board (NMPB) Ministry of AYUSH Govt. of India, New Delhi

In association with:



Society for Ethnopharmacology, India 23/3 Saktigarh, Kolkata, India www.ethnopharmacology.in

Venue: Jadavpur University, Kolkata





With Best Compliment from:

HIGH PERFORMANCE THIN LAYER CHROMATOGRAPHY SYSTEM



HP-TLC System Software





Applicator



Developer



Image Documentation

UV Scan



Scanner

6th Convention: SFE – INDIA, 2019

National Seminar on

"Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*"

September 07-08, 2019



Organized by: School of Natural Product Studies Jadavpur University, Kolkata, India web: www.jaduniv.edu.in



In Association with: Society for Ethnopharmacology (SFE - INDIA) 23/3 Saktigarh, Kolkata www.ethnopharmacology.in Venue: Jadavpur University, Kolkata

PROGRAM SCHEDULE

Day 1: Saturday: September 07, 2019 Venue: Triguna Sen Auditorium, Jadavpur University, Kolkata

REGISTRATION: 09:00 AM - 10:00 AM

INAUGURATION OF THE PROGRAMME: 10:00 AM - 11:30 PM

Dr. Suranjan Das, Vice Chancellor, Jadavpur University, Kolkata Dr. P K Ghosh, Pro Vice Chancellor, Jadavpur University, Kolkata Dr. Chiranjib Bhattacharjee, Pro Vice Chancellor, Jadavpur University, Kolkata Dr Thirumalachari Ramasami. Former Secretary, Department of Science and Technology Government of India, New Delhi Dr. (Mrs.) Tanuja Nesari, Director, All India Institute of Ayurveda, New Delhi & CEO, National Medicinal Plant Board, Govt. of India, New Delhi Shri. Shekhar Dutt, Former Governor, State of Chhattisgarh Dr. C.K Katiyar, Chairman, 6th Convention & National Seminar 2019 & CEO, Healthcare & Technical, Emami Ltd., Kolkata Dr. Pankaj Kumar Roy, Dean, Faculty of ISLM, Jadavpur University, Kolkata Dr. Sadhan Kumar Ghosh, Dean, Faculty of Engineering, Jadavpur University, Kolkata Dr. Asis Mazumdar, Nodal Coordinator, Regional-cum-Facilitation Centre (RCFC), Eastern Region, NMPB, Ministry of AYUSH, Jadavpur University, Kolkata Mr. B.K.Sarkar, President, Society for Ethnopharmacology, India, Kolkata Mr. Indraneel Das, Vice President, Society for Ethnopharmacology, India, Kolkata Dr. Pulok K Mukherjee, Organizing Secretary, National Seminar 2019 & Director, School of Natural Product Studies, Jadavpur University, Kolkata

Session I: 11:30 - 1:00 PM

Chairperson:

Dr. Amitava Bandyopadhyay, Former Scientist, Indian Institute of Agricultural Sciences, New Delhi Dr. Tapan K Mukherjee, Former Scientist, CSIR-NISCAIR, New Delhi

Speaker	Title
Dr. Pulok K Mukherjee Secretary, SFE-India President, International Society for Ethnopharmacology. Switzerland	SFE India: Globalizing Local Knowledge Localizing Global technology
Keynote Lectures: Lecture: 1 Dr Thirumalachari Ramasami Former Secretary Department of Science and Technology Govt. of India, New Delhi	Translational Research for Human Health Care: An insight
Lecture: 2 Dr. Tanuja Nesari CEO ,National Medicinal Plant Board Ministry of AYUSH, New Delhi, India	Importance of Tinospora cordifolia in AYUSH systems of medicine

LUNCH: 01:00 PM – 02:00 PM (Venue: University Guest House)

Plenary Lectures: Session II: 02:00 PM - 03:40 PM

Chairperson:

Dr. Amit Krishna De, Executive Secretary, Indian Science Congress Association, Kolkata **Dr. Arun Bandopadhyay,** Chief Scientist, CSIR-Indian Institute of Chemical Biology, Kolkata

Speaker	Title
Lecture: 3	
Shri. Shekhar Dutt Former Governor State of Chhattisgarh	Development of AYUSH in India
Lecture: 4 Dr. Urmilla Thatte Department of Clinical Pharmacology Seth GS Medical College and KEM Hospital, Mumbai	Tinospora cordifolia: From Stem to Pill
Lecture: 5	
Dr. D K Mitra Department of Transplant Immunology & Immunogenetics, All India Institute of Medical Sciences, New Delhi	Host immune response profile and impact of blocking PD-1 pathway on protective immune response in tuberculosis patients
Lecture: 6	
Dr. Sayeed Ahmed School of Pharmaceutical Education & Research Jamia Hamdard (Hamdard University), New Delhi , India	6 th International Conference of Society for Ethnopharmacology (SFEC-2019)

Plenary Lectures: Session III: 03:40 PM - 04:50 PM

Chairperson:

Dr. Sitesh C. Bachar, Chairman, Dept. of Pharmacy, Faculty of Pharmacy, University of Dhaka, Bangladesh **Dr. Chandana Barua**, Professor, Dept. of Pharmacology & Toxicology, College of Veterinary Science, Guwahati.

Speaker	Title
Lecture: 7 Dr. M G Matsabisa Professor Dept. of Pharmacology University of The Free State Bloemfontein, South Africa	Validation of PHELA – A South African Traditional formulation: India - South Africa collaborative program
Lecture: 8 Dr. Asis Mazumdar Nodal Coordinator, Regional-cum-Facilitation Centre (RCFC), Eastern Region, NMPB, Ministry of AYUSH Jadavpur University, Kolkata	Regional-cum-Facilitation Centre (RCFC), Eastern Region
Lecture: 9 Dr. V.K Joshi Emeritus Professor, Department of Dravuyaguna, Faculty of Ayurveda, Institute of Medical Sciences Banaras Hindu University, Varanasi	<i>Tinospora cordifolia</i> in Traditional Indian medicine- Ayurveda to improve health outcome
Lecture: 10 Mr. Akshay Charegaonkar Director Anchrom Enterprises (I) Pvt. Ltd. Mumbai, India	HPTLC in Pharmaceutical and Herbal Analysis
Plenary Lectures: Sessio	n IV: 04:50 PM - 05:30 PM
Chairperson:	
Dr. Rajib Bandyopadhyay, Professor, Dept. of Instrumentation and Electronics Engineering, Jadavpur University, Kolkata	
Sneaker	
Lecture: 11 Dr. N. Udupa Research Director (Health Sciences) Manipal Academy of Higher Education Manipal, Karnataka, India	Guduchi (<i>Tinospora cordifolia</i>): A wonder plant with various medicinal uses
Lecture: 12 Dr. S. Rajan Research Scientist Centre of Medicinal Plants Research in Homoeopathy, Ministry of AYUSH Government of India, Tamil Nadu, India.	Important Ayurvedic Medicinal Plant <i>Tinospora cordifolia</i> (Willd.) Miers ex Hook.f. & Thoms. and its cultivation methods.
Lecture: 13 Mr. Nirmal Kumar Awasthi Traditional Healer Association Raipur, Chhattisgarh, India	Importance of Tinospora cordifolia in Traditional practices.

Poster Presentation: Session I: 11:30 AM - 01:00 PM

Evaluators:

Dr. Sanmoy Karmakar, Dept. of Pharm. Tech., Jadavpur University, Kolkata

Dr. Achintya Mitra, Research Officer (Ayu), CARIDD, Kolkata

Dr. Alka Mukne, Bombay College of Pharmacy, Mumbai, India

Dr. Prakash R Itankar, RTM Nagpur University, Nagpur

SFE-CONV-1901 SFE-CONV-1912 SFE-CONV-1913 SFE-CONV-1915 SFE-CONV-1916 SFE-CONV-1917 SFE-CONV-1919 SFE-CONV-1920 SFE-CONV-1921 SFE-CONV-1922 SFE-CONV-1923 SFE-CONV-1924 Mr. Amitava Das, CEO, ID Kansultanci Services, New Delhi Dr T. K Gopal, Sri Ramachandra University, Porur, Chennai Dr. Sauvik Halder, Dept. of Chemistry, Jadavpur University, Kolkata

Dr. Rajesh Singh Pawar, Truba Institute of Pharmacy, , Bhopal, India

> SFE-CONV-1925 SFE-CONV-1926 SFE-CONV-1927 SFE-CONV-1928 SFE-CONV-1930 SFE-CONV-1931 SFE-CONV-1932 SFE-CONV-1933 SFE-CONV-1934 SFE-CONV-1935 SFE-CONV-1936

Poster Presentation: Session II: 2:30 PM - 05:00 PM

Evaluators:

Dr. Subhash C. Mandal, Dept. of Pharm. Tech., Jadavpur University, Kolkata

Mr. Prabir Banerjee, EC Member, SFE-India, Kolkata

Dr. Achintya Saha, Department of Chemical Technology, University of Calcutta, Kolkata

Dr. Bipan Tudu, Dept of Instrumentation and Electronics, Jadavpur University, Kolkata

SFE-CONV-1937 SFE-CONV-1938 SFE-CONV-1939 SFE-CONV-1940 SFE-CONV-1941 SFE-CONV-1942 SFE-CONV-1943 SFE-CONV-1944 SFE-CONV-1945 SFE-CONV-1946 SFE-CONV-1948 SFE-CONV-1948 SFE-CONV-1960 SFE-CONV-1961 Dr. Saroj Pal, Directorate of ISM Drugs Control, Govt. of WB, Kolkata

Dr. Ketousetuo Kuotsu, Dept. of Pharm. Tech., Jadavpur University, Kolkata Dr. Thirumalai Kumaran, Sri Ramachandra University,

Porur, Chennai

Dr. Dipak Singha, Asst Professor, CIPT, Uluberia

SFE-CONV-1949 SFE-CONV-1950 SFE-CONV-1951 SFE-CONV-1952 SFE-CONV-1953 SFE-CONV-1955 SFE-CONV-1955 SFE-CONV-1957 SFE-CONV-1959 SFE-CONV-1959 SFE-CONV-1962 SFE-CONV-1963

Day 2: Sunday, September 08, 2019 Venue: Dr. HL ROY Auditorium, Jadavpur University, Kolkata

Session V: 09:30 AM - 11:30 AM

Chairperson:

Dr. Subhash C. Mandal, Directorate of Drugs Control, Govt. of West Bengal, Kolkata

Dr. Jayram Hazra, Director, Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Kolkata

Speaker	Title
Welcome Lecture by: Mr. B K Sarkar President SFE-India & CEO Parker Robinsons Pvt. Ltd., Kolkata	Prospects and scope of herbal industry
Dr. C K Katiyar CEO Healthcare (Tech) Emami Ltd., Kolkata & Chairman, 6 th Convention; SFE-India 2019	Prospects of herbal drug industry
Dr. Vijay Kothari Institute of Science Nirma University Ahmedabad-382481,India	Mainstreaming the Traditional Medicine (TM) to tackle Antimicrobial Resistance (AMR): Demonstrating anti-virulence potential of certain TM formulations/ plant extracts against antibiotic-resistant gram-negative bacteria
Subhendu Saha Aspire Scientific Nagpur, MH, India	HPTLC system with suitable configuration for qualitative and quantitative analysis of Herbal products.
Dr. Shyam Narayan Scientist-E (Dy Director) ICMR-RMRIMS, Patna, Bihar, India	Holistic approach of Traditional Herbal Medicine and their lead molecules in context to post kalazar dermal leishmaniasis

Oral Presentation: Session VI: 11:30 AM - 12:30 PM

Chairpersons:

Dr. Pallab Kanti Haldar, Joint Director, School of Natural Product Studies, Jadavpur University, Kolkata Dr. Satyanshu Kumar, Principal Scientist, Directorate of Medicinal and Aromatic Plants Research, Anand Guiarat

Allana, Oc	
Name	Title
Sreya Dutta Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Kolkata.	<i>Tinospora cordifolia</i> (Guduchi) and its adulterant plant <i>Daemia extensa</i> (Visanika) : A comparative pharmacognsotical study and HPTLC profiling of Leaf
Ademola C Famurewa College of Medicine, Alex Ekwueme Federal University, Ndufu-Alike Ikwo, Ebonyi State, Nigeria	Nephroprotective effect of virgin coconut oil against antibiotic drug gentamicin-induced nephrotoxicity via suppression of oxidative stress and modulation of iNOS/NF-κB/caspase-3 signalling pathway in rats

Rohit Sharma

Central Ayurveda Research Institute for Drug Development, 4-CN Block, Sector-V, Bidhannagar, Kolkata

Rajesh Bolleddu

Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Government of India, Kolkata Evaluation of Hypoglycaemic and anti-hyperglycaemic activity of Guduchi Churnakriya in Swiss albino mice

Pharmacognostical and Physicochemical studies of *Tinospora* cordifolia

Soumendra Darbar

Department of Pharm. Tech. Jadavpur University, Kolkata-India Therapeutic targeting of liver inflammation and fibrosis by Ag nanoparticle using *Tinospora cordifolia* leaf extract

Oral Presentation: Session VII: 12:30 PM - 01:30 PM

Chairpersons:

Dr Sanjit Dey, Professor, Department of Physiology, University of Calcutta, India

Dr Surajit Sinha, Professor, School of Applied & Interdisciplinary Sciences, IACS, Kolkata

Name	Title
Ranjana Das Dept. of Chemical Engineering, Jadavpur University, Kolkata	Antihypertensive Properties of Peptide: A Novel Drug Alternative
Akanksha Bhutani Department of Pharmaceutical Sciences and Technology, Birla Institute of Technology, Mesra,	Anticancer activities of <i>Tinospora Cordifolia</i> on Hela - The cervical cancer cell-lines
Aditi Garg Department of Pharmaceutical Sciences and Technology, Birla Institute of Technology, Mesra, Ranchi	Docking studies of phytoconstituents of <i>Tinospora cordifolia</i> with special reference to Triple-Negative Breast Cancer
L. D. Barik Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Kolkata	Experimental evaluation of an Compound herbal drug on dissolution of encrustation on Urinary Catheters
Anindita Banerjee PG Dept of Physio., Serampore College, West Bengal, India	Ethanol extract of <i>Tinospora sinensis</i> protects pancreatic islets against streptozotocin induced cellular stress, inflammation and apoptosis in rats.
Amitabha Dey Medical Research, Research & Development Centre, Healthcare Division, Emami Limited, Kolkata	Hepatoprotective potential of standardized <i>Tinospora cordifolia</i> extract and its isolatedcompoundson HepG2 cell line
Akanksha Sharma School of Natural Product Studies Dept. of Pharm. Tech. Jadavpur University, Kolkata	Evaluation of Tyrosinase Inhibitory potential of Kumkumadi Tailam – An Ayurvedic preparation

Valedictory Program & Distribution of Prizes: 1:30 PM -02:00 PM

Dr. Jayram Hazra, Director, Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Kolkata
Dr. V Ravichandran, Director, National Institute of Pharmaceutical Education and Research, Kolkata
Dr. M G Matsabisa, Professor, Dept. of Pharmacology, University of The Free State, Bloemfontein, South Africa
Dr. CK Katiyar, Chairman, 6th Convention, Society for Ethnopharmacology, India
Mr. B.K.Sarkar, President, Society for Ethnopharmacology, India, Kolkata
Dr. Sitesh C. Bachar, Chairman, Department of Pharmaceutical Chemistry, Faculty of Pharmacy, University of Dhaka, Bangladesh
Mr. Indraneel Das, Vice President, Society for Ethnopharmacology, India, Kolkata
Dr. Pallab Kanti Haldar, Joint Director, School of Natural Product Studies, Jadavpur University, Kolkata
Dr. Pulok K Mukherjee, Organizing Secretary & Director, School of Natural Product Studies, Jadavpur University, Kolkata

Awards for Best Oral & Poster Presentation

LUNCH: 02:00 PM – 03:00 PM (Venue: University Guest House)

6th Convention: SFE – INDIA, 2019

 National Seminar on

 "Translational Research of Traditionally used Indian medicinal plants with special reference to Tinospora cordifolia"

 September 07-08, 2019

 Organized by:

 School of Natural Product Studies

 Jadavpur University, Kolkata, India

 web: www.jaduniv.edu.in

 In Association with:

 Society for Ethnopharmacology (SFE - INDIA)

 23/3 Saktigarh, Kolkata

 www.ethnopharmacology.in

 Venue: Jadavpur University, Kolkata

Medicinal Plants used in traditional medicine serve as the major source of therapeutically active molecules from ancient time. Guduchi (*Tinospora cordifolia*), is one of the most popular Rasayana herbs which has been traditionally used in Ayurveda and other traditional systems for its immunomodulatory properties and also in the treatment of several other ailments. Indian miraculous Medicinal plant like Guduchi has been explored as a potential candidate for the development of newer drug from several decades. Development of newer drug from medicinal plants is a challenging scientific task, which requires expertise, experience and multidisciplinary research. Therapeutically active lead phyto-molecules have been identified from medicinal plants as new drugs through different new technologies. We would like to highlight the potential medicinal plants of India, mostly used in healthcare through such special conference and events to highlight their beneficial role along with their scientific validation in all aspects.

The 6th Convention of Society for Ethnopharmacology, India (SFE - INDIA) is being organized by the School of Natural Product Studies (SNPS), Jadavpur University in association with Society for Ethnopharmacology, India during September 07-08, 2019 at Jadavpur University, Kolkata. The theme of the convention is focused on "Promotion and development of Indian Medicinal Plant – Special reference with Guduchi (*Tinospora cordifolia*)". On behalf of the School of Natural Product Studies, JU and the Society for Ethnopharmacology, India, I would like to convey my warm welcome to you all for the 6th convention of SFE -INDIA. Multiple scientific institutions have conducted research on Guduchi in terms of its chemistry and Pharmacology including mechanism of action. Few clinical trials have also been conducted on Guduchi as immunomodulator to validate the claim.

This convention is being organized to highlight different aspects for the dissemination of knowledge, promotion and development of medicinal plant. I feel this convention will provide an ideal platform for interaction and dissemination of knowledge & ideas between scientists, professionals from Industry and academia in different areas of Ethnopharmacology and medicinal plant research towards drug discovery and development.

I would like to thank all the participants for their participation and interest to make this event successful. I wish you all a very effective scientific interaction during this program. I convey my sincere thanks to the RUSA 2.0 program of JU and the National Medicinal Plant Board, Ministry of AYUSH, Govt of India, New Delhi for their support in organizing this event.

I gratefully acknowledge the service rendered by the organizing committee members of SFE-India and my beloved research scholars and students for their active support in organizing this convention.

Prof. Pulok K. Mukherjee PhD, FRSC, FNASc Organizing Secretary 6th Convention: SFE-INDIA 2019 & Director School of Natural Product Studies Jadavpur University, Kolkata 700032, India

যাদ্বপুর বিশ্ববিদ্যালয়

PROFESSOR SURANJAN DAS M.A. (cal), D.Phil (Oxon) VICE-CHANCELLOR অধ্যাপক হুরঞ্জন দাস উপাচার্য E-mail : vc@admin.jdvu.ac.in E-mail : suranjandas2000@yahoo.co.in



JADAVPUR UNIVERSITY 188, RAJA S.C. MALLIK ROAD KOLKATA-700 032, INDIA Phone : +91-33-2414-6000 (O) Fax : +91-33-2413-7121 (O)

OFFICE OF THE VICE-CHANCELLOR : AUROBINDO BHAVAN ANNEXE

Date : August 19, 2019

MESSAGE

I am happy to learn that the School of Natural Product Studies Jadavpur University, Kolkata, is organizing a National Seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" during September 07-08, 2019 at Jadavpur University.

The School of Natural Product Studies has been playing a pioneering role in developing different translational approaches for promotion and development of medicinal plants for evaluation and development of natural products particularly quality and safety evaluation of medicinal plants and products derived there from.

I am sure this symposium will bring together scholars and faculty members from different parts of the country to address important contemporary issues on translational research for drug discovery & development from medicinal plants along with their quality evaluation and validation.

I wish the Seminar every success.

Julanjan Das

Suranjan Das

To Prof Pulok K. Mukherjee Director, School of Natural Product Studies Jadavpur University Kolkata - 700032.

Residence : FE-14, Salt Lake City, Kolkata-700 106, West Bengal. India, Telephone : + 91-33-2358-2389

प्रो. (डॉ.) तनुजा मनोज नेसरी मुख्य कार्यकारी अधिकारी Prof. (Dr.) Tanuja Manoj Nesari Chief Executive Officer



भारत सरकार Government of india आयुष मंत्रालय Ministry of AYUSH राष्ट्रीय औषधीय पादप बोर्ड National Medicinal Plants Board

Message

It give me immense pleasure that School of Natural Product Studies Jadavpur University, Kolkata in association with Society for Ethnopharmacology (SFE-INDIA) Saktigarh, Jadavpur, Kolkata is organizing the National Seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" from September 07-08, 2019 at Jadavpur University, Kolkatta.

As we know that Indian system of medicine is mainly plant based system specially 90% Ayurvedic formulations are based on plant. *Tinospora* is one of the important plant of ISM used specially in treatment of different viral diseases like Chikungunya, Dengue *etc*. Presently, about 40% of the World's population is at risk of these diseases. For viral infection, there is almost no treatment available and whatever is there have a lot of side effects so that prevention of these diseases is always better than treatment. It is also used in the treatment of non-communicable diseases and Diabetes mellitus and inflammatory arthritis.

Amrita Giloe as a commonly available time tested, evidence based medicinal herbs is a precious gift from Mother Nature to mankind useful for its Promotive, Preventive and Curative affects. The plant is also known as a *Swasthyahit* and *Sanshamani*. It balances all three doshas (Vata, Pitta & Kapha) and mind, body and soul. So in day to day life it can be taken with by everyone and by all the age groups to maintain the health and prevent diseases. So this is the plant which can be considered as a herbal health promoter in daily life.

For this purpose, 'Amrita' or *Tinospora cordifolia* is the best option for protection and treatment in place of modern antibiotics. The plant is act as an immune booster for such type of infections and autoimmune disorders. The chemical constituents of plant are not only self-antimicrobial, but also helpful in breaking antibiotic-resistance. So the *Tinospora cordifolia* or 'Guduchi' or 'Giloe' is also known as "Herbal Antibiotic". Hence to aware the general masses, NMPB Ministry of AYUSH has launched a Campaign on *Tinospora cordifolia-Amrita for Life*.

I am confident that this event would provide a perfect opportunity to share the information and knowledge about the common uses, conservation, cultivation, quality assurance and other important aspects related to the *Tinospora*.

I wish this event a great success.

Dr. Tanuja Manoj



प्रथम तल, आई.आर.सी.एस. अनेक्सी विल्डिंग 1st Floor, IRCS Annxe buiding 1, रेड कॉस रोड़, नई दिल्ली-110001 1, Red Cross Road, New Delhi-110001 दूरमाषः 11-23721822, फैक्स: 11-23721825, Tel.: 11-23721822, Fax : 23721825 ई-मेल: ceo-nmpb@nic.in, E-mail: ceo-nmpb@nic.in

যাদবপুর বিশ্ববিদ্যালয়

Dr. PRADIP KUMAR GHOSH Pro-Vice-Chancellor ডঃ প্রদীপ কুমার ঘোষ সহ-উপাচার্য



*JADAVPUR UNIVERSITY KOLKATA-700 032, INDIA

OFFICE OF THE PRO-VICE-CHANCELLOR : AUROBINDO BHAVAN

Dated: August 16, 2019

MESSAGE

I am happy to know that the School of Natural Product Studies Jadavpur University, Kolkata is organizing the National Seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" during September 07-08, 2019 at Jadavpur University, Kolkata. I would like to extend warm welcome to all the participants and experts as well as researchers in this area. This symposium will discuss about numerous medicinal plants including *Tinospora cordifolia*. The scientific deliberation during this convention will certainly at values by inculcating the renewed interest for researchers on Guduchi (*Tinospora cordifolia*) and other plants of medicinal significance.

I congratulate Prof. Pulok K Mukherjee and his team at the School of Natural product Studies, Jadavpur University for taking such novel initiative to promote translational research in the field Indian medicinal plants.

I convey my best wishes for the grand success of this convention.

Pradip Kumar Ghosh

* Established on and from 24th December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6th December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

(মো) : ৯৮৩০৩৭৫৩৪০ দূরভায +৯১-৩৩-২৪৫৭-২৫৫৪ ফ্যাক্স : (৯১) - ৩৩ -২৪১৪-৬০০১

Website : www.jaduniv.edu.in E-mail : pradipkghosh1957@gmail.com : provicechancellor@jadavpuruniversity.in Mob. : 9830375340 Phone : + 91-33-2457-2554 Fax : + 91-033-2414-6001

যাদবপুর বিশ্ববিদ্যালয়

Prof. CHIRANJIB BHATTACHARJEE Pro-Vice-Chancellor অধ্যাপক চিরঞ্জীব ডট্টাচার্য্য সহ-উপাচার্য



* JADAVPUR UNIVERSITY KOLKATA-700 032, INDIA

OFFICE OF THE PRO-VICE-CHANCELLOR : AUROBINDO BHAVAN

MESSAGE

It is my great pleasure to welcome all the participants to the national seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" being organized by the School of Natural Product Studies Jadavpur University, Kolkata, India during September 07-08, 2019 at Jadavpur University, Kolkata.

I am feeling happy that School of Natural product Studies, Jadavpur University one of the most vibrant School of the faculty of Inter-disciplinary Studies, Law & Management (ISLM) is making efforts to promote translational research in the field of traditional Indian medicinal plants. The School of Natural Product Studies is working in dissemination of knowledge and promotion of medicinal plants, and validation of drugs for several years and have very effective findings in this field. I greatly admire their work in translation research.

The thrust area of the national seminar is on the promotion of translational research of traditionally used Indian medicinal plants. I hope this seminar will provide an ideal platform for interaction and dissemination of ideas between scientists and stakeholders in different areas of medicinal plants and traditional medicine.

I wish every success of this event.

19/08/2019 BhallaCl

Prof. Chiranjib Bhattacharjee Pro-Vice-Chancellor

* Established on and from 24th December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6th December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

ফোন সরাসরি: ২৪৫৭- ২৭০০

Website :www.jaduniv.edu.in E-mail :provc@jadavpuruniversity.in Phone : Direct 2457-2700

Dr. Snehamanju Basu Registrar ডঃ স্নেহমঞ্জু বসু নিবন্ধক



যাদবপুর বিশ্ববিদ্যালয়

*JADAVPUR UNIVERSITY KOLKATA-700 032, INDIA

OFFICE OF THE REGISTRAR : AUROBINDO BHAVAN

Dr. Snehamanju Basu Registrar Jadavpur University Kolkata: 700 032 Ph.: 2414- 6414 E-mail: registrar@jadavpuruniversity.in

MESSAGE

I am extremely happy to know about the activities of the School of Natural Product Studies Jadavpur University in the area of translational research on medicinal plants. It is my great pleasure to welcome all the participants and dignitaries in the National Seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" at Jadavpur University, Kolkata being organized by the School of Natural Product Studies Jadavpur University, Kolkata jointly with the Society for Ethnopharmacology, India (SFE-India) to commemorate the 6th National Convention during September 07-08, 2019.

I appreciate the initiatives of this School for working on several aspects of dissemination of knowledge through this event for promotion of medicnal plants and its tarnslational aspects through scientific validation of natural products in respect of its quality, efficacy and safety.

I wish grand success of this event.

3000.19

(Dr. Snehamanju Basu)

^b Established on and from 24th December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6th December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981) (জেন সরাসরি:২৪১৪-৬৪১৪ Website :www.jaduniv.edu.in Phone :Direct 2414-6414

ফ্যাক্স :(৯১)-০৩৩-২৪১৪-৬৪১৪

E-mail : drsnehamanju@ gmail.com/registrar@jadavpuruniversity.in

Phone :Direct 2414-6414 Fax : (91) -033-2414-6414

ষাদবপুর বিশ্ববিদ্যালয় কলকাতা-৭০০০৩২,ভারত



*JADAVPUR UNIVERSITY KOLKATA-700 032, INDIA

FACULTY OF INTERDISCIPLINARY STUDIES, LAW & MANAGEMENT

Message

I feel happy to say that the School of Natural product Studies, one of the most vibrant School of the faculty of Interdisciplinary Studies Law and management (ISLM), Jadavpur University and is trying their best to promote translational research in the field of traditional Indian medicinal plants. The School of Natural Product Studies has been working on different integrated approaches for promotion and development of medicinal plants for evaluation and development of natural products particularly quality and safety evaluation of medicinal plants and products derived there from

It is my great pleasure to welcome all the participants to the National Seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" being organized by the School of Natural Product Studies Jadavpur University, Kolkata during September 07-08, 2019 at Jadavpur University, Kolkata The thrust area of the national seminar is on the promotion of translation research of traditionally used Indian medicinal plants. I hope this seminar will provide an ideal platform for interaction and dissemination of ideas between scientists and stakeholders in different areas of medicinal plants and traditional medicine.

19/08/10

Prof. Pankaj Kumar Roy Dean Faculty of Interdisciplinary Studies Law and management Jadavpur University Kolkata

To Prof Pulok K. Mukherjee Director, School of Natural Product Studies Jadavpur University, Kolkata -700032.

* Establis	hed on and from 24 th December, 19 (West Bengal Act XXIII)	55 vide Notification No.10986-Edn/IU-42/55 dated 6 th Decem of 1955) followed by Jadavpur University Act, 1981 (We	ber, 1955 under Jadavp est Bengal Act XXIV	our of 1	University Act,1955 981)
দূরভাষ	: >>-00 -2869- 0005	Website : www.jadavpur.edu	Phone	:	91 33 2457-3001
	2003-2869-0002				91 33 2457-3002
ফ্যাক্স	: \$2-00-2228-9449		Fax	:	91 33 2414 -6886

যাদ ব পুর বি শ্ব বি দ্যাল য়

Prof. Sadhan Kumar Ghosh, Ph.D (Engg.) Dean, Faculty of Engineering & Technology অধ্যাপক সাধন কুমার ঘোষ অনুযদ প্রধান, কারিগরী শিক্ষা



JADAVPUR UNIVERSITY KOLKATA-700 032, INDIA

OFFICE OF THE FACULTY OF ENGINEERING & TECHNOLOGY

29th August 2019

MESSAGE

It is my pleasure to welcome all the participants and dignitaries in the National Seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" at Jadavpur University, Kolkata being organized by the School of Natural Product Studies Jadavpur University, Kolkata jointly with the Society for Ethnopharmacology, India (SFE-India) to commemorate the 6th National Convention during September 07-08, 2019.

I appreciate activities of the School of Natural Product Studies, Jadavpur University in the areas of translational research for promotion of medicinal plants and its translational aspects through scientific validation of natural products in respect of its quality, efficacy and safety.

I wish grand success of this event.

Prof. Sadhan Kumar Ghosh Dean, Faculty of Eng. & Tech. Jadavpur University

To

Prof Pulok K Mukherjee Director, School of Natural Product Studies Jadavpur University, Kolkata 700032

* Established on and from 24th December, 1955 vide Notification No.10986-Edn/IU-42/55 dated 6th December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

দুরভাষ: + ৯১-৩০-২৪১৪-৬০০৭/২৪৫৭-২২৮৭/ ২৪১৪-৬২০৭/২৪১৪-৬৮৯০/২৪৫৭-২৪৮৮ মো: + ৯১ ৯৮৩০০৪৪৪৬৪/৮৭৭৭৬৮৬৩৮৫ Website :www.jaduniv.ac.in E-mail :dean.fet@jadavpuruniversity.in sadhan.ghosh@jadavpuruniversity.in sadhankghosh9@gmail.com Telephone : +91-33-2414-6007/2457-2287/ 2414-6207/2414-6890/2457-2488. Mob. : +91 9830044464/8777686385 Shekhar Dutt, sм Former Governor of Chhattisgarh State



C-805, Kenwood Tower, Charmwood Village, Surajkund Rd., Faridabad-121009. Haryana, India Mobile No. +91-9810222250 Email: duttshekhar@yahoo.com

August 17th, 2019

MESSAGE

I am very happy that the 6th Convention of the Society for Ethnopharmacology, India & National Symposium on "Translational Research on Traditionally used Indian Medicinal Plants with special reference to Tinospora cordifolia", in being organized by the School of Natural Product Studies, Jadavpur University in association with the Society for Ethnopharmacology, India (SFE-India) on September 07-08, 2019 at Jadavpur University, Kolkata.

I am sure that with the very able management and dedicated Teachers of the School of Natural Product Studies, Jadavpur University which is providing a very high quality education, the Convention shall be of a very high standard. Both learning and teaching to mine mind, is an activity which is full of joy. Everyone in this Institution, I believe, is in an atmosphere of immense joyful teaching-learning environment.

I sincerely hope that School of Natural Product Studies will surge ahead in leaps and bounds and shall be counted amongst the best of this kind of teaching institutions.

I convey my best wishes to the Principal and the talented faculty members as well as the efficient administrative staff of the school and also its enthusiastic students who are eager to learn along with the members of SFE, India, an extraordinary convention.

I wish everyone all happiness and pray for their success.

(Shekhar Dutt)

Former

Deputy National Security Adviser Govt. of India
 Defence-Secretary Govt. of India
 Secretary Defence Production Govt. of India
 Secretary Ministry of Health Govt. of India
 Director General Sports Authority of India



SOCIETY FOR ETHNOPHARMACOLOGY

Globalizing Local Knowledge; Localizing Global Technologies Affiliated to: International Society for Ethnopharmacology e-mail: sfeindian@gmail.com; Tele-Fax: +91 – 33 2414 6046 Website: www.ethnopharmacology.in

MESSAGE

It is my great pleasure to welcome all the participants to the national seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" being organized by the School of Natural Product Studies Jadavpur University, Kolkata, India during September 07-08, 2019 at Jadavpur University, Kolkata.

The Society for Ethnopharmacology, India is working in dissemination of knowledge and promotion of medicinal plants and validation of drugs for several years. The thrust area of the national seminar is on the promotion of translation research of traditionally used Indian medicinal plants. I hope this seminar will provide an ideal platform for interaction and dissemination of ideas between scientists and stakeholders in different areas of medicinal plants and traditional medicine.

It gives me pleasure to know the Society for Ethnopharmacology is meeting its commitment of holding dedicated symposium on one plant in every year. It organized the first focused symposium on Ashwagandha in 2017, Brahmi in 2018 and chosen Guduchi in 2019. I hope that this kind of scientific endeavor will promote more awareness both among consumers as well as scientists to promote the use of Guduchi.

I wish every success of this event.

Dr. Chandra Kant Katiyar Chairman, 6th Convention, SFE India Vice President, Society for Ethnopharmacology & CEO-Technical, Emami Ltd. Kolkata.

SOCIETY FOR ETHNOPHARMACOLOGY 23/3 Saktigarh, Kolkata 700032, India



SOCIETY FOR ETHNOPHARMACOLOGY

Globalizing Local Knowledge; Localizing Global Technologies Affiliated to: International Society for Ethnopharmacology e-mail: sfeindian@gmail.com; Tele-Fax: +91 – 33 2414 6046 Website: www.ethnopharmacology.in

MESSAGE

Human being has the right to live in natural atmosphere. The phrase "Health Culture" is new among consumers and scientific community for the past few years. "Health Culture" has multiple facets with immunity as the central focus. Impaired immunity is the most common problem nowadays. While not much development has taken place in pharmacological interventions in this area, ancient Indian system of medicines like Ayurveda has recommended several medicinal plants as "Rasayana". One of the important Rasayana is Guduchi, *Tinospora cordifolia*.

It is my great pleasure to welcome all the participants to the 6th Convention of Society for Ethnopharmacology, National Seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" being organized by the School of Natural Product Studies Jadavpur University, Kolkata in association with Society for Ethnopharmacology, India during September 07-08, 2019 at Jadavpur University, Kolkata

The Society for Ethnopharmacology, India is working in the field of promotion and development of traditional medicine. The society has taken great initiatives at national and international level towards dissemination of knowledge of medicinal plants and validation of drugs for several years. The thrust area of this national seminar is on the promotion of translation research of traditionally used Indian medicinal plants. I hope this seminar will provide an ideal platform for interaction and dissemination of ideas between scientists and stakeholders in different areas of medicinal plants and traditional medicine. I hope that this kind of scientific endeavor will promote more awareness both among consumers as well as scientists to promote the use of Guduchi.

I wish every success of this event.

Mr. Birendra Kumar Sarkar

President, Society for Ethnopharmacology, India & Managing Director, Parker Robinson Ltd 1, Nimak Mahal Road, Kolkata - 700043

SOCIETY FOR ETHNOPHARMACOLOGY 23/3 Saktigarh, Kolkata 700032, India



SOCIETY FOR ETHNOPHARMACOLOGY

Globalizing Local Knowledge; Localizing Global Technologies Affiliated to: International Society for Ethnopharmacology e-mail: sfeindian@gmail.com; Tele-Fax: +91 – 33 2414 6046 Website: www.ethnopharmacology.in

MESSAGE

The Society for Ethnopharmacology, India is working towards scientific promotion and development among consumers as well as scientists to promote the use of traditional medicine. The society has taken several initiatives at national and international level towards knowledge empowerment of traditional healers, scientists and stakeholders in the field of medicinal plants and validation of herbal drugs for several years.

It is my great pleasure to welcome all the participants to the 6th Convention of Society for Ethnopharmacology, National Seminar on "Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*" being organized by the School of Natural Product Studies Jadavpur University, Kolkata in association with Society for Ethnopharmacology, India during September 07-08, 2019 at Jadavpur University, Kolkata. The thrust area of this national seminar is on the promotion of translation research of traditionally used Indian medicinal plants.

I hope this seminar will provide an ideal platform for interaction and dissemination of ideas between scientists and stakeholders in different areas of medicinal plants and traditional medicine.

I wish every success of this event.

Mr. Indraneel Das Vice- President, Society for Ethnopharmacology India & Managing Director, Declibac Technologies Private Limited www.declibac.com

SOCIETY FOR ETHNOPHARMACOLOGY 23/3 Saktigarh, Kolkata 700032, India

6th Convention: SFE – INDIA, 2019

Natíonal Semínar on

"Translational Research of Traditionally used Indian medicinal plants

with special reference to Tinospora cordifolia"

September 07-08, 2019

Organized by:

School of Natural Product Studies Jadavpur University, Kolkata, India web: www.jaduniv.edu.in

In Association with:

Society for Ethnopharmacology (SFE - INDIA) 23/3 Saktigarh, Kolkata www.ethnopharmacology.in Venue: Jadavpur University, Kolkata

Organizing Committee:

Patron-in-chief Prof. Suranjan Das Vice Chancellor, Jadavpur University, Kolkata

Patrons

Dr. Snehamanju Basu

Registrar, Jadavpur University,

Kolkata

Prof. P. K. Ghosh Pro-Vice Chancellor, JU, Kolkata

Mr. Birendra K. Sarkar President, SFE-India & MD & CEO, Parker Robinson, Kolkata

Chairman

Dr. C K Katiyar Vice-President, SFE-India & CEO (Tech.), Emami Ltd., Kolkata

Organizing Secretary

Prof. Pulok K. Mukherjee Director, SNPS, JU. Kolkata & Secretary, SFE, India **Dr. C Bhattacharya** Dean, FET, JU, Kolkata

Mr. Indraneel Das Vice-President, SFE-India & Chairman & MD Declibac Technologies Pvt. Ltd, Kolkata

Co-Chairman

Prof. Pankaj Kumar Roy Dean, Faculty of ISLM, Jadavpur University, Kolkata

Joint Organizing Secretary

Dr. Pallab Kanti Haldar Jt. Director, SNPS, JU, Kolkata

ADVISORY BOARD

Dr. S. G. Sarkar Jt. Registrar, JU, Kolkata **Dr. Debabrata Saha** Development Officer, JU, Kolkata

Prof. Asis Mazumdar Director, SWRE., JU, Kolkata

Mr. Kaniska Sarkar Jt. Registrar, JU, Kolkata Mr. G. K. Pattanayak Finance Officer, J U, Kolkata Dr. B Karmakar Secretary, FET, JU, Kolkata Dr. R. Debnath CIPT, Uluberia, Howrah Dr. V. Ravichandiran Director, NIPER, Kolkata Mr. Sibeswar Saha Mentor, SFE, India Mrs. Sibylle U Saha Mentor, SFE, India Dr. Shanta Dutta Director, NICED, Kolkata

Mr. Siddhartha Bhattacharya Secretary, Faculty of ISLM, JU



LOCAL ORGANIZING COMMITTEE

Mr. Prabir banerjee SFE-India, Kolkata Dr. B. P. Saha SFE India, Kolkata Dr. Sanmoy Karmakar Dept. of Pharm. Tech, JU, Kolkata Dr. Saroj Pal SFE India, Kolkata Dr. S. C. Mandal SFE-India, Kolkata Dr. A. Bandhopadhay IICB, Kolkata Prof L.K Ghosh Dept. of Pharm. Tech, JU, Kolkata Mr. Amitava Das SFE India. Kolkata Dr. D Chattopadhyay SFE-India, Kolkata Mr. Anjan Saha SFE, India, Kolkata Dr. A. Mitra Scientist, NRIADD, Kolkata Dr. Rajib Bandyopadhyay Dept. of Inst. Engg., JU, Kolkata

Coordinators of SFE-India Local Chapter

Dr. Prakash Itankar SFE, Local Chapter, Nagpur Dr. Alka Mukne SFE, Local Chapter, Mumbai Dr. Sayeed Ahmed SFE, Local Chapter, Delhi Dr. Satyanshu Kumar SFE, Local Chapter, Anand, India Dr. D. Chamundeeswari SFE, Local Chapter, Chennai Dr. N Udupa SFE, Local Chapter, Manipal Dr. Pramod HJ SFE, Local Chapter, Belgaum, India Dr. Sathiyanarayan L SFE, Local Chapter, Pune Dr. Chandana C Barua SFE, Local Chapter, Guwahati Dr. Rajesh S Pawar SFE, Local Chapter, Bhopal

Researchers of the School of Natural Product Studies

Mr. Amit Kar SNPS, JU, Kolkata

Mr. Sayan Biswas SNPS, JU, Kolkata

Mrs. Kasturi Basu SNPS, JU, Kolkata

Mr. Shibu Narayan Jana SNPS, JU, Kolkata

Mr. Rupesh Banerjee SNPS, JU, Kolkata Mr. Milan Ahmad SNPS, JU, Kolkata

Mr. Subhadip Banerjee SNPS, JU, Kolkata

Ms. Akansha Sharma SNPS, JU, Kolkata

Ms. Seha Singha SNPS, JU, Kolkata

Mr. Barun Dasgupta SNPS, JU, Kolkata Mr. Joydeb Chanda SNPS, JU, Kolkata

Mr. Bhaskar Das SNPS, JU, Kolkata

Mr. Pradip Debnath SNPS, JU, Kolkata

Mr. Sayantan Sengupta SNPS, JU, Kolkata

Mr. Tanumoy Chatterjee SNPS, JU, Kolkata

School of Natural Product Studies

Jadavpur University, Kolkata, India Tele fax: + 91 33 24146046 e-mail:pulok.mukherjee@jadavpuruniversity.in www.jaduniv.edu.in



The School of Natural Product Studies, Jadavpur University (SNPS-JU) is working on exploring the scientific validation of natural products in respect of its quality, efficacy and safety and development of integrated approaches for promotion of natural products. The school is devoted to empower individuals with skills, spirit and experience required for the

promotion and development of natural products, through educational programme, research activities and sharing of experiences on the scientific validation of herbs for betterment of human healthcare. The school has got international recognition for its multifaceted activities with special reference to traditional medicine inspired drug discovery through various approaches:

- Dissemination of knowledge on education and research for promotion of natural products
- Chemo profiling of natural products and development of analytical techniques for quality control, and standardization of herbal medicine
- Network pharmacology and synergy evaluation of herbs and formulations used in AYUSH system of medicine.
- Validation of ethno-pharmacological claims: Promotion and development of complementary healthcare with medicinal plants through safety, efficacy and quality of natural products from Indian systems of medicine including Ayurveda, Unani, Homeopathy etc.
- Development and evaluation of herbal formulation from natural sources through industry institute partnership
- Globalization of traditional medicine and natural products

The school is working in the area of metabolomics and systems biology approaches for the quality, safety and efficacy evaluation of natural products for establishing molecular mechanisms and drug interactions leading to network pharmacology, synergy research and development of evidence based approaches for new generation of phytopharmaceuticals. In this field of research over 230 research and review articles has been published in various national and international peer reviewed impact journals; over 28 candidates has performed their PhD and are well settled in different national, international institutions and industries. The school is devoted for the evaluation of the holistic medicine which is useful bio-prospecting tools for the traditional medicine based drug discovery programme so as to make them available from '*Farm to Pharma*'. School has established several national and international collaborations among researchers in interdisciplinary, multidisciplinary and trans-disciplinary aspects with several Universities

and Industries to share knowledge and experiences in various fields of research related to botanicals. Its wider offerings include the field of:

- Screening and evaluation of natural products
- Evidence based validation and documentation of herbs used in ancient Indian systems of medicine
- Formulation development of herbal medicinal plants for therapeutic benefits for better health care
- LC-MS/MS based Metabolomic study and marker profiling of medicinal plants
- Network pharmacology of herbal drugs and traditional formulations to understand the mechanism of action.
- Evaluation of synergy to study the molecular interactions for pharmacological actions.
- Quality control and standardization of natural products
- Development of herbal drug delivery systems with plant extracts and metabolites of therapeutic importance
- Bioassay guided isolation and Lead finding in natural products
- High throughput screening methodologies for medicinal plants
- Scientific validation of ancient claims with medicinal plants in Ayurveda, Unani etc.
- Phytochemical and phytopharmacological studies for lead finding in natural products from the great ancient treatise of India.
- Herbal therapeutics pharmacokinetics and utilization of herbal drugs
- Development and evaluation of nutraceutical and dietary supplements
- Harmonization of regulatory requirements to ensure quality, safety and efficacy of the herbal products.

Some important publications of the research groups of the School of Natural Product Studies

- Banerjee S, Bhattacharjee P, Kar A, Mukherjee PK. LC-MS/MS analysis and network pharmacology of Trigonella foenum-graecum - A plant from Ayurveda against hyperlipidemia and hyperglycemia with combination synergy. Phytomedicine. 2019 May 29:152944.
- Chanda, J., Mukherjee, P.K., Biswas, R., Malakar, D., Pillai, M., 2019. Study of pancreatic lipase inhibition kinetics and LC-QTOF-MS-based identification of bioactive constituents of Momordica charantia fruits. Biomed. Chromatogr. 33, e4463.
- Biswas, S., Kumar Mukherjee, P., 2019. Validated high-performance thin-layer chromatographic–densitometric method for the isolation and standardization of ayapanin in Ayapana triplinervis. Journal of Planar Chromatography - Modern TLC 32, 41–46.
- Chanda, J., Mukherjee, P.K., Biswas, R., Biswas, S., Tiwari, A.K., Pargaonkar, A., 2019. UPLC-QTOF-MS analysis of a carbonic anhydrase-inhibiting extract and fractions of Luffa acutangula (L.) Roxb (ridge gourd). Phytochem Anal 30, 148–155.
- Goswami, D., Mahapatra, A.D., Banerjee, S., Kar, A., Ojha, D., Mukherjee, P.K., Chattopadhyay, D., 2018. Boswellia serrata oleo-gum-resin and β-boswellic acid inhibits HSV-1 infection in vitro through modulation of NF-κB and p38 MAP kinase signaling. Phytomedicine 51, 94–103. https://doi.org/10.1016/j.phymed.2018.10.016

- Biswas, R. Chanda, J., Kar, A., Mukherjee, Pulok K. Tyrosinase inhibitory mechanism of betulinic acid from Dillenia indica Food Chemistry, 2017, 232, 689-696
- Harwansh, RK., Mukherjee, Pulok K., Biswas, S. Nanoemulsion as a novel carrier system for improvement of betulinic acid oral bioavailability and hepatoprotective activity. Journal of Molecular Liquids, 2017, 237, 361-371
- Mukherjee Pulok K, Harwansh RK, Bahadur S, Banerjee S, Kar A, Chanda J, Biswas S, Ahmmed SKM, Katiyar CK. Development of Ayurveda – Tradition to trendJournal of Ethnopharmacology, 2017, 197, 10-24.
- Kar A, Pandit S, Mukherjee K, Bahadur S, Mukherjee Polok K. Safety assessment of selected medicinal food plants used in Ayurveda through CYP450 enzyme inhibition study Journal of Science and Food Agricultural. 2017, 97, 333-340
- Katiyar CK, Mukherjee Pulok K. Some excerpts from Charaka Samhita An ancient treatise on Ayurveda & healthy living. Journal of Ethnopharmacology, 2017. 197, 3-9.
- Katoch D, Sharma JS, Banerjee S, Biswas R, Das B, GoswamiD, Harwansh RK, Katiyar CK, Mukherjee Pulok K. Government policies and initiatives for development of Ayurveda Journal of Ethnopharmacology, 2017, 197, 25.31.
- Harwansh RK, Mukherjee Pulok K, Kar A, Bahadur S, Al-Dhabi NA, Duraipandiyan V. Enhancement of photoprotection potential of catechin loaded nanoemulsion gel against UVA induced oxidative stress. Journal of Photochemistry & Photobiology, B: Biology, 160 2016, 318–329.
- Bahadur S, Mukherjee Pulok K. Ahmmed SKM, Kar A, Harwansh RK, Pandit S. Metabolism-mediated interaction potential of standardized extract of Tinospora cordifolia through rat and human liver microsomes Indian Journal of Pharmacology, 2016, 48: 576-81.
- Biswas R, Mukherjee Pulok K, Kar A, Bahadur S, Harwansh RK, Biswas S, Al-Dhabi NA, Duraipandiyan V. Evaluation of Ubtan–A traditional indian skin care formulation Journal of Ethnopharmacology, 2016, 192, 283-291.
- Biswas R, Mukherjee Pulok K, Chaudhary SK. Tyrosinase inhibition kinetic studies of standardized extract of *Berberis aristata* Natural Product Research, 2016, 30,1451-54
- Harwansh RK, Mukherjee Pulok K, Bahadur S, Biswas R. Enhanced permeability of ferulic acid loaded nanoemulsion based gel through skin against UVA mediated oxidative stress. *Life Sciences*, 2015, 141, 202–211.
- Biswas R, Mukherjee Pulok K, Dalai MK, Mandal PK, Nag M. Tyrosinase inhibitory potential of purpurin in *Rubia cordifolia*-A bioactivity guided approach, *Industrial Crops and Products*, 2015, 74, 319–326.
- Sarkar R, Mondal C, Bera R, Chakraborty S, Barik R, Roy P, Kumar A, Yadav KK, Choudhury J, Chaudhary SK, Samanta SK, Karmakar S, Das S, Mukherjee Pulok K, Mukherjee J, Sen T. Antimicrobial properties of *Kalanchoe blossfeldiana*: a focus on drug resistance with particular reference to *Quorum sensing*- mediated bacterial biofilm formation. *Journal of Pharmacy and Pharmacology*, 2015, 67, 951-962.
- Harwansh RK, Mukherjee K, Bhadra S, Kar A, Bahadur S, Mitra A, Mukherjee Pulok K. Cytochrome P450 inhibitory potential and RP-HPLC standardization of Trikatu - A Rasayana from Indian Ayurveda. *Journal of Ethnopharmacology*, 2014, 153, 674–681.

- Sarkar R, Chaudhary SK, Sharma A, Yadav KK, Nema NK, Sekhoacha M, Karmakar S, Braga FC, Matsabisa MG, Mukherjee PK, Sen T. Anti-biofilm activity of Marula - A study with the standardized bark extract. *Journal of Ethnopharmacology*, 2014, 154, 170-175.
- Chanda, J., Mukherjee, Pulok K., Harwansh R., Bhadra, S., Chaudhary S.K., Choudhury, S.RP-HPLC simultaneous estimation of betulinic acid and ursolic acid in *Carissa spinarum*. *Natural Product Research*, 2014; doi.org/10.1080/14786419.2014.953496.
- Goyal RK, Bhise SB, Srinivasan BP, Rao CM, Sen T, Koneri R. Curriculum for pharmacology in pharmacy institutions in India: Opportunities and challenges. *Indian Journal of Pharmacology*, 2014, 46, 241-245.
- Bhattacharyya S, Majhi S, Saha BP, Mukherjee Pulok K. Chlorogenic acid–phospholipid complex improve protection against UVA induced oxidative stress. *Journal of Photochemistry and Photobiology B: Biology*, 2014, 130, 293–298.
- Bhattacharyya S, Ahammed SKM, Saha BP, Mukherjee Pulok K. The gallic acidphospholipid complex improved the antioxidant potential of gallic acid by enhancing its bioavailability. AAPS Pharm SciTech, 2013, 14, 1025-1033.
- Karmakar S, Padman A, Swamy Mane N, Sen T. Hypokalaemia- A potent risk for QTc prolongation in clarithromycin treated rats. *Eur. J. Pharmacol.*, 2013, 709, 80-84.
- Dalai MK, Bhadra S, Bandyopadhyay A, Mukherjee Pulok K. Evaluation of anticholinesterase activity of the standardized extract of Piper betel L. leaf. Oriental Pharmacy and Experimental Medicine, 2013, 14, 31-35.
- Nema NK, Maity N, Sarkar BK, Mukherjee Pulok K. Matrix metalloproteinase, Hyaluronidase & Elastase inhibitory potential of standardized extract of *Centella asiatica* (L.). *Pharmaceutical Biology*, 2013, 51, 1182-1187.
- Bhattacharyya S, Ahmmed SKM, Saha BP, Mukherjee Pulok K. Soya phospholipid complex of mangiferin enhances its hepatoprotective activity by improving its bioavailability and pharmacokinetics. *Journal of the Science of Food and Agriculture*, 2013, 94, 1380-1388.
- Mukherjee H, Ojha D, Bag P, Chandel HS, Bhattacharyya S, Chatterjee TK, Mukherjee Pulok K, Chattopadhyay D. Anti-herpes virus activities of *Achyranthes aspera*: An Indian ethnomedicine, and its triterpene acid. *Microbiological Research*, 2013, 168, 238–244.
- Mukherjee Pulok K, Nema NK, Maity N, Sarkar BK. Phytochemical and therapeutic potential of Cucumber. Fitoterapia, 2013, 84, 227–236.
- Mukherjee Pulok K, Nema NK, Venkatesh P, Debnath PK. Changing scenario for promotion and development of Ayurveda - way forward. *Journal of Ethnopharmacology*, 2012, 143, 424-434.
- Maity N, Nema NK, Sarkar BK, Mukherjee Pulok K. Standardized Clitoria ternatea leaf extract as Hyaluronidase, Elastase and Matrix-metalloproteinase-1 inhibitor. Indian Journal of Pharmacology, 2012, 44, 584-587.
- Nema NK, Maity N, Sarkar BK, Mukherjee Pulok K. Determination of trace and heavy metals in some commonly used medicinal herbs in Ayurveda. *Toxicology and Industrial Health*, 2012, 6, DOI:0748233712468015.

- Pandit S, Mukherjee Pulok K. Mukherjee K, Gajbhiye R, Venkatesh M, Ponnusankar S, Bhadra S. Cytochrome P450 inhibitory potential of selected Indian spices-possible food drug interaction. *Food Research International*, 2012, 45, 69–74.
- Mani Senthil Kumar KT, Puia Z, Samanta SK, Barik R, Dutta A, Gorain B, Roy DK, Adhikari D, Karmakar S, Sen T. The gastroprotective role of Acanthus ilicifolius - A study to unravel the underlying mechanism of anti-ulcer activity. *Scientia Pharmaceutica.*, 2012, 80, 701-717.

The school has made several outstanding, including globally acclaimed contributions for development from natural resources including Ayurveda, ethnopharmacology, herbal drug technology and others. The main stay of research is in the domain of natural product research so much so herbal medicine and allied approaches relating to their quality, safety and efficacy for scientifically validated natural product development. The facilities created should be utilized by the industries and others for betterment of health care for the community at large.

Several national/international collaborations have been made through this school with Indian and foreign universities and industries. Based on this context, MoU/ MoA has been signed with the following Universities / Institutions

- i. University of Bonn, Bonn, Germany, at the Faculty of Medicine, University Clinic Centre, Medical Clinic III, Ag Synergy Research, Bonn, Germany & Jadavpur University, School of Natural Product Studies, for joint research and exchange programs between both the institutes in the field of Synergy research of natural product; Signed MOU with university and working since 2017.
- **ii. University of Illinois, Chicago, USA**, at the Dept. of Pharmacy, University of Illinois at Chicago, USA & Jadavpur University, School of Natural Product Studies, for joint research and exchange programs between both the institutes in the field of natural product research; Signed MOU with university and working since 2014.
- **iii.** University of the Free State, Bloemfontein, Republic of South Africa at the Department of Pharmacology, of Health Science & Jadavpur University, School of Natural Product Studies, for joint research and exchange programs between both the institutes in the field of natural product research since 2016.
- **iv. Indian Institute of Technology, Roorke, Uttarakhand** at Department of Biotechnology & Jadavpur University, School of Natural Product Studies, for joint research collaboration between both the institutes in the field of medicinal plant research 2016.
- v. National Institute of Pharmaceutical Education and Research (NIPER), Kolkata & Jadavpur University, School of Natural Product Studies, for joint research collaboration between both the institutes in the area of natural product's research 2016.

- vi. ICMR-National Institute of Traditional Medicine, Balagavi, Karnataka& Jadavpur University, School of Natural Product Studies, for joint research collaboration between both the institutes in the field of medicinal plant research and drug development since 2017.
- vii. Sri Ramachandra University, Chennai, Tamilnadu & Jadavpur University, School of Natural Product Studies, for joint research collaboration between both the institutes in the field of Pharmaceutical sciences, since 2016.
- viii. Tokushima University, Japan at the Institute of Health Bio Sciences, Faculty of Pharmaceutical Sciences, Tokushima University, Japan & Jadavpur University, School of Natural Product Studies, on "Development of Natural Resources of Therapeutics for Allergy Including an Overview on The Development of Molecular Mechanisms for Activities Related With The Natural Health Products and Dietary Supplements" Signed MOU with university and working since 2015.
- ix. Belo Horizonte, Brazil, Faculty of Pharmacy –UFMG, Av. Antônio Carlos, 6627 for Trilateral Cooperation in Science & Technology between India, Brazil & South Africa Project entitled "Novel Drug Discovery and Development Approaches for the Pharmacological Immune Enhancers In Immune Compromised Individuals".
- x. Parker Robison Pvt. Ltd. 1, NimakMahal Street, Kidderpore, Kolkata 700043, for development of anti-ageing formulation from natural resources through tripartite collaboration between the industry, Jadavpur University and Department of Science and Technology, Govt. of India.

xi. Emami Ltd., Kolkata, 687, Anandapur, EM Bypass, Kolkata.

Technology for "Development and evaluation of 'Varnya' formulations from the medicinal plants of Ayurvedic importance" is being performed through Industry institute collaboration of Jadavpur University and Emami Ltd., Kolkata and MOU has been signed with the University. The work is in progress. The technology is being developed for commercialization and will be transferred to the industry accordingly.

xii. Albert David Limited, Chittaranjan Ave, College Square, Kolkata.

Technology for "Evaluation and standardization of hepato-protective formulation" is being performed with Industry institute collaboration of Jadavpur University and Albert David Limited, Kolkata. The work is in progress. The technology is being made ready for commercialization and will be transferred to the industry accordingly.

The school has been working on the dissemination of knowledge on various issues related to globalization of traditional medicine with international coordination and collaboration. The school has organized several national and international conferences, workshops, seminars in collaboration with scientists all over the world as follows:



- 5TH Convention of SFE INDIA, and the National Seminar [2018] National Symposium on Promotion and development of Indian medicinal plants with special reference- Brahmi (*Bacopa moneril*) organized by School of Natural Product Studies, Jadavpur University, Kolkata, in association with the Society of Ethnopharmacology, September 7-8, 2018.
- UK India Newton Bhabha Researcher Links workshop [2018] A workshop on Scopes and challenges for the development of novel antimicrobial agents from Ayurvedic medicinal plants to combat the problem of antimicrobial resistance jointly organized by School of Natural Product Studies, Jadavpur University, Kolkata and School of Health, Sports and Bioscience, University of East London, Stratford Campus, London at Jadavpur University during September 4-7, 2018
- 4th Convention of SFE INDIA, and the National Seminar [2017] on "Ashwagandha" was organized by School of Natural Product Studies, Jadavpur University, Kolkata, in association with the Society of Ethnopharmacology, 23/3 Saktigarh, Kolkata, India, during September 9-10, 2017 at Jadavpur University, Kolkata. This event was attended by more than 200 delegates from different parts of India with more than 180 scientific presentations.

- International Conclave on Ethnopharmacology in 7th World Ayurveda Congress & Arogya Expo, Kolkata, on "International Conclave on Ethno Pharmacology Traditional Health Practices", being organized by Vigyan Bharti Foundation, Banglore, India during December 02-03, 2016.
- 3rd Convention of SFE INDIA, and the National Seminar [2016] on "Analytical techniques for drug discovery & development form natural products" was organized by School of Natural Product Studies, Jadavpur University, Kolkata, in association with the Society of Ethnopharmacology (Affiliated to: International Society for Ethnopharmacology,UK), 23/3 Saktigarh, Kolkata, India, September 24, 2016.
- 2nd Convention of SFE INDIA, and the National Seminar [2015] on "Integrated Approaches for Promotion and Development of Herbal Medicine" was organized by School of Natural Product Studies, Jadavpur University, Kolkata, in association with the Society of Ethnopharmacology (Affiliated to: International Society for Ethnopharmacology,UK), 23/3 Saktigarh, Kolkata, India, from December 05-06, 2015.
- the National Seminar [2014], 1st
 Convention of SFE INDIA, and the National Seminar [2014], 1st
 Convention of SFE-India on "Opportunities in Medicinal Plant Research" November
 29-30, 2014, Kolkata was organized by School of Natural Product Studies, Jadavpur
 University in association with Society for Ethnopharmacology (SFE-INDIA), Kolkata.
- National Workshop [2013], on "Botanical identification and evaluation of Indian medicinal plants" November 20-26, 2013, Kolkata, India, organized by School of Natural Product Studies in association with Science Engineering Research Board (SERB), Department of Science and Technology (DST), New Delhi.
- National Conference [2011] on "Emerging Trends in Natural Product Research" February 12-13, 2011, This conference mainly highlighted the trends in natural product research with various aspects of scientific validation and evaluation of herbal medicinal products for their promotion and development.
- 12th congress of the International Society for Ethnopharmacology [ISE] held at Kolkata, from February 17-19, 2012, which was the First ISE congress organized in India, on "Traditional Medicines and Globalization–The Future of Ancient Systems of Medicine". The conference has evidenced more than 1000 delegation from 52 different countries.
- National Workshop [2010] on "Developing Quality Monographs for Pharmacopoeia for Herbs and Herbal Products" January 16-17, 2010, Kolkata, India organized by School of Natural Product Studies in association with Indian Pharmacopoeia Commission (IPC), National Medicinal Plants Board (NMPB), and Association of Pharmaceutical Teachers of India (APTI).

SOCIETY FOR ETHNOPHARMACOLOGY, INDIA [SFE -INDIA] "Globalizing local knowledge and localizing global technologies" 23/3 Saktigarh, Jadavpur, Kolkata 700032 (Affiliated to the International Society for Ethnopharmacology) Website: www.ethnopharmacology.in

Activities of Society for Ethnopharmacology, India

The Society for Ethnopharmacology (SFE) is a registered society under the West Bengal Society Registration act and affiliated to the International Society for Ethnopharmacology (ISE). The ISE is an international scientific organization of researchers dedicated to the interdisciplinary study of the pharmacological actions

of plants, animals, insects, and other organisms used in medicines of indigenous and modern, past and present, cultures. The society is also committed to the preservation and conservation of such practices for future generation.

After the grand success of the 12th International Congress of International Society for Ethnopharmacology (ISE) organized by the School of Natural Product Studies, Jadavpur University Kolkata in February 2012, the Society for Ethnopharmacology, India (SFE – India) was constituted in 2013. The Society is extremely grateful to Late Dr. APJ Abdul Kalam, former President of India, for his inspiration and support since its inception.

The Society for Ethnopharmacology, India (SFE - India) was constituted by the eminent academicians, researchers, industrialists and others with the vision of providing an environment for knowledge sharing among industrialists, researchers, students, healthcare-practitioners, decision-makers and others interested in promotion of Ethnopharmacology and medicinal plant. The mission of the society is promotion and development of traditional medicine and medicinal plants through dissemination of knowledge and development of collaboration and cooperation with the its vision on

"Globalizing local knowledge and localizing global technologies"

The society organizes conferences, seminars, symposiums, workshops etc in different parts of India for discussion and sharing knowledge on different issues for cultivation, production, quality evaluation, safety, clinical studies, biological screening and several other issues of natural product research. The Society helps in forming bridge between the academia and industry for developing cost effective natural remedies. Presently the Society has several local Chapters with dynamic Coordinators for individual chapters and over 600 members across the country. To recognize the outstanding contribution in the area of medicinal plant research and Ethnopharmacology, the Society has instituted several awards which are conferred during the International congress of the society every year. This year these awards is being conferred to the dignitaries as mentioned below:

- a) SFE Lifetime Achievement Award "Bisheswar Saha Memorial Award"
- *b)* SFE Outstanding International Ethnopharmacologist Award *"Pranab Banerji Memorial Award"*
- *c)* SFE Outstanding National Ethnopharmacologist Award *"Harihar Mukherjee Memorial Award"*
- d) SFE ZANDU Award for "Best Research on Plant Drugs" supported by Emami Ltd., Kolkata





- e) SFE Outstanding Service Award "Pratim Banerji Memorial Award" supported by Parkar Robinson Pvt. Ltd., Kolkata
- f) SFE- Dr. Tuhinadri Sen Oration Award
- g) SFE Herbal Industry Leader Award
- h) SFE Special Recognition Awards
- i) SFE Outstanding Local Chapter Award
- j) SFE- Young Ethnopharmacologist Award "Dr. PK Debnath memorial Award"

Society of Ethnopharmacology (SFE-INDIA) is dedicated for the dissemination of knowledge and information through different educational programmes throughout India and also to serve as a bridge between industry and academia for development of products, process for value addition and promotion of medicinal plants as well as herbal medicines used in ancient system of medicine and folklore and sharing of experience on the scientific evaluation of Ethnopharmacology of HMs for betterment of healthcare of the society. The major activities of the society are:

- Dissemination of knowledge for promotion and development of Ethnopharmacology and medicinal plants.
- To carry out the objectives of International Society for Ethnopharmacology.
- Organizing conferences, seminars, symposiums, workshops etc. in different parts of India.
- Promotion and development of Ethnopharmacology, Herbal Medicines, medicinal plants and other natural products in India.
- Promotion of the healthcare of the society.
- Sharing knowledge on various issues on cultivation, production and validation of traditional medicine, quality & safety evaluation, pre-clinical screening & clinical studies and several other issues of natural products.
- Act as a resource at local level for individuals including students interested in Ethnopharmacology.
- Encourage career growth and Knowledge empowerment of its members.
- Publishing journals, newsletters, documents, books, etc. for promotion of knowledge in the field of natural product research.

For dissemination of knowledge, several chapters of the society has been made at Guwahati, Bhopal, Chennai, Delhi, Manipal, Mumbai, Nagpur, Belgaum, Pune with active leaderships of the local chapter coordinators from different parts of India (Table 1). The society has organized several seminars, conference etc. throughout the country since its inception. These activities of SFE-INDIA have been shown in Table 2.

Name of the Chapter	Name of the Coordinator Details
Anand Local Chapter	Dr. Satyangsu Kumar Coordinator, Anand Local Chapter & Principal Scientist (Organic Chemistry) Directorate of Medicinal and Aromatic Plants Research, Anand, Gujarat, India
Belgaum, Local Chapter	Dr. Pramod HJ Coordinator, Belgaum, Local Chapter & Head-Pharm. Biotechnology KLE University, Belgaum, Karnataka, India

Table 1: Details of the local chapter coordinators of SFE-Inc

Bhopal, Local Chapter

Chennai, Local Chapter
Delhi, Local Chapter
Guwahati, Local Chapter
Manipal, Local Chapter
Mumbai, Local Chapter
Nagpur, Local Chapter
Pune Local Chapter

Some activities of the Society for Ethnopharmacology, India and its different local chapters:

The 6th International Congress of the Society for Ethnopharmacology (SFE), was organized by the Society for Ethnopharmacology, India during January 13-15, 2018 in association with the Manipal Academy of Higher Education (MAHE), Manipal, Karnataka, India during February 8-10, 2019. The theme of the congress was 'Medicinal plant and Traditional Medicine-Ethnopharmacology at the interface of local and global needs'. This congress was focused on several crucial and contemporary issues on the scientific study based on of Ethnopharmacology and medicinal plants by the renowned scientists throughout the world. This programme was attended by more than 350 participants. This programme also associated with the Synergy Symposium on "Synergey Research on Natural Drugs and Compounds" and Ethnopharmacology Conclave followed by interactive session with Traditional Healers for Documentation of Local Health Traditions (LHTs) and Ethno Medical Practices (EMPs). We will express our sincere thanks to the Prof. N Udupa, Prof. S. Khan and other active members of the organizing committee for their efforts to make the event successful.

- The International Conclave on "Ethnopharmacology, Ethno-medicine and Traditional Health Practices: Global Scenario" was organized by Society for Ethnopharmacology, Kolkata, India (SFE-India) jointly with World Ayurveda Foundation, Bengaluru, Karnataka at Ahmedabad, Gujarat, India as a part of 8th World Ayurveda Congress & AROGYA Expo (8th WAC), during December 16-17, 2018. The major thrust areas of the conference included "Learning from nature and our ancestor: Tradition meets Innovation". There was interactive session between traditional health practitioner and the scientists. The program was accomplished with a great success with an overwhelming response of more than 300 participants from different states of the country.
- The 1st International Conference on "Globalisation of Traditional Medicine" was organized by the School of Health Science, Mae Fah Luang University in association with the Society for Ethnopharmacology, India at Mae Fah Luang University, Chiang Rai, Thailand during December 6-7, 2018. The scientific program deals with a variety of topics focused on development of health care through herbals will be addressed. We are very much thankful to all the colleagues of the School of Health Science, particularly Dr Rawiwan, Organizing Secretary and her esteemed group members of Mae Fah Luang University, Chiang Rai, Thailand for taking keen initiatives with SFE India for organizing this event and developing the scientific program. This program had more than 70 scientific presentations with participation over 200 delegates from different parts of world.
- The Mumbai Local Chapter of SFE-India was organized National Seminar on "Nutraceuticals: Recent Trends and Advances" at Bombay College of Pharmacy, Mumbai, MH, India on November 30, 2018. This program was attended by more than 250 participants and had several scientific presentations. We would like to express our sincere thanks to Dr. Alka Mukne, Coordinator, Mumbai Local Chapter, SFE-India and her active team member for organizing this event.
- The 5th Convention of SFE-India and the National Symposium on "Promotion and Development of Indian Medicinal Plants – special reference to Brahmi (*Bacopa monnieri*) was organized by the School of Natural Product Studies, Jadavpur University in association with Society for Ethnopharmacology, India (SFE-India) at Jadavpur University, Kolkata on September 7-8, 2018. This convention has evidenced with participation over 350 participants from different states of the country and had more than 105 scientific presentations including oral and poster session.
- The 3rd International Conference (Innopharm 3) on "Academic and Industrial Innovations: Transition in Pharmaceutical, Medical and Biosciences" was organized by the Bhopal Local Chapter of SFE-India at Kala Academy, Panjim, Goa during October 22-23, 2018. The Society is very much thankful to Dr. Rajesh Singh Pawar for organizing such event for the promotion and development of SFE-India at large. This event was attended by more than 300 delegates and had several scientific presentation including oral and poster presentation.
- National conference entitled "Ethno-medicine and Traditional Health Practices in Northeast region of India" was organized in the collaboration with the NIPER Guwahati and the

Society for Ethnopharmacology, India on 25th August 2018 at NIPER Guwahati, Mirza Campus, Assam (INDIA).This conference focused on current issues related to drug discovery & development from medicinal and aromatic plants with their quality evaluation, validation and safety aspects. Distinguished deliberations provided information and new idea for activities within the frame of medicinal and aromatic plants of Northeast India. Young scholars to showed their progress and research potentials in herbal technology research. Researchers, scientists, pharmaceutical and chemical industries, drug regulatory bodies participated in discussions on development of nutraceuticals or phytopharmaceuticals from herbal sources and their sustainable development in Northeast region of India.

- 18th International Congress of International Society for Ethnopharmacology (ISE) and the 5thInternational Congress of the Society for Ethnopharmacology (SFE), India (ISE-SFEC 2018) was organized by the Society for Ethnopharmacology, India during January 13-15, 2018 in association with the Department of Pharmacy, Faculty of Pharmacy, University of Dhaka. The theme of the congress was 'Ethnopharmacology & Drug Development: Innovation meets Tradition' at Nabab Nawab Ali Chowdhury Senate Bhaban, University of Dhaka. It was focus on several crucial and contemporary issues on the scientific study based on of Ethnopharmacology and medicinal plants by the renowned scientists throughout the world. The scientists, educationists, students, regulatory bodies and manufacturers from 32 countries had attended. Moreover, about 150 Indian scientists, educationists, manufacturers and students were also participated in this big event. The total of 850+ delegates or participants attended this congress on traditional medicine including 650 from Bangladesh. Through this congress our students, teachers, manufacturers and regulatory body have enriched their knowledge and expertise through exchanging their views and ideas with national and foreign participants. This acquired knowledge definitely will help us to produce quality traditional medicines for the peoples of Bangladesh. Speakers from different parts of the world had given emphasis on herbs and plants as essential drugs in primary healthcare as it is derived from nature, which is very safe and useful for human health. We are very much thankful to Prof. Sitesh C Bachar, Prod. Abdur Rashid and other members of Dept. of Pharmacy, University of Dhaka for organizing this mega event.
- The 4th Convention of SFE-India; the National Symposium on "Ashwagandha" and Ethnopharmacology conclave on "Uses of Medicinal Plants by Traditional Healers of India – Local Health Tradition" was organized School of Natural Product Studies, Jadavpur University in association with Society for Ethnopharmacology, India (SFE-India) at Jadavpur University, Kolkata on September 09-10, 2-17. This convention has evidenced participation of over 300 participants from different states of the country and had more than 110 scientific presentations including oral and poster session.
- Several invited lectures by distinguished speakers were arranged by the SFE-India, Kolkata
 on emerging topics on Ethnopharmacology and promotion of medicinal plants by the Society
 office at Kolkata and also in collaboration with School of Natural Product Studies, Jadavpur
 University, Kolkata in every year to discuss different aspects of Natural Product Research by
 eminent scientists throughout the globe.
- A special issue on "Ethnopharmacology and validation of Traditional Medicine" was developed by Society for Ethnopharmacology, India and published in Indian Journal of Traditional Knowledge; Volume 14 (4), (October 2015). This special issue was edited by Dr. Pulok k Mukherjee; Dr. Tapan K Mukherjee. This issue is available in http://nopr.niscair.res.in/handle/123456789/32961.

- A special issue on "Ayurveda" was published in Journal of Ethnopharmacology, Elsevier Science, USA; Volume 197, Pages 1-306 (February 2017). This was an initiative by Society for Ethnopharmacology, India to promote Traditional Medicine. This special issue was edited by Dr. Pulok K Mukherjee; Dr. CK Katiyar and Dr. Bhushan Patwardhan. This issue is available in <u>https://www.sciencedirect.com/science/journal/03788741/197/supp/C</u>
- A special issue on Ashwagandha will be published in Journal of Ethnopharmacology, Elsevier Science, USA. This is an initiative by Society for Ethnopharmacology, India to promote Indian Medicinal Plants at large. This special issue will be edited by Dr. Pulok K Mukherjee; Dr. CK Katiyar and Dr. Bhushan Patwardhan.
- The society is publishing the News letter regularly in different aspects for development and promotion of medicinal plants and Ethnopharmacology. We are very excited by the keen interest of our members of SFE from a diverse number of institutes and industries throughout the country to share the knowledge in this regard.

With our limited strength, esteemed efforts and keen interest of our members we have been working for the promotion and development of medicinal plants and ethnopharmacolgy in various ways.

We cordially invite you all to join SFE-India in our efforts of "Globalizing local knowledge; localizing global technologies" for a healthier tomorrow, capitalizing the very rich heritage and culture that is so ethnic, so ancient and yet so Indian.

Mr. Birendra Kumar Sarkar President Society for Ethnopharmacology, India 23/3 Saktigarh, Jadavpur, Kolkata 700032 Prof. Pulok K Mukherjee Secretary Society for Ethnopharmacology, India 23/3 Saktigarh, Jadavpur, Kolkata 700032



SOCIETY FOR ETHNOPHARMACOLOGY

23/3 Saktigarh, Kolkata 700032, India; Affiliated to: International Society for Ethnopharmacology email: sfeindian@gmail.comwww.ethnopharmacology.in



Dr. Birendra K. Sarkar President



Dr. Bishnu Pada Saha Treasurer



Dr. D. Chattopadhyay News Letters and Publicity



Mr. Anjan Saha Chairperson Volunteer Engagement & Maintenance



Mr. Indraneel Das **Vice-President**



Vice-President



Mr. Sibeswar Saha



Mentor



Dr. Pulok K. Mukherjee Secretary



Mrs. Sibylle U Saha



Dr. Sanmoy Karmakar Chaiperson News Letters and Publicity Website & Management



Dr. Prabir Banerjee Chairperson Governance



Mr. Amitava Das Chairperson Volunteer Engagement & Maintenance



Dr. S. C. Mandal Chairperson Strategic Planning for ssemination of Knowledge



Mr. Amit Kar Chairperson Volunteer Engagement & Maintenance



SOCIETY FOR ETHNOPHARMACOLOGY 23/3 Saktigarh, Kolkata 700032, India;

Affiliated to: International Society for Ethnopharmacology, UK email: sfeindian@gmail.comwww.ethnopharmacology.in



Prof. Manju Sharma Shri Shekhar Dutt Dr. B Suresh Former Secretary DBT, Govt. of India, New Delhi



Former - Governor Chhattisgarh, India

President Pharmacy Council of India

Dr. S S Handa Former Director IIIM(CSIR), Jammu

SFE - ADVISORS



Dr. C K Kokate Vice-Chan KLE University, Belgum



enior Dire GPS, USA



Dr. S P Thyagrajan Dr. M. Heinrich SRMU, Chennai University of London, UK



Dr. R K Goyal Vice Chancellor DIPSAR, New Delhi



Dr. T K Mukherjee Dr. Y K Gupta Former Editor IJTK, New Delhi

Dr. R. Verporte AIIMS, New Delhi



Professor emeritus Leiden University

Netherland

Dr. P. Paul enior Direct GPS, USA



Dr. MG Matsabisa Professor University of the Free State South Africa



Dr. Marco Leonti University of Cagliari Cagliari, Italy



Dr. B Patawardhan Dr. Anna K. Jager UGC, India



Dr. B. G. Shivananda Dr. Dilip Ghosh etary, APTI, India



Dr. S K Pandey Pt. RSU, Raipur



Dr. O. P. Ajagbonna University Of Abuja, Nigeria.





Professor University of Zurich Switzerland



Dr. JN (kOBUS)Eloff Professor University of Pretoria South Africa



Dr. Zhao Zhongzhen Dr. Gudrun Ulrich-Merzenich Professor Hong Kong Baptist University, China



Research Director KHS-MRC, Mumbai



University Hospital Bonn Bonn, Germany



Ms. Kasturi Basu Associates

Asso

Associates

Mr. Pradip Debnath Mr. Barun Dasgupta Mr. Rupesh Banerjee Mr. Shibu Narayan Jana Associates Associates





e mail : sfeindian@gmail.com ; Website: www.ethnopharmacology.in





ISE

(SFEC 2020)

www.ethnopharmacology.in

New Delhi, India February 15-17, 2020

Ethnopharmacology in development of scientifically validated quality products from Medicinal plants and Regulatory aspects

Organized by

School of Pharmaceutical Education and Research Jamia Hamdard New Delhi, India

In association with

Society for Ethnopharmacology, India Saktigarh, Jadavpur, Kolkata, India www.ethnopharmacology.in

CV & ABSTRACT OF SPEAKERS

6th Convention of SFE-INDIA & National Symposium on

""Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*"

September 07-08, 2019

JADAVPUR UNIVERSITY, KOLKATA, INDIA

——— School of Natural Product Studies, Jadavpur University ———— 1

—— 6th Convention: Society for Ethnopharmacology, India, 2019 —

Dr. Thirumalachari Ramasami

Former Secretary to the Government of India, Ministry of Science and Technology

Dr T. Ramasami is the former secretary to the Government of India. He served in the Ministry of Science and Technology during May 2006-14. Prior to joining DST as Secretary, he was the Director of Central Leather Research Institute, Chennai during 1996- 2006. He has made some important research contributions in the areas of chemistry of chromium, electron transfer phenomena, molecular sciences, environmental sciences and technology as a scientist. His contribution to the changes in the technological paradigm in Indian leather sector based on "Do Ecology" options are well known. During the period of his directorship, CLRI made some impactful contributions. His tenure in DST as Secretary saw some landmark changes in both department and in Indian science, technology and innovation sector. He was a major contributor to the ideas behind, INSPIRE, PURSE, formation SERB and formulation of Science, Technology and Innovation policy 2013. He is winner of Bhatnagar prize in chemical sciences in 1993, Padma Sri 2001, Padma Bhushan 2014 and many others. He is Fellow of Indian Academy of sciences, Indian National Science Academy, The National Academy of Sciences and India, Indian National Academy of Engineers, and The World Academy of Sciences.

Translational Research for Human Health Care: An insight

T. Ramasami

Former Secretary to the Government of India, Ministry of Science and Technology, Nayudamma Abdul Wahid Chair Professor Centre for Academic Research and Excellence Central Leather Research Institute Adyar, Chennai, 600 020

Texture of translational research for human health care differs significantly from those of basic and applied research in several ways. Translational research demands multilateral conversations among social & natural scientists, economists, stake holders, industry, trade and policy professionals. Translational research in human health care delivery involves many steps with both scientific and sociological dimensions with technical, legal and moral implications. Translation of a research finding into society is a many step process involving humans, patients, health care practitioners and community. Migration of a research finding of a laboratory into clinical practice in modern world is a multi-layer process. Whereas in management of infectious diseases, modern science has delivered viable and visible outcomes, in treatment of metabolic diseases, limitations of modern science built on reductionism and theory of causality have become evident. Current global models for human health care are resource intensive and not sustainable. The outcomes of R&D based on resource intense models are not affordable to many countries in the world and more than 60% of the global population. Health care based on traditional medicine of the orient built on the principle of integrative biology is not only affordable for management of metabolic and autoimmune diseases but could also easily lend itself to efficient models in translational research. A personal insight into new ways of translational research for traditional medicine will be shared for consideration.

Shri. Shekhar Dutt

Former Governor, State of Chhattisgarh

Shri. Shekhar Dutt was the governor of the Indian state of Chhattisgarh. Earlier he had served on various bureaucratic posts including, as an IAS officer, as Secretary in the Ministry of Defence of the Government of India. Dutt belongs to the 1969 batch of IAS from Madhya Pradesh cadre. Dutt became a short service commission officer in the Indian Army and was awarded the Sena Medal for gallantry during the Indo-Pakistani War of 1971. He held various posts in the Madhya Pradesh government, including Principal Secretary in the Department of Tribal and Scheduled Caste Welfare and Principal Secretary, Departments of School Education, Sports & Youth Welfare. Dutt was appointed of Secretary of the Department of Ayurveda, Yoga, Naturopathy, Unani, Siddha & Homeopathy in the Ministry of Health and Family Welfare of India. As Director General of the Sports Authority of India, Dutt played a role in the hosting of the Afro-Asian Games in Hyderabad, India in November 2003. He eventually became the Joint Secretary in the Department of Defence Production and later took over as the Defence Secretary of India in 2005. In July 2007, Dutt retired as Defence Secretary and was appointed Deputy National Security Advisor for a two-year term. In September 2009, Dutt was named to the board of trustees of DeSales University. On 23 January 2010, he assumed the office of the Governor of Chhattisgarh, the post to which he served till his resignation on 2014.

—— 6th Convention: Society for Ethnopharmacology, India, 2019 ——

Dr. Vinod Kumar Joshi

Emeritus Professor, Department of Dravuyaguna, Faculty of Ayurveda Institute of Medical Sciences, Banaras Hindu University, VARANASI-221005

Vinod Kumar Joshi is presently honored as Emeritus Professor since 31st December, 2018 after superannuation on 31st May 2018 in Dravyaguna Department, Faculty of Ayurveda, Institute of Medical Sciences, Banaras Hindu University. He was Head of the Department and also Dean of the Faculty of Ayurveda. Supervised 10 Ph.D. and 23 M.D. (Ay.) theses, at present 3 PhD scholars are working under him. He is Chairman of the Ayurvedic Pharmacopeia Committee, since Nov., 2013; member of the Governing Body of CCRAS and the Governing and Executive Council member of the All India Institute of Ayurveda Ministry of AYUSH, Govt. of India, and New Delhi. He is referee of the International and National Journals. He is recipient of many awards, a few notable are; Lifetime Achievement Award, All India Institute of Medical Sciences, Zandu International Oration for research contribution to Ayurvedic Products. He has published 105 scientific papers in-International and National Journals to his credit.

6th Convention: Society for Ethnopharmacology, India, 2019

Tinospora cordifolia in traditional Indian medicine- Ayurveda to improve health outcome

Dr. Vinod Kumar Joshi

Emeritus Professor Department of Dravuyaguna, Faculty of Ayurveda Institute of Medical Sciences, Banaras Hindu University, VARANASI-221005

Tinospora cordifolia (L.) Miers of Menispermaceae Family is the botanical source of the Guduchi used as one of the audbhid dravyas (plant substances) in Ayurveda since ancient times. In original scriptures of Ayurveda i.e. Charaka Samhita and Susruta Samhita of 1000 BCE hundreds of its uses to maintain the Healthy long life and to alleviate the disorders are specified. In fact, Guduchi is Sanskrita language based name and the etymological derivation of the guduchi is; gudati rakshati rogebhyo iti guduchi, 'which signifies to protects from disorders'. Ayurveda advocates that it is having invariable properties, which is responsible for multidimensional therapeutic action. In Charaka Samhita it is recommended to enhance power of; retention of memory, recollection and acquisition. On comprehensive review of the Guduchi in Ayurvedic Classics, a few of the interesting facts were observed as follows; its leaf is used as food substance and stem, root, seed possesses medicinal value and recommended as rasayana (health promotive), medhya (intellect promoting), ayuskara (life sustaining) and IN common and complicated disorders like jvara(fever), kasa (cough), svasa (dyspnoea), kamla (jaundice), kustha (dermatopathies), gulma (abdominal lump), yakshma (tuberculosis) etc. Its single and compound preparations like churna (powder), vati (tablet), kasaya (decoction), medicated-ghrita (clarified butter), taila (oil), asava and arista (natural alcoholic preparation) etc. are described. It is worth to mention here that in most of the parts of our country it is available throughout the year and found as climber on tree.

——— School of Natural Product Studies, Jadavpur University ———

— 6th Convention: Society for Ethnopharmacology, India, 2019 —

Dr. Urmila Thatte

Professor and Head, Department of Clinical Pharmacology, Seth GS Medical College and KEM Hospital, Mumbai

Dr. Urmila Thatte is Professor and Head at the Department of Clinical Pharmacology, Seth GS Medical College and KEM Hospital, Mumbai. She has an M.D. and Ph.D. in Pharmacology from the University of Mumbai, a Diplomate of the National Board of Examinations, New Delhi, in Clinical Pharmacology and is a Fellow of National Academy of Medical Sciences, New Delhi. Dr. Thatteis a Member of the Subject Expert Committees (Govt. of India) for review of new drug applications and the Expert Committee set up by the Ministry of Health and Family Welfare for deciding compensation for Research Related Injury. She also serves on Scientific Advisory committees as a Clinical Pharmacology expert of the ICMR. Dr. Thatte is the Member Secretary, Forum for Ethical Review Committees in the India (FERCI), Chair of the Signal Review Panel, Pharmacovigilance Programme of India, member of the WHO Expert Advisory Panel on Drug Evaluation and Asia-Pacific Consortium, International Society of Pharmacoeconomics and Outcomes Research (ISPOR). Dr. Thatte serves on the National Ethics Committee of NACO and chairs the Ethics Committees of the IIT-B and Bombay Hospital. She also serves on he Institutional Ethics Committee of KEM Hospital as well as on the Independent Ethics Committee, Mumbai. Having won several prizes at the undergraduate level, her team's research work has been recognised by the prizes they have won in scientific conferences. Dr. Thatte has been awarded the prestigious Dr. KN Udupa Award for Excellence in research in Ayurveda by IASTAM. She was conferred the "Excellence in Drug Research Award" (Traditional Medicine) by the Central Drug Research Institute, the prestigious Dr. BN Ghosh Oration of the Indian Pharmacological Society on the topic "Herbal Drug Development - Opportunities and Challenges" and the Dr. Faroque Abdullah Oration of SMS Medical College, Jaipur on "Ethical Issues in Clinical Research". She has over 220 Publications in National and International Journals including 8 books and 20 chapters in various books on clinical pharmacology to her credit. Dr. Thatte was the Clinical Pharmacology Section Editor for Clinical Pharmacology for the API (Association of Physicians of India) Textbook of Medicine published in 2008.Dr. Thatte is in the core team that authored the 2017 edition of the ICMR Ethical Guidelines for Biomedical Research.

——— 6th Convention: Society for Ethnopharmacology, India, 2019 ——

Dr. Dipendra Kumar Mitra

Head, Department of Transplant Immunology & Immunogenetics, All India Institute of Medical Sciences, New Delhi

Prof. Dipendra Kumar Mitra works in AIIMS since 2004. He is an MD, Ph.D, trained in Stanford in the lab where flow cytometry was invented by Professor L.A. Herzenberg. His area of research interest is to understand the role of various lymphocyte subsets, particularly at local pathological site in disease pathogenesis. Currently he heads the Department of Transplant Immunology & Immunogenetics, AIIMS. His current research focuses on local immune response among patients with chronic intracellular infections (TB, Leishmaniasis, Leprosy, HIV-TB), Rhematoid Arthritis and transplant patients. He runs several projects funded by various national and International agencies. His laboratory also offer diagnosis services for patient with leukaemia and immune deficiency disorders. Since 2004, he guided 6 PhD. students and several DM students to complete their thesis.

———— 6th Convention: Society for Ethnopharmacology, India, 2019 —

Host immune response profile and impact of blocking PD-1 pathway on protective immune response in tuberculosis patients

Dipendra Kumar Mitra

Department of Transplant Immunology & Immunogenetics, All India Institute of Medical Sciences, New Delhi, India.

Host T cell response plays a critical role in containment of *M. tuberculosis* (Mtb) infection. Regulatory T cells, mediate suppression through contact dependent involving programmed cell death protein 1 (PD-1) and contact independent involving suppressive cytokines. In this study, we evaluated the status of host immune response among the Drug Resistant (DR) and Drug Sensitive (DS) TB patients. We also checked the contribution of PD-1 pathway and Tregs on poly-functional T cells (PFTs), critical for protective immunity in TB. We observed increase in theEx vivo frequency of Tregs in Drug Resistant (DR) as compared to Drug Sensitive (DS) TB patients. Invitro stimulation of PBMCs showed decrease in frequency of Mtb specific T cell cytokine producers (IFNy or TNF- α or IFN-y+ TNF- α +)) in DR as compared to DS patients. We observed that the PFTs (IFN- γ + TNF- α +) facilitating granuloma formation and maintenance undergo apoptosis in TB patients due to higher expression of PD-1. In addition, we observed rescue of PFTS and reduction of Tregs in TB patients by blocking PD-1. Blocking PD-1 pathway in vivo among mice infected with Mtb, demonstrated restoration of PFTs with enhanced reduction of bacillary load relative to chemotherapy alone. In addition, we observed modulation of Mtb efflux pump expression in presence of pro-inflammatory and anti-inflammatory cytokines. Our results demonstrate elicitation of weaker effector T cell response in DR TB compared to DS TB patients. Additionally, our results showed that rescuing appropriate immune response improves the efficacy of anti-tubercular therapy in TB.

— 6th Convention: Society for Ethnopharmacology, India, 2019 —

Prof. N. Udupa

Research Director, Manipal Academy of Higher Education, Manipal, Karnataka, India

Dr. N. Udupa Professor and Research Director, Manipal Academy of Higher Education, Manipal, Karnataka, India obtained BPharm, MPharm and PhD graduated from Banaras Hindu University, Varanasi. He worked in pharmaceutical industries (IDPL and Citadel) for 8 years. He has been working in academics for more than 3 decades. He is presently working as Research Director at Manipal University, Manipal. He was Convenor-Scientific Services of Indian Pharmaceutical Congress Association. He was the chief coordinator of 62nd IPC at Manipal in 2010. He has guided more than 100 MPharm and 30 PhD students. Dr Udupa has received enormous funding from various agencies such as UGC, CSIR, DST, DBT, ICMR, AICTE and many industries. Dr. Udupa has published more than 500 articles in national and international journals and is editor of 12 books. He has 9 Indian patents to his credit. He has more than 425 conference presentations and delivered 125 gust lectures. He is recipient of many prestigious awards such as Premchand Dandiya Endowment Trust Award, Principal of the Year award from APTI, 54th IPC trust Pharmacy Teacher of the year Award, Pharmaceutical Scientist of the year award IAPST, IPA Fellowship Award 2009, STARS Award, Prof C J Shishoo Award from APTI, Acharya P C Ray Gold Medal Award, "Schroff Memorial National Award" by IHPA in 2012.

6th Convention: Society for Ethnopharmacology, India, 2019

Guduchi (Tinospora cordifolia): A wonder plant with various medicinal uses

N Udupa

Research Director, Manipal Academy of Higher Education, Manipal 576104, Karnataka State, India

Medicinal importance of natural plant products is gaining immense significance in clinical research due to their reduced side effects. Tinospora cordifolia, commonly known as "Guduchi", a deciduous climbing shrub of the Menispermaceae family, is recognized for its traditional Avurvedic uses. Isolation of the active components from the plant have led to the discovery of a variety of medicinal properties of Guduchi. Alkaloids have been shown to possess anti-cataract and anti-cancer activity in mice. Glycosides derived from the stem have shown anti-oxidant properties. Steroids from aerial portions of stem have shown anti-osteoporotic effects in mammals. Aliphatic compounds such as octacosanol can modulate pro-inflammatory cytokines such as IL-6 and inhibit endothelial cell proliferation in tumour cells of mice. Immunomodulatory and cytotoxic properties have been shown by active compounds such as tinocordiside and syringin through increase in nitric oxide production, reactive oxygen species and elevation of the phagocytic activity of macrophages. Anti-stress property of the plant has been clinically tested showing good results in children with behavioural disorders. The plants extract also exhibited hepatoprotective action. Upper respiratory tract infections in children were treatable with Guduchi and it also served as an antipyretic. Tinospora cordifolia has antidiabetic potential due to the presence of phytoconstituents such as tannins, flavonoids, alkanoids, saponins and steroids. A clinical study has been undertaken to assess the anti-diabetic and anti-obesity properties of this plant and the results are encouraging. Tinospora cordifolia is thus a versatile plant with diverse medicinal uses.

—— 6th Convention: Society for Ethnopharmacology, India, 2019 ——

Mr Akshay Charegaonkar

Director, Anchrom Enterprises (I) P. Ltd., Mumbai

Mr Akshay Charegaonkar is the Director of Anchrom Enterprises, Mumbai. He did his BS in Chemistry from Rochester Institute of Technology, in New York state in 2008. He was actively involved in non-academic activities, as well. Subsequently, he worked in Vicor Corp. near Boston for a year, working on polymers in a semiconductor housing context. He resigned in order to return to India to pursue higher studies as well as manage family business. At Anchrome he looks after Business Development for all aspects of business including the India-specific HPTLC Application Research Laboratory. As a part of this responsibility, he has been visiting Camag, Switzerland and Mitsubishi latron, Japan. He has delivered numerous lectures on HPTLC all over India. Co-author of a poster on HPTLC-MS put up at ASMS 2015 at St. Louis, USA.

HPTLC in Pharmaceutical and Herbal Analysis

Akshay Charegaonkar

Director, Anchrom Enterprises (I) P. Ltd., Mumbai

High Performance Thin Layer Chromatography (HPTLC -a planar chromatography) using appropriate instruments and standardised methodologies is a useful tool in pharma industry today. It answers all the requirements for analytical data which is mandatory as per the regulations. For assay determination of pharmaceutical drug in formulations, accurate quantification is required using methods that meet the ICH guidelines for validation. HPTLC using appropriate instruments and standardised methodologies is mandatory for materials of botanical origin. It is now official in the USP 2015 with respect to chapters 202, 203 and 1064. Botanical origin materials (plant extracts powder viz. uni-and poly herbals, essential oils, tinctures. and phytopharmaceuticals), medicinally used stem, bark, roots, flowers, rhizomes, seed, whole plant and nutraceuticals have a complex matrix with multiple metabolites which can be very well resolved only by using this technique. Establishing the validation parameters such as reproducibility, accuracy (recovery) that can very well work out using HPTLC technique. It is a form of visible chromatography with proper documentation in the UV, Visible and Fluorescence region is possible. This can be further supplemented with derivatisation technique for the metabolites for selectivity, specificity etc. Further with proper markers, metabolites can be quantified using densitometric scanning. The Instrument running and documenting applications are software driven which is 21 CFR Part 11 compliant and hardware is IQ, OQ compliant. In pharma, studies with respect to impurity profiling, dissolution analysis, degradation studies, fixed dose combination drug analysis (MOA not present in IP) and content uniformity with respect to the label claim can be done using HPTLC. HPTLC offers a low cost guide and visual analysis in a modern way.

6th Convention: Society for Ethnopharmacology, India, 2019 —

Dr. S. Rajan

Head, at Centre of Medicinal Plants Research in Homoeopathy, Ministry of AYUSH, Government of India, Emerald, The Nilgiris, Tamil Nadu

Dr. S. Rajan (b. 1960) is holding the position of Scientist and Head, at Centre of Medicinal Plants Research in Homoeopathy, Ministry of AYUSH, Government of India, Emerald, The Nilgiris, Tamil Nadu. He took his MSc degree from Annamalai University and PhD degree from Tamil University, Thanjavur. He has rich academic and professional experience as a Scientist (Plant Taxonomist) for nearly 35 years. His major areas of research thrust are Taxonomy and Ethnobiology. He is a recipient of "Young Scientist Award" and "Gold Medal" from Sri Venkateshwara University, Tirupati for his contribution in the field of natural medicines in the year 1997. He is also the recipient of "Talented Scientist Award" from Sri Venkateshwara University, Tirupati for his contribution in the field of Herbal medicines and its products at International level in the year 2008. Similarly he has received "International Talented Conservation Award" at University of Colombo, Colombo, Sri Lanka. Currently, he is an active editorial board member in scientific journals. He has 10 books and 15 articles on edited books and 60 research articles to his credit in various National and International scientific journals. He is an active member in many professional bodies. He is examiner to various universities for Postgraduate, M.Phil. and Ph.D. research courses. He has guided 4 M.Phil. and 2 Ph.D for his credit.

———— 6th Convention: Society for Ethnopharmacology, India, 2019 —

Important Ayurvedic Medicinal Plant *Tinospora cordifolia* (Willd.) Miers ex Hook.f. & Thoms. and its Cultivation methods.

S. Rajan

Centre of Medicinal Plants Research in Homoeopathy, Ministry of AYUSH, Government of India, 3/126, Indira Nagar, Emerald-643209, The Nilgiri District Tamil Nadu, India.

T. cordifolia belongs to the family Menispermaceae which comprises 40 species that are distributed in tropical Africa, Madagascar, Asia to Australia and the Pacific Islands. In India, the genus is represented by 4 species namely; *T. cordifolia* (Willd.) Miers ex Hook.f. & Thoms.; *T. crispa* (L.) Hook.f. & Thoms.; *T. glabra* (Burm.f.) Merr. And *T. sinensis* (Lour.) Merr., are reported. *T. cordifolia* (Willd.) Miers ex Hook.f. & Thoms. is commonly called 'Guduchi' is an evergreen perennial woody climber. It is important medicinal plant in Ayurvedic system and nominated as Rasayana and stem is a component of several preparations. The whole plant is used medicinally and the stem is accepted for use in medicine in Ayurveda because of its high content of alkaloid in the stems than the leaves. The plant is also used by the different ethnic communities in India for various ailments as a curative purpose. The present article is an attempt to highlight the various propagation techniques of *T. cordifolia* diverse methods from collection of seeds to till the harvest techniques have been discussed.

—— 6th Convention: Society for Ethnopharmacology, India, 2019 —

Prof. Asis Mazumdar

Nodal Coordinator of Regional cum Facilitation Centre (RCFC), Eastern Region, National Medicinal Plants Board (NMPB), Ministry of AYUSH, Govt. of India, Jadavpur University, Kolkata

Prof. Dr. Asis Mazumdar is the Nodal Coordinator of Regional cum Facilitation Centre (RCFC), Eastern Region, National Medicinal Plants Board (NMPB), Ministry of AYUSH, Govt. of India, Jadavpur University, Kolkata since its inception in 2017-18. He has gained expertise in medicinal plants during his tenure as Coordinator, Regional Centre, National Afforestation & Eco-Development Board (NAEB), Ministry of Environment Forests & Climate Change, Govt. of India, India in last 16 years. He has the credit of research, publications and Ph.D. guidance on medicinal plants apart from more than 20 Ph.D. thesis guidance, 114 publications in peer reviewed impact journals and 3 books authored/edited and 9 book chapters as Director, School of Water Resources Engineering, Jadavpur University on Hydraulics and Water Resources Engineering, Hydrological and Limnological Modeling, Climate Change and Natural Resources Management in his 30 years of experience. He served as the Chairman, State Level Expert Appraisal Committee (SEAC), Govt. of Mizoram; Member, Arsenic Task Force, Govt. of West Bengal, Nodal Officer, Key Resource Centre - Ministry of Drinking Water and Sanitation, Govt. of India; Expert Member of Green Technology Watch Group (Forestry Sector), Department of Science and technology, Govt. of India with innovative and outstanding contributions in academic and research.

———— 6th Convention: Society for Ethnopharmacology, India, 2019 —

Brief of Regional-cum-Facilitation Centre (RCFC), Eastern Region

Prof. Asis Mazumdar

Nodal Coordinator of Regional cum Facilitation Centre (RCFC), Eastern Region, National Medicinal Plants Board (NMPB), Ministry of AYUSH, Govt. of India, Jadavpur University, Kolkata

Regional-cum-Facilitation Centre (RCFC), Eastern Region, National Medicinal Plants Board (NMPB), Jadavpur University has been established as one of the seven such Centres in different regions (East, West, North-I, North-II, South, Central and North East) of the country under the Ministry of AYUSH, Government of India during 2017-18. This RCFC, NMPB for Eastern Region will act as one stop center for the growers, cultivators, researchers, traders and other stakeholders of medicinal plants. The centre caters the state of Bihar, Jharkhand, Odisha, West Bengal & Sikkim and would function in close co-ordination with State Medicinal Plants Board (SMPBs), the State implementing agency of the medicinal plants component of the AYUSH Mission. The RCFC, NMPB is to provide a service window for growers of medicinal plants for supporting conservation, development, marketing, cultivation and provide handholding support to stakeholders in terms of technology dissemination and also for establishing primary processing facilities etc. besides undertaking identified research relevant to the area concerned as and when assigned.

The major functions of the RCFC, NMPB are:

- To act as multifaceted facilitating arm of NMPB
- Development of Quality Planting Materials (QPM)
- Development of Agrotechnology of medicinal plants
- Setting up of primary processing, grading, marketing facilities
- To develop managerial and technical skill among the stakeholders
- Facilitation of sale of medicinal plants and produces
- To provide inputs on conservation, sustainable cultivation, technology upgradation, training & research
- Domestication of wild species in demand
- To function as a platform for bringing together the different stakeholders
- To organize periodical meetings, workshops, consultation of stakeholders
- To review of the projects sanctioned by NMPB to various organizations
- To collect and maintain database of all concerned Sectors of the Medicinal Plants in the states and Integration of database of various States of the region concerned.
- To develop strategy for Information, Education and Communication (IEC) and its implementation.
- To document and disseminate success stories of activities supported by NMPB.

- School of Natural Product Studies, Jadavpur University ----- 17

— 6th Convention: Society for Ethnopharmacology, India, 2019 —

Dr. Motlalepula Gilbert Matsabisa

Professor, Dept. of Pharmacology, Faculty of Health Science, University of the Free State, Bloemfontein, South Africa

Dr. Matsabisa has a PhD in Pharmacology. He is currently the Director of the Indigenous Knowledge Systems (Health) Lead Programme (IKS) at the Department of Pharmacology, Faculty of Health Sciences at the University of the Free State. He served on Medicines Control Council and he is a current member of the Complementary Medicines Committee of Medicines Control Council (MCC). Dr Matsabisa serves on the DOH Traditional Health Practitioners Council and Chairs the Research and Health Committee of the same council. Dr Matsabisa is also a member of the WHO Afro Regional Expert Committee on Traditional Medicines. He serves in the Steering Committee on Regional Initiative on Traditional Medicines and HIV and AIDS in Eastern & amp; Southern Africa (RITMA). Dr MG Matsabisa is also an advisory member of the Indian Traditional Medicines Systems. He is also a member of the steering committee on access and benefit-sharing review of the Biodiversity Management Act. He is also a member of the SA Military Health Services (SAMHS) PHIDISA III project. Dr Matsabisa is also a member of the SADC committee on access and benefit -sharing and has served as a technical advisor to SADC secretariat and WHO on traditional medicines. He serves on the MRC Scientific Peer review Committee. Dr Matsabisa has on4 consecutive terms participated in the African Ministers of Health meetings, been part in 3 occasions of the AU –STRC meetings and has been a temporary technical advisor to SADC secretariat. He has just recently been nominated in the WAC in Kolkata India 2016 to serve in the international committee set up by the Indian Government to look at the Indigenous communities' interests and research. Dr. Matsabisa has contributed in three consecutive terms on the AU ordinary sessions of Ministers of Health. Dr Matsabisa is further a project leader on regional and international research consortia in the scientific research and development of traditional medicines. Dr Matsabisa leads many research collaborative projects nationally, regionally and internationally. Dr. Matsabisa is reviewer of a number of peer reviewed and indexed scientific journals.

------ School of Natural Product Studies, Jadavpur University ------ 18

——— 6th Convention: Society for Ethnopharmacology, India, 2019

Holistic approach for Traditional Herbal Medicine and their lead molecule in context to Post Kala-azar Dermal Leishmaniasis (PKDL)

C.P. Thakur ¹, S.N. Pandey ¹, A. Kumar ¹, D.K. Mitra ², P.K. Mukherjee³, Shyam Narayan ⁴ ¹Balaji Utthan Sansathan, Kala-azar Research Centre, Uma Complex, Patna ²Dept. of Transplant Immunology & amp; Immunogenetics, AIIMS, New-Delhi ³School of natural product studies, Dept. of pharmaceutical Technology, Jadavpur, University ⁴Microbiology Division, ICMR-RMRIMS, Patna

Increasing trend of allopathic drug resistance along with adverse event is an alarming situation for good health. Many diseases are growing for unresponsiveness to the existing drugs of which Leishmaniasis and Tuberculosis are the best examples. There is a risk of Post Kala-azar Dermal Leishmaniasis and multi drug resistance Tuberculosis even after taking the full course of treatment. The adverse events of drugs also affect immunity of the body. In this circumstances, holistic approach to the people to make up mentally, physically and emotionally sound to accept the traditional herbal medicine or their lead molecule are urgently required. In foreign countries about 60% people accept herbals voluntarily. Today there is a need to scientifically mark the specific herb for particular disease by searching effective lead and fixing safe lead/herb regimen. As Tinospora cordifolia (Guduchi) is reported mainly for immunomodulation and antidiabetic activities, its active compound Alkaloids, Diterpenoids, Glycosides, Steroids, are also reported for anti-viral, anti-microbial, anti-neurological problems etc. However, we have tried with aqueous extract and found partial anti-leishmanial activities. Apart of this, the lead molecules of Trachyspermum ammi and Cedrus deodara have shown very effective and safe anti-leishmanial activities that may be phytopharmaceutical candidate for treatment of PKDL, to be discussed during presentation. Therefore, it can be explored that having Immunomodulatory activities of Tinospora cordifolia and highly anti-leishmanial activities of Trachyspermum ammi, the combination therapy of their lead molecules may be very innovative and affective for treatment of PKDL.

------ School of Natural Product Studies, Jadavpur University ------ 19

———— 6th Convention: Society for Ethnopharmacology, India, 2019 ———

Mainstreaming the Traditional Medicine (TM) to tackle Antimicrobial Resistance (AMR): Demonstrating anti-virulence potential of certain TM formulations/ plant extracts against antibiotic-resistant gram-negative bacteria

Dr. Vijay Kothari

Institute of Science, Nirma University, Ahmedabad-382481, India.

We assessed the anti-virulence potential of certain traditional medicine (TM) formulations/ plant extracts i.e. Tinospora cordifolia stem extract, Panchvalkal, Panchgavya, and Triphala against multi-drug resistant Pseudomonas aeruginosa, Chromobacterium violaceum, and beta-lactamase producing Serratia marcescens. These formulations were able to attenuate virulence of the test bacteria towards the model worm-host Caenorhabditis elegans. They could also exert therapeutic effect on pre-infected worms. Triphala and Panchgavya were found to possess prophylactic effect too, as the worms pre-fed on these formulations scored better survival in face of subsequent pathogen-challenge. Investigation for elucidating molecular mechanism underlying the anti-pathogenic efficacy of these formulations are underway in our lab wherein we have found generation of nitrosative stress and disturbance of molybdenumhomeostasis as the major mechanisms associated with anti-infective effect of Panchvalkal against P. aeruginosa. All these TM candidates were able to modulate quorum sensing (QS) in the susceptible test pathogens. Since antibiotic-resistant gramnegative bacteria including P. aeruginosa and S. marcescens are listed by the WHO and CDC (USA) as pathogens of critical importance, TM formulations capable of curbing virulence of these pathogens are much relevant in current times. Their mainstreaming in association with modern antibiotics can certainly help effective tacking of the global AMR challenge.

—— 6th Convention: Society for Ethnopharmacology, India, 2019 ——

Mr Subhendu Saha

Director, Aspire Scientific, Nagpur, MH, India

Mr Subhendu Saha did his M. Sc. in Organic Chemistry in 1997 from Vidyasagar University, Midnapur, West Bengal. Previously he was associated with Anchrom as Product Manager (South Asia) for 13 years till October, 2017. Mr. Saha left Anchrom and founded Aspire Scientific in the year of Feb, 2018 with another two HPTLC experts of Aspire Scientific. He is having experience of more than 18 years on TLC/HPTLC method development, application and instrumentation. As an HPTLC expert he has travelled to Switzerland, Nigeria, Bangladesh, S. Arabia Bhutan, Nepal, for lecturers and on-site support to HPTLC users. He has participated in a training program on GC-IMS in GAS, Dortmund, Germany in the year 2018. Mr. Subehndu Saha has also been invited to speak on HPTLC at numerous seminars in India, being a recognized expert in theory and practice of HPTLC.

— 6th Convention: Society for Ethnopharmacology, India, 2019 —

Mr. Subhendu Saha

Director, Aspire Scientific, Nagpur, MH, India

TLC/HPTLC is one of the useful analytical tool for the analysis of articles of botanical origin for identification, fingerprinting, adulteration, stability check and micro preparative work. We need to make a decision a correct, practical and inexpensive HPTLC configuration based on the analytical works to be performed. USP, Ph.Eur., ChP, Indian Pharmacopoeia and many other official methods recommend TLC/HPTLC is one of the useful method for the identification and fingerprinting of herbal drug and herbal drug preparation product. USP 203 chapter and Ph.Eur. define HPTLC instrument as precoated HPTLC plate, a device for band wise sample application, a suitable chromatogram development tank, a device suitable to transfer reagent on the plate and heating of the plate for derivatization and a device suitable to document plate images under 254nm, 366nm and visible wavelength. Recently the European Pharmacopoeia (Ph. Eur.) commission endorses semi- quantitative HPTLC testing for Traditional Chinese Medicines as an alternative quality control which could be used instead of HPLC assays. It is a marker level quantification using appropriate software which converted HPTLC chromatograms into peak profile. It is one of the favourite methods for the analysts in the other fields like Food, Forensic & Toxicology and Pharmaceutical analysis for the identification of compounds, toxic chemicals, preservatives and adulterants in a complex mixture. Using other different quick development modes like OPLC, PPEC can improve the resolution power of TLC/HPTLC. It can be interfaced with many multiple detection modes like Bio autography, Radio TLC, MS, NMR, RI, ELSD, PDA detector. Sample application on the TLC/HPTLC plates is the first step of HPTLC analysis and thus determines the quality and reproducible result of the analysis. Band wise sample application with spray-on technique with accurate volume and positioning are the key factors to get accurate and reproducible analytical result. Variables like solvent grade, developing solvents, temperature, reagent quality, handling of the plate, transfer of reagents on the plate, heating temperature with time and proper documentation under different wavelengths are the key factors for getting reproducible and accurate result.

—— School of Natural Product Studies, Jadavpur University ——— 22

ABSTRACT OF ORAL & POSTER

6th Convention of SFE-India & National Symposium on

""Translational Research of Traditionally used Indian medicinal plants with special reference to *Tinospora cordifolia*"

September 07-08, 2019

JADAVPUR UNIVERSITY, KOLKATA, INDIA

School of Natural Product Studies, Jadavpur University — 23

– 6th Convention: Society for Ethnopharmacology, India, 2019 —

Oral Presentation

SFE-CONV-1902-(O)

Tinospora cordifolia (Guduchi) and its adulterant plant Daemia extensa (Visanika): A comparative pharmacognsotical study and HPTLC profiling of Leaf

<u>Sreya Dutta</u>, Kalyan Hazra, Deboleena Paria, Shreya Ghosal, M.M.Rao Central Ayurveda Research Institute for Drug Development, 4-CN Block Sector-V, Bidhannagar, Kolkata-700091.

In Ayurveda, the significant Rasayana drug Tinospora cordifolia (Thunb.) Miers, (Sanskrit: Guduchi) from the family Menispermaceae has remarkable medicinal importance in the traditional system of medicine as most of the aerial parts of this plant are reported for immense therapeutic and ethno-botanical uses. This plant is adulterated by Daemia extensa (Jacq.) R.Br. (Sanskrit: Visanika) from family Asclepiadaceae, due to the similar leaf structure and climbing habit of both. Present study evaluates the identifying comparative pharmacognostical features along with HPTLC profiling of fresh and dried leaves of both the plants. It includes the collection and identification of fresh leaf samples of Tinospora cordifolia and Daemia extensa followed by macroscopy and sectional microscopy (T.S). Powder microscopy, physicochemical studies and HPTLC profiling of dried leaf samples were also performed as per the standard methods. The findings reveal few similarities and a number of significant differences between the leaves of both plants regarding size, shape, texture, pubescence, type of stomata, location and type of trichomes, abundance and position of starch grains and ray parenchyma, quantitative features (stomatal index, vein islet number and palisade ratio) etc. HPTLC profile of the leaves of Visanika is completely different from that of Guduchi. The distinguishing band of Berberin is well present in Guduchi while it is totally absent in methanolic extract of Visanika leaves. So, this study helps to distinguish between both the leaf samples for the quality control avoiding adulteration of Guduchi leaf.

SFE-CONV-1903-(O)

Nephroprotective effect of virgin coconut oil against antibiotic drug gentamicin-induced nephrotoxicity via suppression of oxidative stress and modulation of iNOS/NF-κB/caspase-3 signalling pathway in rats

Ademola C Famurewa^{1,2} and Fidelis E Ejezie³

¹Department of Medical Biochemistry, Faculty of Basic Medical Sciences, College of Medicine, Alex Ekwueme Federal University, Nigeria. ² Department of Biochemistry, Amala Cancer Research Centre, Thrissur, Kerala, India. ³ Department of Medical Biochemistry, Faculty of Basic Medical Sciences, College of Medicine, University of Nigeria, Enugu Campus, Enugu, Enugu State, Nigeria.

Gentamicin is an effective aminoglycoside antibiotic used in the treatment of severe infections in humans and animals. However, its major side effect is oxidative nephrotoxicity. We hereby explored whether dietary supplementation of virgin coconut oil (VCO) in rats could mitigate biochemical alterations associated with gentamicin nephrotoxicity. Rats were fed with VCO-supplemented diet (10 % w/w) for 16 days

School of Natural Product Studies, Jadavpur University _____ 24

- 6th Convention: Society for Ethnopharmacology, India, 2019 —

against renal toxicity induced by intraperitoneal administration of gentamicin (100 mg/kg b.w.) from day 11 to 16. Gentamicin caused marked elevations in serum levels of urea, uric acid and creatinine, followed by considerable depletion in renal reduced glutathione (GSH), superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx) activities, while malondialdehyde (MDA) level increased significantly. Furthermore, it raised renal levels of interleukin-1 β (IL-1 β), interleukin-6 (IL-6) tumour necrosis factor- α (TNF- α) and nitric oxide (NO) confirmed by renal histopathological alterations. The mechanistic expression of inducible nitric oxide synthase (iNOS), nuclear factor-kappa B (NF- κ B) and caspase-3 protein was prominently increased. VCO-supplemented diet significantly modulated the serum markers, GSH and MDA levels, and antioxidant enzyme activities. Additionally, VCO down regulated the expression of NO, iNOS, NF- κ B, caspase-3 and cytokines while the histopathological lesions were alleviated. VCO protects against gentamicin-induced nephrotoxicity; thus, it could be a promising dietary supplement for patients undergoing gentamicin treatment.

SFE-CONV-1904-(O)

Evaluation of Hypoglycaemic and anti hyperglycaemic activity of Guduchi Churnakriya in Swiss albino mice

Rohit Sharma

Central Ayurveda Research Institute for Drug Development, 4-CN Block, Sector-V, Bidhannagar, Kolkata-700091.

Guduchi (Tinospora cordifolia) is reported as highly potent anti-diabetic herb in Ayurveda. Hypoglycemic and anti-hyperglycemic activity of various dosage forms and parts of Guduchi is ascertained by recent studies. Guduchi Churnakriya (levigating its Churna with own extracted juice/decoction) is an unexplored and unique Ayurvedic formulation, developed by the pharmaceutical process of Bhavana. Present study is first of its kind to evaluate the hypoglycemic and anti-hyperglycemic activity of Jala Bhavita (JBGC), Kwatha Bhavita (KBGC) and Svarasa Bhavita Guduchi Churna (SBGC) in Swiss albino mice. Hypoglycaemic and anti-hyperglycaemic potential of JBGC, KBGC and SBGC was evaluated in normal mice using both 18 h fasted mice model and oral glucose tolerance test. Drug was suspended in distilled water and administered to animals at the dose of 520 mg/kg. In overnight fasted animals SBGC showed highly significant reduction in blood sugar level (BSL) at all time intervals, while JBGC and KBGC showed only marginal reduction. In glucose overloaded animals SBGC and KBGC showed highly significant reduction in BSL. The study concludes that both SBGC and KBGC can be used in the treatment of diabetes as well as a supportive drug without risk of producing hypoglycaemia in stated doses.

SFE-CONV-1905-(O)

Pharmacognostical and Physicochemical studies of *Tinospora cordifolia*

Rajesh Bolleddu, Ch V Narasimhaji, Rohit Sharma, M M Rao

Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Kolkata - 700 091.

Pharmacognostic evaluation is the first and foremost step to determine identity and to assess the quality and purity of the crude drugs. Physicochemical characterization further establishes the qualitative and quantitative measures for proper authentication of

- School of Natural Product Studies, Jadavpur University — 25

- 6th Convention: Society for Ethnopharmacology, India, 2019 —

medicinal plants. Guduchi (Tinospora cordifolia) belongs to the family Menispermaceae, is a potent medicinal plant in traditional systems of medicine and designated as Rasayana in Ayurveda. All parts of this plant were reported to contain several therapeutically active phytoconstituents. The starch obtained from the stem (Guduchi-Satva) has high nutritive value and plays an important role in cures to digestive problems and several other ailments. Stem, leaves, whole plant used to strengthen the immune system and treatment of diabetes, allergies, rheumatoid arthritis, gout, fever, ulcer, respiratory tract infections, skin inflammation and cancer. Guduchi plant is a dioecious creeper, where male and female flowers are borne on separate plants. Few reports claimed that there is a marked difference in morphology and phytochemistry of male and female plants of Guduchi. This paper aimed to establish the complete pharmacognostical and physicochemical characters of Guduchi male and female plants. These plants have different shapes in leaf, petiole and length. The water and alcohol soluble extractive values was found higher in male variety, while the total alkaloid, total mucilage, total starch contents and loss on drying values were higher in female variety.

SFE-CONV-1906-(O)

Antihypertensive Properties of Peptide: A Novel Drug Alternative

Ranjana Das, Chiranjib Bhattacharjee

Department of Chemical Engineering, Jadavpur University, Kolkata, India.

Hypertension is a significant health problem worldwide. It is the prime risk factor associated with cardiovascular disease like, myocardial infarction, heart failure, and end-stage diabetes. Bioactive peptides are the primary structure of proteinswhich synthesised by enzymatic hydrolysis of the protein. Among various beneficial aspects of bioactive peptides, antihypertensive property is one of the important issue. Bioactive peptides have the ability to control the renin-angiotensin system (RAS) thereby decreasing activities of renin or angiotensin-converting enzyme (ACE) systems, the two important enzymes involve in regulation of blood pressure. These particular class of peptides can increase the endothelial nitric oxide synthase (eNOS) pathway to increase nitric oxide (NO) levels to promote vasodilation. The peptides can block the interactions between angiotensin II (vasoconstrictor) and angiotensin receptors, which can contribute to reduced blood pressure. ACE belongs to the class of zinc proteases which converts the biologically inactive angiotensin I to the potent vasoconstrictor and cardiovascular trophic factor angiotensin II responsible for vascular remodelling. Commercial antihypertensive drugs are associated with adverse effects, necessitating exploration of cheaper, safer alternative components from sustainable resources. Apart from basic nutritional aspect, food proteins, specifically peptidespossess specific physiological functions. In present context mango kernel is used as source of peptide to study the antihypertensive propensity. ACE inhibition activity and inhibition pattern of the peptide fraction derived from mango kernel was determined in vitroUsing enzyme system pepsin at degree of hydrolysis 24% about 25% inhibition activity was observed for the synthesised peptide fraction suggesting its potential as drug alternative.

School of Natural Product Studies, Jadavpur University — 26
SFE-CONV-1907-(O)

Anticancer Activities of *Tinospora Cordifolia* on Hela - The Cervical Cancer Cell-Lines

<u>Akanksha Bhutani</u>, Abhishek Das, Amar Nath Mishra, Manik Ghosh Birla Institute of Technology, Mesra, Ranchi - 835215, India.

Herbal medicineis time tested form of medicine and should be the first choice because of its efficacy, safety and lesser side effect. The modern cancer therapy has serious side effect and lesser efficacy. So, there is largest need to develop an herbal medicine for cancer treatment with less side effect. *Tinospora Cordifolia* was choses a plant for study. It contains many different chemicals. Some of chemicals have antioxidant effect. Other might increase the body's immune system. Some chemical might have activity against cancer cell in test animal.Anticancer activity of Tinospora cordifoliais checking with Tinospora Cordifoliaamla treated aqueous (TCCA), Tinospora Cordifolia heat treated aqueous (TCH), Tinospora Cordifolianormal aqueous (TCN) precipitated assessed by Sulphorodamine B (SRB) assay in Hela cell line exposed to concentrations (10-8 microgram per millilitre) checked. Our SRB result showed that TCCA showed moderate reduction in cell viability against HELA cellline. The maximum reduction in cell viability of Hela cell were recorded at 80µg/ml as 64.2%. TCH & TCN at 10-80 µg/ml concentration did not cause any significant decrease in the cell viability of Hela cell. Thus, it acts as a very important role against anticancer activity.

SFE-CONV-1908-(O)

Therapeutic targeting of liver inflammation and fibrosis by Ag nanoparticle using *Tinospora cordifolia* leaf extract

Soumendra Darbar

Department of Pharmaceutical Technology, Jadavpur University, Raja S C Mallick Road, Kolkata-700032, India.

The present work was aimed to evaluate hepatoprotective effect of TC-AgNPsagainst Carbon tetrachloride (CCl4) induced liver damage in swiss albino mice. Mice were divided into seven groups of ten animals each. The mice of control group received 1% CMC. Liver damage was introduced by i.p. administration of 3 ml/kg BW of CCl4 suspended in olive oil (1:4 sol). The mice of test group received plant methanol extract at the dose of 12.5mg/kg, 25mg/kg and 50mg/kg body weight respectively. After the experimental period all the animals were fasted overnight and collect blood through retro orbital plexus and serum was separated and analyzed for biochemical parameter such as alanine aminotransferase(ALT), aspartate aminotransferase (AST), yglutamyltransferase (GGT), alkaline phosphatase(ALP), total bilirubin, direct bilirubin and total plasma protein. The plant extract showed significant hepatoprotective effect by lowering the serum levels of various essential biochemical parameters. Moreover treatment with TC-AqNPsraised the level of serum total protein and lowered the lipid peroxidation to normal levels. The redox balance (SOD-CAT-GSH-GPx) remains normal in the experimental groups treated with TC-AgNPs. Normal histological examination and immunohistochemistryof the liver also supported hepatoprotection. These results suggest that TC-AgNPsmay induce remarkable protective effects againsthepatic injury induced by CCI4 treatment through upregulation of the antioxidant system.

----- School of Natural Product Studies, Jadavpur University ------ 27

SFE-CONV-1909-(O)

Ethanol extract of Tinosporasinensis protectspancreatic islets against streptozotocin induced cellular stress, inflammation and apoptosis in rats. Anindita Banerjee, Oly Banerjee, Siddhartha Singh, Sandip Mukherjee, Bithin Kumar Maji

Post Graduate Department of Physiology, 9 William Carey Road, Serampore College, Serampore, Hooghly-712201, West Bengal, India.

Tinosporasinensis Lour. (Merr.) stem extract has been used in Indian traditional medicine for various therapeutic uses. The aim of the study was to evaluate the effects of ethanol extract of stem of Tinosporasinensis(EETS) protective againststreptozotocin induced cellular stress, inflammation and apoptosis in rats. A high-performance liquid chromatography technique (HPLC) was used to identify and quantify the major phytochemicals present in the EETS. Diabetic rats were administered with EETS at a dose of (100,200 and 400mg/kg respectively orally) and standard drug Metformin (300mg/kg). Effect of the extract on glucose homeostasis, oxidative stress, antioxidant status, inflammatory cytokines, histopathology of pancreas and also on intracellular ROS, mitochondrial membrane potential, apoptosis, cell cycleof pancreatic islet cells were studied in diabetic rats. The major phytochemicals identified and quantified by HPLC in the extract were berberine, caffeic acid andmyricetin. This result showed that ethanol extract exhibited good antioxidant effect. The ethanol extract of the plant prevented the diabetogenic effect of STZ by significantly lowering the fasting blood glucose level, glycatedhaemoglobin and increasingthe level of insulin and C peptide in STZ treated rats. EETS also blunted the induction of apoptosis inpancreatic islet of STZ treated ratsby significantly decreasing pro inflammatory cytokines (TNFa, IL6), intracellular reactive oxygen species (ROS) generation, lipid peroxidation, nitric oxide (NO) production with simultaneous increase in mitochondrial membrane potential, sub-G0 peak areaand enzymatic and nonenzymatic antioxidants. The results revealed that the ethanol extract of the stem of the plant possesses antidiabetic efficacy which underscores its uses as therapeutic strategy.

SFE-CONV-1910-(O)

Docking studies of phytoconstituents of *Tinospora cordifolia* with special reference to Triple-Negative Breast Cancer

Aditi Garg, Abhishek Das, Manik Ghosh

Department of Pharmaceutical Sciences and Technology, Birla Institute of Technology, Mesra, Ranchi-835215, India.

Traditional medicines are in great demand nowadays due to their easy affordability and safety. The demand of these medicines increases when the synthetic medicine become ineffective like in case of advanced cancer and new infectious diseases. In Ayurvedic literature, Tinospora cordifolia commonly known as "Guduchi" has immense application in treatment of various diseases like diabetes, lymphoma and other cancers, rheumatoid arthritis etc. In the present work, docking studies of phytoconstituents present in various parts of Tinospora cordifolia were studied on PARP 1 antagonist (5HA9), that induces apoptosis and inhibits metastasis in triple negative breast cancer. Various phytoconstituents like alkaloids (Berberine, Syringine, Tinocordifolin, Palmatine); diterepinoids (Salvaronine A, Palmarine); steroids (Beta-sitosterol, Hydroxy ecdysone) and a minor constituent (N-trans-feruloyl tyramine) were docked on 5HA9 receptor.

---- School of Natural Product Studies, Jadavpur University ----- 28

Upon analysis of the docking scores of the various phytoconstituents present in Tinospora cordifolia, the highest docking score was found to be -29.6549 of Palmatoside G (Glycosides), in case of Salvironine A, the docking score was found tobe -29.6465. Tembeterine (Alkaloids) gave a docking score of -24.6887. N-trans-feruloyl tyramines (minor constituents) have docking score of -24.7061. Hence, we can predict that these phtoconstituents may have anticancer properties which can be beneficial for the treatment of triple negative breast cancer.

SFE-CONV-1911-(O)

Hepatoprotective potential of standardized *Tinospora cordifolia* extract and its isolated compounds on HepG2 cell line

<u>Amitabha Dey</u>, Satyajyoti Kanjilal, Satyabrata Mahapatra, Sagnik Haldar, Bibhuti Nath Bhatt, Tulika Chakraborty, Archana Kumari Srivastava, Avinash Narwaria, Chandra Kant Katiyar

Emami Limited, 13 BT Road, Kolkata- 700056. India.

Tinospora cordifolia (Guduchi) is a deciduous, climbing shrub distributed throughout the tropical India and China. Tinospora cordifolia traditionally is considered as rejuvenator the stem beingused as a tonic to promote physical and mental (Rasavana) herb: Health; and is used in various formulations intended as immunity booster, anti-stress, Hepato protectionand in inflammatory disorders. The present study was designed to evaluate thein vitro antioxidant and hepatoprotective efficacy of Tinospora cordifolia alcoholic extract and its isolated compounds on HepG2 cell line. Five chemical compounds were isolated and purified from the extract by liquid – liquid fractionation and column chromatography. The compounds were characterized by spectroscopic methods. Five doses (31.25, 62.5, 125, 250 and 500 µg/ml) of extract and the isolated compounds were tested on D-galactosamine induced HepG2 cell toxicity model. For antioxidant assays, in vitro DPPH scavenging assay and glutathione estimation were performed on lipo-polysaccharide treated HepG2 cell lines by using ELISA kits. The isolates were confirmed as diterpenes through spectroscopic analysis. Tinospora cordifolia extract and its isolates effectively scavenged the DPPH free radicals and showed elevation in the glutathione levels in 10µg/ml of lipo-polysaccharide treated HepG2 cell lines. The extract and its isolates demonstrated a significant hepatoprotective activity against D-galactosamine induced cytotoxicity in a dose dependent manner. The protective experimental evidences of Tinospora cordifolia reaffirm its traditional claims as a hepatoprotective agent. The standardized stem extract and its isolates could be analternative choice in the treatment of various hepatic disorders.

SFE-CONV-1912-(O)

Experimental evaluation of an Compound herbal drug on dissolution of encrustation on Urinary Catheters

L. D. Barik, S.K. Debnath, M. M. Rao, M. Sahu

Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Kolkata - 700 091.

Encrustation, a crust or hard coating on the surface of urinary stent, is developed due to the formation of biofilm which leads to super saturation & crystallization. Encrustation causes blockage of Urinary catheters and leads to reflux of urine, increases renal pressure and ultimately damage renal parenchyma tissues. Frequent changing of

School of Natural Product Studies, Jadavpur University _____ 29

urinary catheters is generally recommended. One experimental study was conducted taking 40 albino rats at Centre of Experimental Medicine and Surgery Department of Banaras Hindu University, Varanasi. They were grouped into control, preventive and treatment. All Albino rats were intervened with the implantation of Urinary catheters bead in the urinary bladder following Suprapubic cystostomy under intraperitoneally injected pentobarbitone sodium in a dose of 30-60 mg /kg body weight. One Ayurvedic drug (taking equal quantity of Bryophyllum pinnatum and Crataeva nurvala quath extract) was given in a dose of 35 mg/100 gm body weight to Preventive group (7 days before and 30 days after implantation) and 30 days to Treatment group. Study period was of two months and Urine out, Urine pH, Plasma electrolytes and Urinary electrolytes were evaluated in a period of 15 days interval and also plain x-ray abdomen done in all the group. After adopting Statistical procedure One way ANOVA and Post Hoc - Bonferroni's test, p-value shows statistical significant in increasing Urine output & Serum Potassium in both Preventive and Treatment group where as Urine pH was remarkably decreased to normal 5.5 to 6.5. Serum Calcium, Serum Sodium& Urinary sodium were also shown remarkably decreased. Statistical p value was also shown highly significant in both the group in comparison to control group in reducing the catheter encrustation. Serum Uric acid and Serum phosphorus were within their normal limit in the entire group.

SFE-CONV-1913-(O)

Evaluation of Tyrosinase Inhibitory potential of Kumkumadi Tailam – An Ayurvedic preparation

Akanksha Sharma¹, Pulok K. Mukherjee¹, C. K. Katiyar², Subhadip Banerjee¹, Joydeb Chanda¹, Amit Kar¹, Rajarshi Biswas¹

¹School of Natural Product Studies, Jadavpur University, Kolkata-700 032, India. ²Health Care Division, Emami Limited, 13, BT Road, Kolkata -700056, India.

Kumkumadi tailam is an age-old Ayurvedic herbal skin care preparation, which is used for skin brightening and whitening. In Ayurveda system of medicine, "Varnya" group of herbs improve skin health and appearance. It has been reported that the herbs used in formulation of kumkumadi tailam, has good tyrosinase inhibiting property, which results in reduction in melanin synthesis, and imparts fairness and a glow to the skin. Kumkumadi tailam has been used as body massage oil for glowing and healthy skin. To validate the claims made by ancient literatures and practitioners, scientific evaluation of kumkumadi tailam was performed in this study. With the help of GCMS, 23 major compounds were identified like Sarcosine, Benzoic acid, Safranal etc. Upon performing tyosinase inhibition assay of Kumkumadi tailam, the IC50 value observed was 180.54 \pm 0.21 µg/ml. Physicochemical properties of Kumkumadi tailam showed brown appeanrance and distinct smell, with pH and viscosity as 6.3 and 1.09 respectively. On performing stability testing it was observed that the oil could be kept for long period of time under room temperature. The heavy metal content and microbial count were within the permissible limit of pharmacopoeial standards.

----- School of Natural Product Studies, Jadavpur University ------ 30

Poster Presentation

SFE-CONV-1901

In-vitro α -amylase enzyme inhibition potential of some food plants belongs to Cucurbitaceae family

Seha Singha, Barun Dasgupta, Sayan Biswas, Pulok K. Mukherjee*

School of Natural Product Studies, Department of Pharmaceutical Technology, Jadavpur University, Kolkata 700032, India

The cucurbitaceae family commonly known as gourd family comprises of a large group of vegetables as well as fruits such as cucumbers, melon, gourd, pumpkin etc. These fruits and vegetables are also used in traditional system of medicine for their therapeutic values due to the presence of a large number of bioactive metabolites such as cucurbitacin. This study focuses on *in-vitro* alpha amylase inhibitory potential of Luffa acutangula, Luffa cylindrica, Sechium edule and Tricosanthes dioica fruits. Alphaamylase is an enzyme that hydrolyses alpha bonds of large, alpha-linked polysaccharides, such as starch and glycogen, yielding glucose and maltose. It is the major form of amylase found in humans and other mammals. α -amylase inhibitors have been proved to delay the glucose absorption through the intestinal epithelia. In this study fresh fruits of the four food plants were collected, dried, powdered and extracted with hydro alcoholic (70:30) solvent. The extracts were standardized by using cucurbitacin E as marker compound through RP-HPLC. The standardized extracts were screened for their *in-vitro* alpha amylase inhibitory activity by using acarbose through standard in 96-well micro plate based assay. Luffa acutangula and Sechium edule fruit extract were shown the maximum inhibition (IC₅₀ of *L. acutangula* 3.42±0.50 and *S.* edule is 3.11±0.40). Further research is underway to find the mechanism of inhibition and phytomolecules responsible.

SFE-CONV-1915

"Alambushadi Churna" – A Poly Herbal Ayurvedic Drugfor Amavata (Rheumatoid Arthritis) Management

Saroj Kumar Debnath, Laxmidhar Barik

Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Kolkata - 700 091.

The drug is any substance or product that is used to modify or explore the physiological systems or pathological status for the benefit of the recipient. Ayurveda accepts all the dravyas(substances) arepanchahautika(five elements) and any dravya(substances) has the medicinal properties and it may useasausadha(drug) but all of them cannot be used everywhere. The use of a particular ausadha(drug) for a particular purpose demands the yukti(the planning). According to Ayurveda treatment is basically SampraptiVighatana

---- School of Natural Product Studies, Jadavpur University ------ 31

(break down the Pathogenesis). So the choice of any drug for the treatment of a particular disorder should be ideally based on a thorough consideration of the SampraptiGhataka (favourable condition of Pathogenesis). Ama(Biotoxin) and vitiated Vata(Bioforce) are the main causative factor in the disease manifestation of Amavata.Amavata disease is more simulated to Rheumatoid arthritis according to its clinical manifestations and pathogenesis. One important plant based Ayurvedic drug i.e. Alambushadi Churnais mentioned in famous Ayurvedic book (i.e. BhavaPrakasha) in context of treatment of Amavata.It is a poly herbal Ayurvedic drug and thirteen Ayurvedic medicinal plants are used in it as ingredients. Its ingredients havevata-kaphashamaka(vata-kapha-reducing) properties and have mainly deepan (enzyme stimulant), amapachan (biotoxin neutralizing), shothaghna (anti-inflamatory), vedanasthapaka (analgesic), jwaraghna (anti-pyretic), rasayana (rejuvenator), valya (power enhancer) and amavatahara(anti-rheumtoid) actions which help to break down the samprapti(pathogenesis) of Amavata (Rheumatoid arthritis) and to reduce the clinical manifestations of Amavata(Rheumatoid arthritis).

SFE-CONV-1912

Quantification and Standardization of andrographolide in *Andrographis paniculata* extract using HPLC, HPTLC and NIRS method.

Shibu Narayan Jana¹, Subhadip Banerjee¹, Sayan Biswas¹, Dilip Singh², Rajib Bandyopadhyay², Pulok K Mukherjee¹.

¹School of Natural Product Studies, Dept of Pharmaceutical Technology, Jadavpur University. Kolkata- 32 ²Department of Instrumentation and Electronics Engineering, Jadavpur University, Salt Lake Campus, Kolkata 700 098, India

Andrographis paniculata (Kalmegh), belong to family Acathaceae is a popular medicinal plant in India, which is expansively used in Ayurveda, Unani and Siddha medicines as home remedy for various diseases in Indian traditional system for multiple clinical applications. The plant is used as an important ingredient in different medicinal formulations. The present study aimed at the development of a simple, rapid, accurate and specific RP-HPLC and HPTLC method in combination with Near Infrared Spectroscopy (NIRS) to realize precise determination and high quality assessment of bioactive compound andrographolide in Andrographis paniculata that are collected from various geographical location of West Bengal. A fabricated and procured NIR spectrometer is used for the development of calibration models. HPLC method developed using chloroform: methanol-7:1 at Rt-5.90.HPTLC method was developed using solvent system methanol: 1% acetic acid in water-60:40 with a retention factor (R_f = 0.85). The developed method was validated for linearity, specificity, limit of detection (LOD), limit of quantification (LOQ), accuracy and precision according to ICH guidelines. The LOD and LOQ were found to be 0.254 \pm 0.41, 0.744 \pm 0.33 µg/spot (for andrographolide). The % RSD of intra-day and inter-day precision was found to be < 2%, which confirms high repeatability of the method.

----- School of Natural Product Studies, Jadavpur University ------ 32

A comperarative Pharmaceutico and chemical evaluation of Haratala Bhasma and Rasamanikya

Sucheta Mondal

Banaras Hindu University, Banaras, India

In Ayurveda for the treatment of several diseases, arsenic containing drugs such as Haratala Bhasma and Rasamanikya are used. The two arsenic samples are prepared with the help of various procedures. Several testing procedures such as Namburi Phased Spot test; loss on drying, extractive value, ash value was performed to check the quality of the two samples of Haratala. Sophisticated instrumental analysis like XRD, TEM, TGA, DTA, EDAX, AAS were studied to understand the crystal profiles, thermo stability, particle size, trace elemental analysis, chemical micro analysis are done respectively. XRD analysis of the sample Rasamanikya showed comparatively amorphous in their structure. TEM Image of Haratala Bhasma showed that average particle size is 100nm. It is highly irregular in shape and is homogeneously distributed. EDAX analysis revealed that Haratala Bhasma wt % of Arsenic is 58.69% and sulphur is 11.69%. Rasamanikya contains 41.77% wt % of Arsenic and 15.81% of sulphur. Both Rasamanikya and Haratala Bhasma contain oxygen, carbon, silicon, etc. The DTA plot showed two endothermic peaks in the range of 300 to 600oc in the two samples. Thus an attempt has been made for creating a comparative database of two such drugs by the modern analytical methods. It can be concluded that there were minimal comparative differences found in the Haratala Bhasma and Rasamanikya but Haratala Bhasma showed better results from the standardization point of view.

SFE-CONV-1917

Optimized Extractive Protocol for the Protoberberine Alkaloids as per Ayurveda

Kalyan Hazra and M. M. Rao

Central Ayurveda Research Institute for Drug Development, 4-CN Block, Bidhannagar, Kolkata-700091, India.

The plant, *Tinospora cordifolia* (Guduchi) belonging to Menispermaceae family occupies pride of place in Ayurveda, because it can cure several diseases by alleviating all the three Doshas and Ama and rejuvenate tissues (Rasayana). Ayurveda recommends use of the plant stems for optimum health benefits. The protoberberine alkaloids (PA), present in the plant stems can bind to DNA that is believed to contribute to its medicinal attributes, as has been verified in laboratory experiments.1-3 However, due to the presence of quaternary iminium moiety in a hydrophobic framework in them, these alkaloids are not freely soluble in ethanol or water. Therefore, it is essential to find the composition of ethanol-water mixture with best extractive yield, particularly the PA content. Hence, the present investigation was aimed to evaluate the PA levels in the dried and pulverized plant stems, extracted with 0-100% hydroalcoholic solvents at room temperature. With increasing concentrations of water in the extractive media, the extractive yields (EA) and PA contents increased progressively, up to 50% and 40% of water concentrations respectively. Maximum EA (7.9%) and PA level (3.8%) were found

---- School of Natural Product Studies, Jadavpur University ----- 33

in these solvents. The high EA in aqueous extract may be because the glycosides, but not PA are preferentially extracted in it. However, PA has less solubility in ethanol. Together our results revealed that 40:60 water-alcohol solvent mixture is best suited to extract the PA from T. cordifolia stems.

SFE-CONV-1918

Studies on Anticancer Agents from Natural Sources with Special Reference to Euphorbia hirta linn.

Nilanjana Ghosh, Payal Singh, Manik Ghosh, Kishanta Kumar Pradhan.

Birla Institute of Technology, Mesra, Ranchi. India.

Medicinal plants are rapidly gaining importance in the present day scenario, alternative systems of medicines are gaining popularity and in many cases have replaced the ageold prescribed drugs. Phytotherapeutics booming nowadays due to its widespread pharmacological properties which include anticancer and other activities. Herbal medicines and its phytoconstituents provide a rich source for novel anticancer drug development. In any cases they also prove to be more effective than standard drugs. The plant selected for the study was Euphorbia hirtaLinn. belonging to the family Euphorbiaceae. The plant was chosen preliminary on the basis of the extensive literature review which reported its widespread folklore uses and properties mentioned in the Ayurveda. The plant was claimed to possess anti-asthmatic, antipyretic, antimicrobial, anti-fungal activities. This formed a basis for the research methodology and for selection of the plant to investigate its potency against Breast cancer in-vitro. The Phytochemical extracts were prepared and found to be potent against MCF-7 cell line, thus the extracts were further investigated for its phytoconstituents which lead to this activity. The most potent extract was isolated and further characterizations were done by UV, FT-IR, Mass spectroscopy.

SFE-CONV-1913

HPTLC Standardization of Cucurbitacin E in Different Varieties of Cucumber (*Cucumis sativus*) Fruit

Pradip Debnath, Sayan Biswas, Pulok K. Mukherjee

School of Natural Product Studies, Department of Pharmaceutical Technology, Jadavpur University, Kolkata, India.

Cucumber (*Cucumis sativus* L.) fruit is a member of the Cucurbitaceae family. Fruits have high water content (96.4%) and nutritional components include protein (0.4%), fat (0.1%), and carbohydrate (2.8%)as primary metabolites. *C. sativus* also contains vitamin B (30 IU/100 g), mineral (0.3%), calcium (0.01%), phosphorus (0.03%), iron (1.5 mg/100 g)and dietary fiber which is important for the digestive system. Besides, various bioactive compounds have been reported in cucumber including cucurbitacins (A, B, C, D, E, I), cucumegastigmanes I and II, cucumerin A and B, vitexin and orientin. Cucurbitacins have demonstrated different pharmacological activities viz. antioxidant, anti-diabetic, lipid lowering and anticancer activity. Cucurbitacin E is the most common cucurbitacin identified in Cucurbitaceae family. Standardization of the different varieties

- School of Natural Product Studies, Jadavpur University ----- 34

of cucumber ethanolic extracts was carried out by high-performance thin layer chromatography (HPTLC) with the Cucurbitacin E. The mobile phase was optimized to pet ether and ethyl acetate and the spots of standard and sample were detected under UV lamp at 254 nm. A calibration curve was prepared by using area under curve (AUC) of standard Cucurbitacin E. The content of Cucurbitacin E present in different varieties of cucumber extracts was found to be 0.064-0.231% (w/w). Cucurbitacin E present in curve may be useful in future research to treat different ailments.

SFE-CONV-1919

Acute Dermal Toxicity and Wound Healing Activity of *Mikania Micrantha* Ointment in Rats

<u>Dip Sundar Sahu</u>, S.N.UpadhyayaM.Bora.Larin Puia, M.M.Rao Central Ayurveda Research Institute for Drug Development, CCRAS, Ministry of AYUSH, Kolkata - 700 091.

The plant, Mikania micranntha Kunth. has been traditionally used as a wound healing drug since ancient times, but its scientific evaluation is not fully explored yet. The objective of our study was to evaluate acute dermal toxicity and wound healing activity of a M. micrantha ointment in rats. Excision wound model was used in current study. The effect of test drug was assessed from wound contraction. The M. micrantha ointment showed moderate rate of contraction of wound that was slightly less than that of the standard drug, mupirocin. The M. micrantha ointment was also non-toxic to rat skin, suggesting a good potential of developing an inexpensive M. micrantha ointment for promoting accelerated wound healing.

SFE-CONV-1920

Application of a natural polysaccharide as mucoadhesive agent

Simran Shaw, Gopa Roy Biswas

NSHM College of Pharmaceutical Technology, NSHM Knowledge Campus - Kolkata, Group of Institutions, 124, B.L Saha Road, Kolkata 700053, India.

Mucoadhesion is commonly defined as the adhesion to the mucosal surface. Mucoadhesive agents interact with the mucus layer covering the mucosal epithetical surface and mucin molecules constituting a major part of mucus.Gum karaya is a polysaccharide gum from Sterculia urens tree, which has been used in the buccal patch asmucoadhesive agent. This natural polymer offered greater attachment and retention of dosage forms. Dummy buccal patches were prepared without drug, with Hydroxy propyl methyl cellulose, Ethyl cellulose and glycerine. In one set over the patch a layer of gum Karaya were included through the circumference of the circular patch (BPG). Another set remained without gum karaya layer (BP). The patches were evaluated for some of the physicochemical parameters like water retention, moisture uptake, folding endurance and surface pH. The results did not show any remarkable differences between the patches BPG and BP.However, in the study of mucoadhesive strength, the patches with gum karaya(BPG) showed quite promising results.Mucoadhesive strength of BPG was 20.50 ± 1gm, while BP was around 9.33 ± 0.67gm.Force of Adhesion were found to be 20.09 X10-2N and 9.1 X10-2N and Bond Strength were 639.80 N/m2 and293.54 N/ m2 respectively for BPG and BP.That means, Mucoadhesivestrengths of

- School of Natural Product Studies, Jadavpur University — 35

BPG were good enough to hold the formulations attached to the buccal region and again, the tackiness was such that it was easy to be removed from the buccal area with a little effort.Hence it can be concluded that Gum karaya can be well used in buccal patches as mucoadhesive agent.

SFE-CONV-1921

Standarization of ayurvedic formulation Ajmodadi churna

Sana Aftab, Anima Pandey and Nazia Tabbasum

Department of Pharmaceutical Sciences & Technology B.I.T. Mesra, Ranchi, JharkhandIndia. India.

Ajmodadi churna is a polyherbal ayurvedic medicine used as a carminative and an antispasmodic, is a strong wormifuge, and helps in all painful conditions like stiffness in back and also restores normal digestive functions. With the increasing demand of plant based products, it's very important to standardize the formulations being used for many centuries. The Ajmodadi churna was procured from the local market and an In-house formulation was also prepared for the study. The Ajmodadi churna was examined by physicochemical, pharmacognostic, phytochemical and quantitative studies. The diagnostic characteristics of individual ingredients were identified by Lycopodium spore method. The percentage purity of stone cells of black pepper, was observed to be 7.41. Ash value of the sample ranges from 10.33-10.35% w/w with SEM value of 0.016. The water solublity of ash of different sample ranges between 6-7% w/w with SEM of 0.02, and the acid insoluble ash ranges between 3-3.5% w/w with SEM value of 0.04-0.06. Methanol soluble extractive value ranges from 48-49% w/w with SEM of 0.05-0.06. Water soluble extractive value ranges from 7.27-7.29% w/w with SEM of 0.02. Moisture content range from 4.2-4.6% w/w with SEM of 0.03-0.04. Preliminary phytochemical screening revealed the presence of alkaloid, carbohydrate, sugar, anthraquinone glycosides, cardiac glycosides, saponins, proteins, steroids, triterpenoids, tannins, flavonoids. The in-vitro antioxidant activity was determined by using DPPH radical scavenging activity.

SFE-CONV-1922

To evaluate the anti-obesity of *Syzygium cumini* (Linn.) in mono sodium glutamate-HFD induced obese mice.

<u>Nikita Nayak</u>

Department of Pharmaceutical Sciences & Technology B.I.T. Mesra, Ranchi, JharkhandIndia. India.

Effect of excess fat is dangerous to human health since the time of Hippocrates, and is one of the leading causes of the preventable deaths. The seeds of the Syzygiumcumini (Linn.) also known as Malabar plum is used in various alternative healing systems like Ayurveda and Unani, also found effective against hyperglycemia in diabetic mice/rat. The n-butanolic extract of seeds were tested for the presence of phytoconstituents, antioxidants property, digestive enzyme activity, hypoglycemic effect and histology of adipose tissue and fatty liver by MSG-HFD induced obesity in swiss albino mice, animals treated with these extracts have reduced the increased body weight, periepididymal fat etc. The plant have shown the presence of some common

--- School of Natural Product Studies, Jadavpur University ----- 36

constituents like saponins, flavonoids, steroids, tri-terpinoids, glycosides and anthocyanins. The plant extract are found to be beneficial for the suppression of the obesity and associated complications. This experimental work indicates great potential work as anti-obese. The mice model designed for the study was developed by S.C. administration of the MSG in neonatal pups and was further continued by feeding HFD to facilitate obesity. I.P. administration of 200mg/kg of extract reduces the level of circulating lipids, as well as amount of adipose tissue resulting in remarkable improvement in obese animal model which was supported by histopathological analysis of liver tissue and adipose tissue of obese mice, bearing close resemblance to human obesity.

SFE-CONV-1925

Effect of Combination Therapy of Quercetin and Cisplatin on Matrix Metalloproteinase Expression in NDEA Induced Liver Cancer in Rats

Reetuparna Acharya, Procheta Acharya, Pritha Bose, Shakti P. Pattanayak

Department of Pharmaceutical Sciences and Technology, Birla Institute of Technology, Mesra, Ranchi-835215, India.

Flavonoids possess antioxidant, antitumor, anti inflammation and other diversified biological properties. The bioflavonoid Quercetin also possess these typical pharmacologic activities along with anti-proliferative and anti-angiogenic activities.Matrix metalloproteinases play a pivotal role in cell migrationduring cancer invasion and thus may serve as a potential target for cancer therapy. This study was performed to evaluate the efficacy of combination therapy of quercetin (QRC) and cisplatin following cancer induction in NDEA-induced HCC Model in rats which was correlated with MMP-2,9 expressions by simple zymography techniques. 24 Wistar rats wererandomly groups namely; divided into 4 control. induced control (partialhepatectomised+NDEA).nd two treatment groups receiving NDEA+QRCand NDEA+QRC+CISrespectively. At the end of the study period (8 weeks), animals were sacrificed, and various morphological and biochemical investigations were performed. MMPs including their zymogen (inactive) forms were quantified using SDS-PAGE, while the gelatinolytic activity of MMP-2, 9 were evaluated through gelatin substrate zymography. The altered body and liver weight post cancer induction were restored back significantly (p<0.001) following co administration of QRC and CIS. The elevated levels of diagnostic markers, lipoproteins and glycoproteins in cancer bearing animals were evidently ameliorated on combination treatment. Latent MMP-2 was observed in both control as well as induced group while induced control group predominantly demonstrated active MMP-2 and zymogen form of MMP9. These expressions were markedly reduced (p<0.001) in the treatment groups. This study validates combination of QRC and CIS as a potent combination therapeutic approach to regulate metastasis of liver cancer.

School of Natural Product Studies, Jadavpur University — 37

In-vitro anticancer efficacy of coumarin loaded silver nanoparticles in MCF-7 cell lines

Pritha Bose¹, <u>Shuchismita Mitra</u>¹, Amiya Priyam², Shakti P Pattanayak²

1. Department of Pharmaceutical Sciences & Technology B.I.T. Mesra, Ranchi, JharkhandIndia. India.

2. Department of Chemistry, Department of Chemistry, Central University of South Bihar, Gaya823001, India.

Coumarins belong to a large group of naturally occurring compounds with diversified biological properties including anticancer activity. The current global prediction estimates approximately 23.6 millionnew cancer cases each yearwith breast cancer being one of the leading causes of death in women. The advancement in the field of nanotechnology has improved treatment strategies in biomedical fields. In this study we aimed to develop a coumarin loaded silver nanoparticle (COU-AgNPs) for drug delivery improving the therapeutic effectiveness of the drug. The silver nanoparticles were synthesized followingone-step aqueous synthesis by regulating the hydrogen-bond interactions between sodium citrate (stabilizer), and hydrazine hydrate (reductant). This was followed by coumarin (COU) quenching. The synthesized nanoparticles were characterized spectrophotometrically (uv-vis spectroscopy and FTIR) with particle size and zeta potential, drug loading and in-vitro drug release analysis. These nanoparticles were then subjected to in vitro cytotoxicity analysis (MTT assay) using MCF-7 breast cancer cell line. The UV analysis demonstrated characteristic peaks corresponding to synthesized silver nanoparticles as well as of coumarin while the FTIR spectrum of COU-AgNPsdenoted the characteristic peaks of coumarin with certain alteration and shift of peaks that indicated proper loading of COU. The particles size wasin nanoscale range (nm) with optimum zeta potential. Sufficient drug loading with controlled and sustainable drug release was also observed. The invitro cytotoxicity study revealed the silver nanoparticles to possess potent growth inhibitory activity. These results establish the anticancer efficiency of coumaringuenched silver nanoparticles in MCF-7 breast cancer cell lines.

SFE-CONV-1924

Analytical Profiling of Anti-diabetic Component Obtained from the Seeds of *Acacia auriculiformis* a. Cunn ex. Benth.

Minakshi Hore, Anurag Saran, Naresh Kumar Rangra, Kishanta Kumar Pradhan

Department of Pharmaceutical Sciences and Technology, Birla Institute of Technology, Mesra, Ranchi-835215, India.

Acacia auriculiformis A. Cunn ex. Benth.(family :Fabaceae) is an evergreen tree which have a numerous medicinal properties and it is widely distributed through out the world. In this present study it is aimed to identify the antioxidant and antidiabetic activity of seed extract of the plant. The seeds obtained were authenticated, extracted (by Soxhlation) and subjected to Antioxidant assay and in vitro Antidiabetic assay. The methanol extract found to be very rich in flavonoid and other phytoconstituents are also present which responded favourably towards the antioxidant and antidiabetic assay. On quantitative screening the methanol extract exhibited highest phenolic profile with 0.7521 \pm 0.0143 mg GAE/g dw of phenolic content & 0.0723 \pm 0.0012 mg RE/g dw of flavonoid content. Chromatographic techniques showed peaks at Rf = 0.86 and

Spectroscopic techniques were employed for further charecterisation which yielded two isolated compounds at $\lambda 1$ = 273nm and $\lambda 2$ =220 nm. Thus the result implies that the methanolic extract is a potential source of antioxidant and antidaibetic agents which would be a guide in the selection of potential candidates for further pharmacological activity.

SFE-CONV-1926

Silymarin in combination with cyclophosphamide ameliorates hepatocellular carcinoma in rats

Roja Sahu, Ritabrata Halder, Pritha Bose, Reetuparna Acharya, Shakti P. Pattanayak

Division of Advanced Pharmacology, Department of Pharm. Sciences & Technology, Birla Institute of Technology, Mesra, Ranchi- 835215, India.

Liver cancer is one of the most common liver malignancies globallyand ranks third for cancer mortality in the world.Oxidative stress owing to NDEA metabolism is responsible for the cytotoxic, mutagenic and carcinogenic effect. Flavonoids, known to be efficient scavengers of various oxidizing species have potent in vitro and in vivo anticancer activities. Silymarin, an antioxidant flavonoid complex from the herb milk thistle (Silymarin marianum), has long been used in liver diseases treatment. The aim of the study was to evaluate the combined effect of silymarin(SIL) and cyclophosphamide (CYC) on NDEA-induced partially hepatectomized rat liver carcinogenesis. 4 groups of Wistar rats (n=6) were used, namely control, induced control: partially hepatectomized rats receiving single dose of NDEA (200mg/kg i.p.,), and 2 treatment groups receiving NDEA+SIL and NDEA+SIL+CYCrespectively. At the end of the experimental protocol of 8 weeks, following sacrifice of the animals, body and liver weight in all animals were estimated along with of lipid peroxidation and antioxidant activities (SOD, CAT, GPx, GSH, ascorbic acid and a-tocopherol) estimations. Histopathological evaluations were also conducted. Combined therapy of SIL+CYC significantly (p<0.001) reduced lipid peroxidation as well as both enzymic and non-enzymic antioxidant profiles that were altered following liver cancer induction. Also, the body weight and liver weight of animals were evidently restored by the combination therapy. The histopathological evaluation also highlighted the potential and enhanced chemotherapeutic efficacy of SIL+CYC. These results validate the combination therapy of SIL+CYC in successful alleviation of liver carcinogenesis in rats.

SFE-CONV-1927

Evaluation of the activity of Quercetin (plant flavonoid) in hippocampal memory impairment

<u>Tanishk Saini</u>

Department of Pharm. Sciences & Technology, Birla Institute of Technology, Mesra, Ranchi- 835215, India.

Hippocampal memory impairment is a pathological phenomena in which the patient faces difficulty in remembering, learning new things, concentrating or making decisions. Various microelements have significant action on cognitive function. Zinc plays a key role in modulating cognitive function and hippocampus dependent learning, memory and BDNF expression. High dose of supplementation of zinc induces specific zinc deficiency

— School of Natural Product Studies, Jadavpur University — 39

in hippocampus by decreasing expression levels of cognition related receptors and synaptic proteins such as NDMA, NR2A, NR2B, AMPA-GluR1, PSD-93 and PSD-95 in hippocampus, with significant loss of dendritic spines, which further impair cognition due to decreased availability of synaptic zinc. At a time when dietary fortification and supplementation, mice fed with high dose of zinc (60ppm) showed significant memory impairment when compared to control mice with standard diet due to zinc overdose toxicity. Behavioural tests (Morris water maze test, Passive avoidance test, Elevated plus maze test) were performed on the animals. The result showed that high dose supplementation of zinc leads to memory impairment. The activity of Quercetin on zinc induced dementia was evaluated in the presented research work. Quercetin at a dose of 40mg/kg bwp.o. was administered to the animal for 21 days. It has been found that Quercetinenhanced the memory function of animals as animals showed enhanced activity in the behavioural tests. It has also been found that there was elevation in the level of SOD and GSH and reduction of MDA and AChE level in the Quercetin treated mice. These findings suggest that Quercetin improves the memory functions in dementia patient.

SFE-CONV-1928

Docking Studies of Phytoconstituents of *Tinospora cordifolia* with Special Reference to ER+ Breast Cancer

Piyush Makkar, Abhishek Das, Manik Ghosh

Department of Pharm. Sciences & Technology, Birla Institute of Technology, Mesra, Ranchi- 835215, India.

Plants are one in every of the vital sources of medicines since the start of human civilization. Tinospora cordifolia, a usually used ligneous plant in Ayurvedic drugs has notable medicative properties i.e. anti-diabetic, anti-spasmodic, anti-malarial, antianti-arthritic, anti-oxidant, anti-allergic, anti-stress, inflammatory, anti-leprotic, hepatoprotective, immunomodulatory, anti-neoplastic. In the present workdocking studies of chemical constituents present in the Tinospora cordifolia were studied on estrogen receptor (PDB: 3ERT) to predict the anticancer potentials of its phytoconstituents. The plant is rich in phytoconstituents compounds viz. alkaloids (Berberine. Syringin, Tinocordifolin, Palmatine, Tembetarine, Magnoflorine, Tetrahydropalmtine, Jatrorrhizine), glycosides (Tinocordiside, Tinocordifoliside, Palmatoside), diterpenoids (Palmarine, Salvaronine A), steroids (β - Sitosterol, Hydroxy (N-trans-Ferulov) Ecdysone) and а minor constituent Tyramine). These phytoconstituents were docked on estrogen receptor that is found in four differing kinds of cancers like breast &gynaecologic cancers, endocrine gland cancers, cancers of digestive system and respiratory organ cancers. Of all, the very best docking score was of phytoconstituent Tetrahydropalmtine(alkaloid) -34.516. Compound N-trans-Feruloyl Tyramine showed superb affinity towards the receptor with highest dock score of -19.3689. Compound Palmatoside(glycosides) and Palmarine(diterpenoid) show dock score of -5.4073and -7.0221 respectively. Apart from these steroids show negative affinity towards the 3ERT receptor. Hence, we can predict that these phytoconstituents may have anticancer properties which can be beneficial for the treatment of ER+ breast cancer.

Anticancer Activity of Tinospora cordifolia on Estrogen Positive MCF-7 Cell-Lines

Anjana Sinha, Abhishek Das, Manik Ghosh

Department of Pharm. Sciences & Technology, Birla Institute of Technology, Mesra, Ranchi- 835215, India.

In the present study an approach was made to identify new lead molecule from natural sources against breast cancer. Tinospora cordifolia was chosen as a plant of choice for study due to its various medicinal properties. Anticancer activity of different extracts of Tinospora cordifolia was checked via SRB assay in estrogen positive MCF-7 cell-lines. Cytotoxic effect of aqueous extract (TCN), heat treated aqueous extract (TCH) and amla juice treated aqueous extract (TCCA) were assessed at a concentrations of 10-80 μ g/mL on cancer cell-lines. The results of SRB assay showed the reduction in cell viability against MCF-7 on increasing the concentration. TCCA treated group showed a very good activity of 62.0 ± 3.0 percentage of cell growth at a concentration of 80 μ g/mL. TCH and TCN were also found to be active at a concentration of 80 μ g/mL.

SFE-CONV-1930

Comparative Study of Physicochemical, Phytochemical Parameters, Quantitative Estimation, and DPPH Potentials of Mung, Erada and Bala

Leena R. Dhoble, Prakash R. Itankar

University Department of Pharmaceutical Sciences, RashtrasantTukdojiMaharaj Nagpur University, Nagpur, Maharashtra, India.

Many plants possess inherent free radical scavenging activity. The potential of such phytochemicals may include their use as antioxidant, anti-inflammatory, anti-Parkinsonian, anti-Alzheimer's, anticancer, etc. Three plants Mung beans, Erada root bark and Bala roots were studied for their physicochemical and phytochemical parameters, followed by quantitative estimation of secondary metabolites. In addition, DPPH radical scavenging potentials were calculated.Physicochemical studies involved determination of ash value, extractive value, loss on drying, swelling index, foaming index, foreign matter and crude fibre content. The phytochemical studies included organoleptic characteristics and preliminary screening for primary and secondary metabolites. Quantitative estimations of water-ethanolic (30:70) extracts encompassed total- phenolic, tannin, flavonoid, flavanol, and alkaloid content. The physicochemical parameters obtained were found to be within the Pharmacopoeial limits. Phytochemical studies confirmed presence of various secondary metabolites like tannins, flavonoids, alkaloids, glycosides, sterols, etc.Quantitative estimationsof water-ethanolic (30:70) extracts revealed high quantities of flavonoids, phenols and alkaloids in Mung beans, Erada root bark and Bala roots. The DPPH radical scavenging potential (% inhibition) for Mung beans, Erada root bark and Bala roots, was found to be 46.8%, 43.28%, and50.22% respectively. All the above results point towards the potential antioxidant activities of the mentioned plants. These activities can be further explored in terms of isolation of active moieties, animal studies essentially involving inflammatory

School of Natural Product Studies, Jadavpur University — 41

mechanisms in their pathophysiology,biopharmacokinetic studies, formulative aspects, clinical studies etc. Thus, ethnopharmacologicalplants have a great potential and a significant place in modern science, given their exploration in a systematic and logical manner.

SFE-CONV-1931

Miraculous Herb

Anup Kumar Sarkar, Sabitabrata Das, Arpita Paul Debnath

Parnasree Sustha, 109 Parnasree Pally, Pin-700060, Kolkata, West Bengal, India.

This herb controls muscle pain and nerve pain. It is very useful to relief any type of muscle contraction and muscle cramps. This herb is very effective in curing any long time muscle cramp. One teaspoon paste of this herb should be taken twice daily. This herb can also be taken in the form of soup with potato and other vegetables. Its use in the form of soup will not only add medicinal value to our meal but will also help us in long run.

SFE-CONV-1932

An Experimental Model for Idiopathic Pulmonary Fibrosis in Rats

Syed Mohammad Abdullah, Papiya Mitra Mazumder

Department of Pharmaceutical Sciences & Technology, Birla Institute of Technology, Mesra, Ranchi-835215, India.

Idiopathic pulmonary fibrosis is a frequent form of interstitial lung disease with unknown etiology. It is progressive and reversal of pulmonary fibrosis after diagnosis is ambiguous.Imprecise information in pathogenesis of IPF and availability of limited animal models, have led to uncertain development of effective therapeutic agents. Asit is observed, not a single treatment has been developed yet that can claim to be therapeutically effective against IPF. Therefore, to enhance understanding about onset mechanism of IPF, an experimental model is developedin rodents that would mimic human pulmonary fibrotic conditions. In the present study, male rats were sensitized with ovalbumin (antigen) and aluminum hydroxide (adjuvant) i.p and challenged with aerosolized ovalbumin to induce acute allergy. Subsequently, they were repeatedly exposed to formaldehyde and cigarette smoke in pixel-glass chamber equipped with autonomic nebulizer and air suction pump. After last exposure, rats were evaluated for forced running-wheel exercise and then sacrificed to remove the lungs for biochemical analysis, BALF collection and histopathological examination to substantiate the animal model of IPF. Enhanced oxidative stress and inflammatory markers, reduced exercise performance and fibrosis denoted by biochemical estimation of hydroxyprolineare common findings, which were significantly pronounced in disease induced group with respect to normal control. Histopathology of lungsreveals alveolar-epithelial-cells destruction, intra-alveolar hemorrhage and interstitial lung fibrosisbeyondinfiltration of inflammatory cells.Significant risk aspectsincluding genetic factors (allergy), environmental irritant (formaldehyde), common insults (cigarette smoke) and gender (male)may develop IPF, ascertained through oxidative stress, inflammatory and fibrotic markers and cytological findings.

- School of Natural Product Studies, Jadavpur University ----- 42

Antioxidative Effect of Tinospora cordifolia

Shreya Ghosh, Soumya Ganguly

Calcutta Institute of Pharmaceutical Technology & Allied Health Sciences. Banitabla, Uluberia, Howrah -711316, India

The traditional system of medicine remains a major part of the health care system. It is a safer alternative, less costly and better tolerated with less complication. In view of its traditional claims, antioxidant and antiproliferative activities were evaluated in the study. Tinosporacordifolia or Guduchi (Family:Menispermaceae) present is geographically distributed in topically in India, Sri Lanka, Myanmar, and its extract is widely used due to its antioxidant properties. Antioxidants are substances that can prevent or decelerate damage to cell caused by free radicals, unstable molecules that the body produces as a reaction to environmental and other physical or mental stress. Antioxidants are needed to prevent the formation and oppose the negative effects of reactive oxygen and nitrogen species, which are generated in vivo and damage DNA, lipids, proteins, and other bio-molecules. The different extracts of the root and stem of Tinosporacordifolia can combat oxidative stress-related problems by inhibition of the enzymes involved in the production of eicosanoids and provide protection against radical-inducedprotein (BSA) oxidation as well as plasmid DNA damage. These protective properties of the extracts would be directly attributed to the presence of phytochemicals such as polyphenols, tannins, and glycosides.Prevalence of oxidative properties is a major matter of concern in the Indian population where peoples are suffering from oxidative stress-related diseases such as CVDs, non-alcoholic fatty liver, and type-2 diabetes. The aim of this current review is to accumulate experimental data about the pharmacological efficacy of T.C. extract in different models.

SFE-CONV-1934

Tinospora cordifolia and its clinical significance on neuronal degeneration

Subhajit Mandal, Soumya Ganguly

Calcutta Institute of Pharmaceutical Technology & Allied Health Sciences. Banitabla, Uluberia, Howrah -711316, India.

Neurodegenerative disease is a parasol term for a wide range of conditions which primarily affect the neurons in the human brain. Neurons are the building blocks of the neurons system which include the brain and spinalcord. Example of the neurodegenerative disorder is Parkinsonism, Alzheimer's and Huntington's disease. Prevalence of the neurodegenerative disease is a major matter of concern in Indian perspective where roughly 30 million people are diagnosed with the neurological Tinosporacordifolia(Guduchi) commonly disorder. known as heart leaved moonseed, Guduchi and giloy belonging to the family Menispermaceae native to tropical areas like India, Myanmar, and Sri Lanka, and its extracts have shown effectiveness in different neurodegenerative disease.Guduchiis widely used shrub in flock Siddha, Unani, Homeopathy, and Ayurvedic system of medicine.A studv demonstratedTinosporacordifolia having free radical scavenging capacity, decrease oxidative stress by increasing glutathione and other antioxidant enzyme and downregulate the pro-inflammatory. It stimulates helper T-cellular immune, innate immune response.Additionally, it induces apoptosis that prevent tumor activity.A research group

- School of Natural Product Studies, Jadavpur University - 43

reported the neuroprotective activity of Tinosporacordifoliaethanolic extract (TCEE) on LPL induced behavioral alteration and neuronal damage in rat.Another group investigated the effect of T.cordifoliaagainst 6-OHDA lesion in a rat model of Parkinsons's disease. Another study revealed the therapeutic potential of T.cordifolia extract on glutamate-induced excitotoxicity using cerebral neuronal cultures. This study presents a detailed survey on the pharmacological effect of Tinosporacordifolia on the neurodegenerative disorder.This data can be further translated into relevant pharmaceutical formulations.

SFE-CONV-1935

Effect of Tinosporacordifolia on Cardiovascular Disease

Souvik Haldar, Soumya Ganguly

Calcutta Institute of Pharmaceutical Technology and Allied Health Sciences, Banitabla, Uluberia, Howrah-711316

Tinospora cordifolia (Family- Menispermaceae) commonly known as "Amrita" or 'Guduchi' is a large, glabrous deciduous shrub distributed throughout the tropical Indian subcontinent and China, Sri-Lanka, Myanmar. It is an important drug of Indian system of medicine including Ayurveda, Unani, Siddha, homeopathy and Chinese medicine and its alcoholic extract exhibited effectiveness in different cardiovascular diseases(CVD). These are the major health concern in world perspective where roughly 17.9 million deaths per year are estimated (30% of global death). CVD is a general term for a condition affecting heart or blood vessels which include high blood pressure, Myocardial Ischaemia, Hyperlipidaemia, Arrhythmia, etc. Hyperlipidemia involves high levels of fat particles in the blood which narrow blood vessel and restrict blood flow. It creates a risk of heart attack, stroke, chest pain affecting the heart muscle, valves or rhythm. The cardioprotective effect exhibited due to phytoconstituentsberberine, furanolactone, clerodane of T.C. results in decreased lipid peroxidation and caused a dose-dependent reduction in lipid profiles by 30 % have been reported by a research group. Another study revealed that methanolic extract T.cordifolia had significant cardioprotective activity against isoprenaline-induced myocardial infarction. A study reported that the extract of T. cordifolia demonstrated potent antiarrhythmic activity in CaCl₂ induced arrhythmia indicating that T. cordifolia may be used in ventricular tachyarrhythmias. The aim of this current review is to accumulate experimental data about the cardioprotective activity of Tinosporacordifolia extract in different models. Future prospective involves the development of pharmaceutical formulation which can be made commercially viable.

SFE-CONV-1936

Effect of Tinospora Cordifolia on Pain & Inflammation

Sk. Riaz, Soumya Ganguly

Calcutta Institute of Pharmaceutical Technology & Allied Health Sciences. Banitabla, Uluberia, Howrah -711316, India.

Pain & inflammation are common complaints in many patients suffering from acute conditions provoked by a specific disease or injury. There are many modern drugs (like opioids, salicylates, corticosteroids) currently used in the management of this condition with many known adverse effects. Many medicinal herbs have been used in the relief of pain without any adverse effect. Tinosporacordifolia(Guduchi,family: Menispermaceae)

School of Natural Product Studies, Jadavpur University — 44

is avaluable resource due to the traditional uses in the treatment of pain & inflammation. It is an important drug used by Ayurvedapractitioners in various disease condition and also for the maintenance of health. It is widely distributed throughout the tropical area of India, Myanmar & China ascending to an altitude of 300 meters. In India, the leaves of Guduchi were used as vegetable by common Indian. It has effective anti-analgesic & anti-inflammatory activity and exerts it by increasing the pain threshold. The alcoholic extract of T. Cordifolliahas been found to exert anti-inflammatory actions in models of acute and subacute inflammation. In another study, an aqueous extract of T. cordifolia showed a significant analgesic & anti-inflammatory effect in the cotton pellet granuloma but the acute anti-inflammatory effect studies are sparse. Another group reported the analgesic effect of T.cordifolia in both the hot plate and abdominal writhing method in rodent models. The study is to explore the analgesic and anti-inflammatory activity of various extracts of T. Cordifolia in animal models. These results can we utilized in the future for the development of potential formulations.

SFE-CONV-1937

Effect of Tinospora Cordifolia on Diabetes Mellitus

Md.Toufik, Soumya Ganguly

Calcutta Institute of Pharmaceutical Technology & Allied Health Sciences. Banitabla, Uluberia, Howrah -711316, India.

Tinospora cordifolia (T.C.) commonly known as Guduchi, belonging to the family Menispermaceae, is a highly potent herb, which can be found in tropical area like India, Myanmar, Sri Lanka. Tinosporacordifolia is widely used in Folk, Ayurveda, Unani, Siddha as herb and as mother tincture inHomeopathy. Diabetes mellitus is a chronic metabolic disorder caused due to defective insulin secretion, resistance in insulin action or both. Hyperglycemia a cogent consequence of diabetes is the source of most harmful effect's associated with this disease along with alternation in glucose and lipid metabolism and modification in liver enzyme levels. Despite the availability of many marketed synthetic medicines which are either costly or having adverse effect, diabetes can't be cured completely. As reported in Ayurveda herbs provide betters alternatives, owing to low cost and less side effect. T. cordifolia has been used to combat diabetes. Oxidative stress regulates insulin resistance which is prevalent in developing countries and leads to diabetes mellitus. The ethyl acetate or hexane extracts of stem of T.cordifoliais generally used to cure diabetes by regulating the level of blood glucose level byinhibiting Gluconeogenesis and Glycogenolysis. The anti-diabetic properties exhibited by this plant species are due to the presence of alkaloids, tannins, glycosides, flavonoids, saponins, steroids, etc. The present review encompasses the anti-diabetic activity of extract of Tinospora cordifolia in different models and future prospects of this important neglected plant for research in the field of plant tissue culture. The extract of this Plant can be potentially translated into dosage form of Pharmaceutical relevance.

School of Natural Product Studies, Jadavpur University

45

Formulation and Optimization of Itraconazole Niosomes for Leishmaniasis

<u>Maiti S</u>, Roy S

Guru Nanak Institute of Pharmaceutical Science and Technology, Sodepur, Kolkata 700114, India.

Itraconazole is an antifungal medication used to treat a number of fungal diseases, one of which is Leishmaniasis, one of the most deadly disease caused by the Leishmania type parasites. The only formulations available for Itraconazole in the market right now is a blue 22mm (0.87 in) capsule with tiny 1.5 mm (0.059 in) blue pellet inside containing about 100mg drug. The Itraconazole is an insoluble and ph sensitive drug and hence has a very low bioavailability. Due to its insoluble nature parenteral administration has The objective of this study is to prepare a noisome formulation to been discontinued. overcome the drawbacks of itraconazole and to evaluate process-related variables like hydration and sonication time, the effects of charge-inducing agent and centrifugation on itraconazole entrapment and release from niosomes. Formulation of itraconazole niosomes was optimized by altering the proportions of Span, Tween and cholesterol. The effect of changes in osmotic shock and viscosity were also evaluated. Nonsonicated niosomes were in the size range of 2-3.5 µm. Itraconazole niosomes formulated with Tween 80 entrapped high amounts of drug (88.72%). The mechanism of release from Tween 80 formulation was the Fickian type and obeyed first-order release kinetics. Niosomes can be formulated by proper adjustment of process parameters to enhance itraconazole entrapment and sustainability of release. These improvements in itrazonazole formulation may be useful in developing a more effective leishmaniasis therapy.

SFE-CONV-1939

Increased Rosmarinic Acid Content of *in vitro* Root Cultures of *Ocimum basilicum* L. Treated with Precursors

Trayee Biswas

Bangabasi Morning College, 19, Rajkumar Chakraborty Sarani, Kolkata 700009, India.

Present study highlights precursor feeding as the strategic for enhanced production of rosmarinic acid, a phenolic compound of high medicinal importance, through non transformed in vitro root culture. Root cultures were established in one fourth strength of liquid MS basal media supplemented with 1.0 mg/l α -napthaleneacetic acid (NAA) and were treated with three different concentrations (0.01 mM, 0.1 mM and 1.0 mM) of two precursor molecules (Phe and Tyr) during the initial growth phase (30 days in culture). The efficacy of phenylalanine was more than tyrosine in enhancing rosmarinic acid content in root cultures. The maximum accumulation of rosmarinic acid (4.31 ±0.54 % of dry weight) obtained in cultured roots treated with 0.1 mM phenylalanine which was found to be 1.71 and 2.85 times higher than control and in vivo plants respectively.

Formulation and Evaluation of Herbal Toothpaste

Supratim Ghosh, Priyanka Ray

Gurunanak Institute of Pharmaceutical Science & Technology, Sodepur, Kol-114, India.

The current research work aims to formulate herbal toothpaste utilizing plant extract like Guava leaves, Clove and other ingredient are Camphor, Honey. The plant extract ingredient posses the potent anti-bacterial property. The formulated herbal toothpaste is evaluated for its antimicrobial effect against Staphylococcus aureus and Lactobacillus species which are the main microorganisms present in bucaal cavity. The formulated herbal toothpaste compared with marketed preparation.Physical examination: Colour-greenish brown, smooth in nature, pH-8.1, spredability- Good and stable formulation. It has been good scope in future to improvise the dental health of public.

SFE-CONV-1942

Production of Anti-aging Cosmetics Containing Amla Pulp and Betel Leaf Extract

Satadru Nag, Anuranjita Kundu

Guru Nanak Institute of Pharmaceutical Science and Technology, Panihati, Kol-700114, India.

Tannins are polyphenolic biomolecules having astringent property which is useful for the anti-aging effect on skin by protein precipitation mechanism. That is how the tannin shows anti-bacterial activity by the same astringent property which induces the complexation of microbial enzymes. In our present study the tannin is collected from two natural sources – Betel leaf (*Piper betle*) and amla pulp (Phyllanthus emblica). The aqueous extracts of both are evaluated by phytochemical screening and microbiologically tested through disc-diffusion method. The combined effect of both extracts shows better result and with that three cosmetic formulations – Toner, Gel(for oily skin), and Cream(for dry skin) are prepared. As the extracts are positively showed antimicrobial activity so that the formulations can be claimed as anti-aging cosmetics.

SFE-CONV-1941

Anticancer and Antineoplastic Effect of Tinospora cordifolia

Anirup Jana, Soumya Ganguly

Calcutta Institute of Pharmaceutical Technology & Allied Health Sciences. Banitabla, Uluberia, Howrah-711316, India.

Natural products with medicinal value are gradually gaining importance in clinical research due to their well known property of lesser side effects with better tolarance as compare to synthetic drug. Tinospora cordifolia (Family: Menispermaceae), also known as or Guduchi is used as important drug in traditional medicinal system such as Folk, Ayurveda, Siddha, Unani etc. and it's different exibit activity on cancer cells. Cancer is a term use to describe a group of disease involving abnormal cell growth with the potential to invade or spread to the other parts of the body. Amongst different types of cancer,

--- School of Natural Product Studies, Jadavpur University ----- 47

mainly breast cancer (in 41%women), leukemia & brain tumors (in 34% children) and lung cancer (in 25% men) are the disease burden of the world where approximately 9.6 millions deaths occurs per year. Methanolic extract of *Tinospora cordifolia* showed significant anticancer activity against MDA-MB-231 human breast cancer cell line as reported by a research group. Methanolic extract of Tinospora cardifolia shows cytotoxic effects owing to lipid peroxidation and release of LDH and decline in GST. Another study revealed that administration of Tinospora cordifolia. Stem methanolic extract to BALBIC mice increased the total white blood cell count significantly with increase bone marrow cellularity & increased maturation of stem cells. The aim of this review is to demonstrate the effect of Tinospora cordifolia against different cancer cells. Future prospective involves development of pharmaceutical dosage form which can improve the quality of life in cancer patient.

SFE-CONV-1943

Immunomodulation in Obstructive Jaundice by *Tinospora Cordifolia*: A Review

Pritha Janah, Tapan Kumar Maity

Jadavpur University, Kolkata, India.

Obstructive jaundice arises mainly due to blockage of bile ducts or abnormal bile retention. It's not a disease, but an indication of abnormal liver condition. Severe pain and fever can be seen. Most common cause of blockage of the bile duct is gallstone. Another reason for this blockage can be associated with cancer of bile duct. If, the gallstones are detected, then endoscopic removals of those gallstones are recommended. Sometimes, it is known as surgical jaundice. A sudden drop in cellular immunity has been observed in animals, after the ligation of its bile duct has been done. A similar reduction in cellular immunity in the patients with obstructive jaundice has been observed. This immunosuppression is considered to be caused by biliary obstruction. Tinospora cordifolia has a potential to improve and modulate immune system and body resistance against infections. Several compounds viz. cordifolioside, syringin have been isolated from Tinospora cordifolia having immunomodulatory activity. They have been collectively proved to increase the phagocytic activity which has been reduced in the case of obstructive jaundice. In this review, the activation of macrophage and immunomodulatory action of Tinospora cordifolia are compared.

SFE-CONV-1946

Formulation and Evaluation of Acryl Polymer Based Sustained Release Multiparticulate Drug Delivery System

Sumon Sheel, E.Bhanoji Rao, Rana Mazumder

Department of Pharmaceutics, Calcutta Institute of Pharmaceutical Technology and Allied Health Sciences, Uluberia, Howrah-711316, West Bengal, India.

The purpose of the present work was to formulate and evaluate acryl polymer based sustained release multiparticulate system as microspheres of freely water-soluble diltiazem hydrochloride by using with eudragit as a acryl polymer i.e eudragit RS100 and combination with eudragit RS100/ RL100 eudragit RS/RL 100 which are

- School of Natural Product Studies, Jadavpur University — 48

biocompatible and non-biodegradable polymer. Microspheres of diltiazem hydrochloride prepared by solvent-evaporation technique to get the optimum release of the drug for a prolonged period. The prepared microspheres were characterized by entrapment efficiency, particle size, micromeritic properties, in-vitro release behaviour, scanning electron microscopy etc. Drug loaded microspheres should high entrapment efficiency (86.87%). The release of drug was prolonged upto 12 hrs. by increasing the polymer concentration was achieved when drug: polymer ratio was taken up to 1:3 and followed by kinetics profile was best fit in Higuchi matrix model kinetics followed by first order kinetics. It was found that the mechanism of drug release from microspheres was diffusion controlled. The n value in korsmeyer-peppas model was found to be less than 0.5, which means prepared microspheres followed fickian diffusion.

SFE-CONV-1944

The Radio-Sensitizingeffect of Ferulic Acid on Carcinoma Cells by Collapsing Redox Balance: An involvement of Akt/p38 MAPK pathway

<u>Ujjal Das¹</u>, Krishnendu Manna², RakhiDey Sharma³, Biswanath Majumder⁴ and Sanjit Dey¹

1. Department of Physiology, Centre for Nanoscience and Nanotechnology and Centre with Potential for Excellence in Particular Area (CPEPA), University of Calcutta, 92 APC Road, Kolkata-700009, India, 2. Cancer Biology and Inflammatory Disorder Division, CSIR-Indian Institute of Chemical Biology, 4, Raja S.C. Mullick Road, Kolkata-700032, West Bengal, India. 3. Belda College, Belda,Paschim Medinipur, West Bengal-721424. 4. Department of Molecular Pathology and Cancer Biology, Mitra Biotech, 202, NarayanaNethralaya, Hosur Main Road, Bangalore 560099, India

Cancer cells acquire resistance against drugs and radiation because of high level of cellular antioxidant and activation of PI3K-Akt-NF-kB-STAT3 pathway which increases cell survival and angiogenesis. Therefore, in the current study we successfully developed an approach to break down the antioxidant defence of cancer cells by tuning the dose and duration of ferulic acid (FA) treatment. We established our hypothesis using biochemical assays, immunoblotting, flow cytometry and microscopic techniques.FA pretreatment initially decreased reactive oxygen species (ROS) level in carcinoma cells which induced reductive stress and cytostasis. To overcome this stress, cellular mechanism increased the Keap1 level to down-regulate nuclear localization of Nrf2 and its dependent antioxidant system. The antioxidant system reached the lowest level after 3 and 6 h of FA treatment in A549 and HepG2 cells respectively. As endogenous ROS were still being generated at same rate, ROS level was clearly higher than control which changed the reductive stress to oxidative stress. Exposure to yradiation in this condition further increased ROS level and caused radio-sensitization of carcinoma cells. Combination of irradiation (IR) and FA activated mitochondrial apoptotic pathway and concomitantly inhibited the cell cycle progression and survival pathway over the IR group. Moreover, the combination treatment showed significant tumour regression, caspase 3 activation and nuclear fragmentation in tumour tissue compared to radiation alone. In contrast, FA pretreatment protected peripheral blood mononuclear cell (PBMC) and normal lung fibroblast WI38 cells from radiation damage. Together, combination treatment offers effective strategy of killing cancer cells and demonstrates its potential for increasing the efficacy of radio-therapy.

- School of Natural Product Studies, Jadavpur University — 49

Preclinical Safety and Toxicity Studies of Guduchi [*Tinospora cordifolia* (Willd.) Miers.]

<u>Manajit Bora¹</u>, Lalrinpuia¹, S.N. Upadhyay², Amit Kumar Dixit², Barnali Maiti Sinha⁴, Koyel Mukheerjee⁴ and M.M. Rao⁵

Central Ayurveda Research Institute for Drug Development, Sec. V, Bidhannagar, Kolkata-700091, India

Tinospora cordifolia (Willd.) Miers.] commonly known as "Guduchi" is an important medicinal herb in Ayurveda and is used for treating fever, diabetes, dyspepsia, jaundice, urinary problems, chronic diarrhoea, dysentery etc. Different phyto-chemicals present in Guduchi are alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides. The present article is prepared based on data of various research articles published in journal from the period 2011-2019. Aerial parts of Guduchi at the dose of 3, 5, 7 and 9ml/kg decoction and 2, 4, 6 and 8gm/kg body weight whole plant powder orally to Swiss albino mice could not altered body weight, food and water consumption. There was no mortality recorded even at the highest dose level i.e. 9ml/kg for decoction and 8gm/kg for whole plant powder of Guduchi (Pingale, 2011). No acute toxicity was observed on oral administration of the aqueous extract of Tinospora cordifolia at a dose of 150mg/kg body weight in male albino mice (Sengupta et al., 2011). Neither mortality nor toxic signs and symptoms observed in rats following single dose oral administration of stem extracts of Tinospora cordifolia @2000mg/kg in acute toxicity and at the doses of 500mg/kg and 1000mg/kg in 28 days repeated dose toxicity studies in rats (Kannadhasan & Venkataraman, 2012). Aqueous extract of Guduchi administrated orally up to 800mg/kg showed the nontoxic nature of Guduchi in rats (Kumar et al., 2013). LD50 value of hydroalcoholic extract of Guduchi was found more than 1000mg/kg body weight in female rats (Pandey, Govind, 2014). Acute toxicity study of Rasasindura, an Ayurvedic formulation showed that drug did not produce any signs and symptoms of toxicity or mortality up to oral dose of 2000mg/kg in rats. Chronic toxicity results also showed that Rasasindura at the dose of 450mg/kg had no significant effect on the ponderal and hematological parameters in rats (Gokarn et al., 2017). Rats treated with Tinospora cordifolia extracts at a dose of 2000mg/kg of body weight showed neither mortality nor abnormal behavioral during the 14 day observation period following dosing (Tiwari et al., 2019 and Ghatpande et al., 2019). Experimental data reported from the present review established that Guduchi [(Tinospora cordifolia (Willd.) Miers.] is safe when administered in appropriate doses for therapeutic use. However, an extensive research should be undertaken for isolation, characterization and elucidation of mechanism of action of the active principles of Guduchi.

School of Natural Product Studies, Jadavpur University

50

Immunomodulatory Activity of Tinospora cordifolia

Rohit Guin, Soumya Ganguly

Calcutta Institute of Pharmaceutical Technology & Allied Health Sciences, Banitabla, Uluberia, Howrah: 711316, India.

In developing countries and particularly in India low-income people such as farmers, people of isolated villages and native communities use folk medicines for the treatment of common diseases. TinosporaCordifolia is a plant which is known by the common name heart-leaved moonseed. It is a herbaceous vine of the family Menispermaceae. This plant grows in the tropical area of India, Myanmar, and Sri Lanka. The immunity system of the human body is the most important factor to support life and the extract of T.cordifoliahelps in increasing the immunity. A PMN phagocytotic function study employing ethyl acetate, water fractions and hot water extract of *T. cordifolia* exhibited immunomodulatoryactivity with an increase in the percentage of phagocytosis. Chromatographic purification of these fractions led to the isolation of a mixture of 11-Hydroxymustakone, N-Methyl-2-Pyrolidone for the first time from a natural source and five known compounds by nuclear magnetic resonance (NMR) and mass spectrometry. Furthermore, the effect of Tinosporacordifolia extract on the modulation of immunostimulatory function in Carbon Tetrachloride (CCl₄) intoxicated matured rats has been reported in another study. CCl₄ administrationcauses immunosuppressive effect as indicated by phagocytic capacity, chemotactic migration and cell adhesiveness of rat peritoneal macrophages. However, treatment with T.cordifolia extract (100mg/kg bodyweight for 15 days) in CCl₄ intoxicated rats was found to protect the liver as indicated by changes in the enzyme level in serum. In this study, we are attempting to review experimental data about the pharmaceutical efficacy of Tinosporacordifolia extract on different experimental models.

SFE-CONV-1948

Assessment of rutin on acute asthma model induced by OVA and formaldehyde

Mansi Agrawal, Dhruv Jha, Syed Mohammad Abdullah, Papiya Mitra Mazumder

Department of Pharmaceutical Sciences and Technology, Birla Institute of Technology, Mesra - 835215, Ranchi, Jharkhand, India.

Asthma is a common prolonged inflammatory disease of lung airway. In most of the preclinical studies, OVA (ovalbumin) have been used to sensitize and challenge the host animals but it usually takes prolong time period. Formaldehyde is one of the most important causative agents, present as an air pollutant in atmosphere, which is responsible for further augmentation as well as expedite the onset of asthma attacks, especially in those individual who are prone to allergens. Thus the purpose of this study was to establish an animal model of acute asthma using ovalbumin and formaldehyde and also determine the efficacy of rutin against it. Animals were sensitized with OVA at day 0 and 5 and formaldehyde at 3,4,6,7 days followed by challenge with OVA from

--- School of Natural Product Studies, Jadavpur University ----- 51

8,9,10 days. Beclomethasone was used as standard anti inflammatory drug. After its development the lung was isolated, weighed and stored for further studies like lung weight index, bronchoalveolar lavage fluid (BALF) content for total and differential WBCs count and lung histology. The significant difference (p<0.05) was observed, lung weight index, total and differential WBCs count was significantly increased in disease group and significantly decreased in rutin treated group as compared to normal control. Histological analysis of lung tissue of disease group showed perivascular edema and mucus gland hyperplasia while rutin treated group showed mild perivascular edema and mucus gland hyperplasia. Therefore, in the current study an attempt was made to assess the action of rutin on OVA and formaldehyde induced acute asthma model.

SFE-CONV-1949

Formulation and Evaluation of Herbal Face Toner

Jagaran Saha, Kavita Bharati, Priyanka Ray

Gurunanak Institute of Pharmaceutical Science and Technology, 157/1, Nilgunj Road, Panihati, Kolkata, West Bengal-700114, India.

Herbal face toner helps to keep our skin even toned. It removes the oil present in our skin and also removes the excess impurities and dirt from our skin. It also removes marks present on skin. The herbal face toner closes the open pores on our skin, which opens due to polluted atmospheric conditions and this problem is faced by almost every individual. By applying the face toner on the skin it close the open pores and also prevent absorption of chemicals of beauty products and also helps in maintaining pH of the skin. It is a very good attempt to establish the herbal face toner containing aqueous extracts of neem leaves, turmeric rhizomes and seed of nutmeg.Formulations showed good Spreadability, good consistency, homogeneity, appearance, pH, Spreadability and cooling effect . The formulation show no redness, edema, inflammation and irritation during irritancy studies. These formulations are safe to use for skin and increase tone of skin.

SFE-CONV-1950

Effect of Abiotic stress induced by Acetylsalicylic Acid on Growth and Morphology of *Bacopa monnieri*, family Scrophulariaceae

Sayan Chatterjee, Soumya Bhattacharya

Gurunanak Institute of Pharmaceutical Science and Technology, 157/1, Nilgunj Road, Panihati, Kolkata, West Bengal-700114, India.

Stress in plant is induced by any unavoidable external living or non-living agents or conditions. Plants face both biotic and abiotic stress in its life. Acetylsalicylic acid (ASA) and salicylic acid derivatives (analgesic) showed some positive effect in plants growth and germination. These include exercising a thermogenic effect, stimulation of adventives root, showing a herbicidal effect, reducing leaf shedding, providing resistance against pathogens , inhibiting ethylene biosynthesis, modifying the quality and quantity of proteins and providing endurance against stress in some plants (swampweeds, bacopa, cucumber, oilseed rape, broccoli plants etc.). In this study we

--- School of Natural Product Studies, Jadavpur University ----- 52

have determined stress induced by high dose of ASA (100mg to 700mg) on Bacopa monnieri, family Scrophulariaceae. For this study we collected Bacopa plants (saplings) from State Medicinal Plant Board and acclimatized in laboratory condition in similar type of soil and climatic condition. ASA was introduced in plant by root-feeding technique in four separate groups of Bacopa (including control). Gross morphology including plant height, colour of leaf, leaves number, pH of soil was determined on day basis. Finally we observed that ASA shows dose –dependent stress on plants height, leaf number and also altered the pH of soil. It shows chemical stress on both plants growth and morphology of *Bacopa monnieri*.

SFE-CONV-1951

Investigation of Antidiabetic activity by the β -cell Regeneration with Hydroalcoholic Extraction of *Vinca rosea*, *Momordica charantia* and *Aegle marmeloes*

Tanmay Mohanta*, Mr.Sujit Das, Mr.Bibhas Pandit, Koushik N Sarma

Department of Pharmaceutics, Himalayan Pharmacy Institute, Majhitar, East Sikkim-737136, India.

Diabetes is one of the leading health care problem for developing and developed China, USA. Though stem cell therapy, is lets countries like India, cell transplantation, synthetic drugsare available to treat this disorder but these regiments are not effective enough. The present work has been designed to think that the herbal plants those having antidiabetic activitymay help in the regeneration of β-cell of Langerhans. The aim of this study was to examine the antidiabetic potential of plant extracts (Vinca rosea, Momordica charantia, and Aegle marmelos) in a diabetic rat model. Dose depended effect of plant extracts (200 and 250 mg/kg) on blood glucose was evaluated in Streptozotocin (STZ) induced diabetic rats by oral administration for 30 days. Histology studies with hydroalcoholic extract of herbal plants showed different phases of recovery of β -cell of the Langerhans of pancreas, which in the untreated diabetic rats were less in the number and showed varied degree of atrophy. These findings suggest that bale bark extract has the therapeutic potential in STZ-induced hyperglycemia and can be used as alternative treatment sources of β-cell regeneration in type-1 diabetes.

SFE-CONV-1952

Inhibition kinetics analysis of *Bacillus subtilis* and *Escherichia coli* using Natural Thiosulfinate Drug

Souptik Bhattacharya¹, Pallavi Chakraborty¹, Dwaipayan Sen², Chiranjib Bhattacharjee¹

1. Department of Chemical Engineering, Jadavpur University, Kolkata, India. 2. Department of Chemical Engineering, Heritage Institute of Technology, Kolkata, India

Outbreak of infectious diseases and resurgence of antibiotic resistant bacteria have attracted the attention of the researchers on the need of aggressive antibiotic discovery. Ancient Indian medicinal system (Ayurveda) provided concepts of pharmacotherapy to treat infectious diseases. Various medicinal plant parts contain numerous types of nutraceutical phytochemicals, like flavonoids, phenols, thiosulfinates, quinones, alkaloids, terpenes and plant antimicrobial peptides (pAMPs) which shows significant

- School of Natural Product Studies, Jadavpur University ----- 53

antimicrobial properties. The present study illustrated the inhibitory effect of nutraceutical phytochemical S-Allyl 2-propene-1-sulfinothioate (SAPS) on model laboratory strains i.e. Bacillus subtilis and Escherichia coli. The comparative study between normal growth of designated bacterial strains at favorable condition and in presence of SAPS indicated the growth inhibitory property of the garlic extract containing SAPS. Synergistic study of SAPS with commercial antibiotics was conducted and had shown positive results. It suggested that the use of garlic extract containing SAPS along with antibiotics might overcome the resistance developed by bacteria. From the time kill study, it was evident that garlic extract containing SAPS is more effective against gram-positive bacteria. Therefore, from the investigation it can be concluded that fresh garlic extract containing SAPS is a potential antibiotics. Considering the potentiality of SAPS, it can be stated that in future it has possibilities to be used as a therapeutic antimicrobial drug alternative.

SFE-CONV-1953

In vivo Hepatoprotective Activity of Cocciniagrandis: Conventional to Molecular Approach

<u>Arnab Banerjee</u>¹, Debasmita Das¹, Rajarshi Paul¹, Sandipan Roy¹, Ujjal Das², Samrat Saha², Sanjit Dey², Arghya Adhikary³, Sandip Mukherjee¹, Bithin Kumar Maji¹

1. Department of Physiology (UG & PG), Serampore College, 9 William Carey Road, Serampore, Hooghly-712201, West Bengal, India. 2. Department of Physiology, University of Calcutta, University College of Science and Technology, Kolkata 700009, India. 3. Center for Research in Nanoscience and Nanotechnology, Acharya Prafulla Chandra Roy SikhshaPrangan, University of Calcutta, Saltlake City, Kolkata-700098, West Bengal, India.

Most food additives act either as preservatives or enhancer of palatability, monosodium glutamate (MSG) is one of such food additives (AJI-NO-MOTO), is the inducer of oxidative stress. In the present era, MSG with high lipid diet (HLD) as "fast food" is becoming a part of daily life. Despite its taste stimulation and improved appetite enhancement, it has toxic effects on human and experimental animals. Concomitantly, there is a tremendous increase in the incidences of hepatocellular injury as well as liver damage. In the absence of an effective treatment in modern medicine, efforts are being made to find suitable naturally occurring herbal drugs. Cocciniagrandis (L) voigt belonging to the cucurbitaceae family has been used as traditional medicine for various diseases with its different types of bioactive compounds and pharmaceutical industry is in search of natural products to treat various life threatening diseases. A perception of the main bioactive components in leaves part of the plant with which antioxidant activity is achieved is required for this research to move forward. In this context the specific aim of our study is to assess the hepatoprotective effects of ethanol extract of Cocciniagrandisleaves against MSG mixed HLD fed hepatic changes in rat model and to elucidate the possible mechanism for this effect. The present study revealed that Cocciniagrandis leaves provided significant protection to liver against the oxidative stress induced by co-administration of MSG and HLD. So, we got an interest to fulfill the paucity of studies by means of preliminary evaluation of in-vivo antioxidant and free radical scavenging activity which we have carried out in Coccinia grandis, here is our initiation for the future drug.

- School of Natural Product Studies, Jadavpur University — 54

SFE-CONV-19054

Efficacy of Anticancer Potential of *Annona muricata* Leaves in Huh-7 liver Cancer Cells

Arnab Banerjee, Aniruddha Sengupta, <u>Rajarshi Paul</u>, Sandip Mukherjee, Bithin Kumar Maji

Post Graduate Department of Physiology, Serampore College, 9 William Carey Road, Serampore, Hooghly-712201, West Bengal, India.

Hepatocellular carcinoma (HCC) is the fifth most basic type of disease on the planet. Regardless of such a variety of choices for HCC treatment, the cure rate for patients is generally low especially among patients who are ineligible for surgical or percutaneous methods. HCC is generally viewed as a chemotherapy-safe malady. These disadvantages require the proceeded with scan for novel HCC treatments. The plant Annona muricata has been accounted for to have acetogenins as major phytoconstitutent which are in charge of number of exercises and one of them is anticancer and antiproliferative impacts against different tumors. The present study was intended to assess the anticancer potential of aqueous extract of Annona muricata leaves (AEAML) against Huh-7 human liver cancer cells.

SFE-CONV-1955

Role of Pumpkin Seed Protein Isolate Against Cadmium Induced nimmunomodulation in Rats

Siddhartha Singh, Oly Banerjee, Bithin Kumar Maji, Sandip Mukherjee

Endocrinology, Reproductive PhysiologyandEnvironmental Toxicology Laboratory, Department of Physiology, Serampore College, 9 William Carey Road, Serampore, Hooghly-712201, West Bengal, India.

Mounting evidence suggests that cadmium (Cd) is one of the most potent environmental and industrial pollutants that enhances oxidative stress. On the contrary, Pumpkin seeds are rich source of phytoconstituents, carotenoids, flavonoids, polyphenols & saponins which are known to have antioxidative properties. This study aims to understand the antioxidative and anti-inflammatory properties of pumpkinseeds protein isolate (PSPI) against cadmium mediated oxidative stress-induced damage in spleen, Fresh pumpkin seeds were collected from Serampore region, West Bengal, India and the PSPI was prepared. Twenty male albino rats were divided into four groups; Control, Cd treated, Cd treated and PSPI 1 and 2 (200 and 400mg/kg body weight) supplemented. The animals were sacrificed after the completion of treatment period (21 days) and the spleen tissue was collected and biochemical assays were performed.PSPI supplementation was found to have a significant free radical scavenging activity as pointed by the decreased lipid peroxidation and NO formation and increased SOD, CAT and GSH activity. Significant rise in the levels of TNF a and IL 6 was observed in Cd treated rats which were significantly countered by PSPI supplementation. Therefore, treatment with Cd causes oxidative stress and an inclination

---- School of Natural Product Studies, Jadavpur University ------ 55

in the pro-inflammatory cytokines in the spleen tissue of rats, thus leading to immunomodulation. PSPI 2 supplementation was found to be more effective against this Cd induced immunomodulation. The mechanism by which PSPI ameliorates these damages is unclear in this study but we can speculate that PSPI supplementationplay a key role in amelioration of Cd toxicity.

SFE-CONV-1956

Traditional Uses of *Tinospora cordifolia* by Native Healers of Sikkim

M K Pasi, P Rai, R Gupta, P Darjee, R Roy, R Sharma, A Raja, R Das

School of Skill Building, SRM University Sikkim, Tadong, Gangtok -737102, India.

Throughout ages, traditional Ayurvedic medicine is trusted and served as a back bone for human healthcare. As Sikkim is abundant in medicinal plants therefore ancient medical system are still prevalent and popularly nurtured by native traditional healers. The traditional healers of Sikkim includes Jhakri, Amji, Pau, Muns, Neyjum and Bongthing who perform healing for physical, mental diseases in various villages andcommunities. Tinospora cordifoliawhich is large glabrous climbing shrub, whose different parts contains secondary metabolites like tinosporin, palmitin, tembetarine, choline, giloinsterol, cordifoliside etc. Therefore, they are claimed to be useful in treating diseases like Rheumatoid Arthritis, Gout, Gonorrhoea, Diabetes, Fever, Asthma, Jaundice etc. This paper emphasised on analysing and understanding the use of Tinospora cordifoliaby diverse native healers of Sikkim in their healing system.

SFE-CONV-1957

Comparative Phytochemical Screening and HPTLC Finger Print Profile of *Tinospora Cordifolia* (Wild) Maers Leaf and Stem in Different Solvent Extracts and Its Pharmacognostical Evaluation

Manosi Das, CH. Venkata Narasimhaji, Rajesh Bolludu, Avijit Banerji, M. M. Rao

Central Ayurveda Research Institute for Drug Development, 4-CN Block, Sec-V, Bidhannagar, Kolkata-700 091, India.

Tinospora cordifolia (Wild) Maers (Guduchi) is an evergreen perennial climber belonging to the family Menispermaceae. It is a plant of significant medicinal importance in the indigenous systems of medicine and designated as Rasayana. All the parts of the plants are reported for various ethnobotanical and therapeutic uses. Vegetative aerial parts, viz. leaf and stem were collected. Their phytochemical screening and HPTLC finger print profile were carried comparatively along with macroscopy, microscopy studied four different solvents with increasing polarity, viz. hexane, ethyl acetate, methanol and water were used to obtain extracts of leaves and stems. These extracts were used for preliminary phytochemical analysis along with HPTLC finger print profile. Data indicates the presence of flavonoids, alkaloids, proteins, phenolic compounds, phytosterols, cardiac glycosides and tannin. Most of the phytochemical components were found in the methanolic and aqueous extracts due to high solubility of active compounds of

---- School of Natural Product Studies, Jadavpur University ------ 56

Tinospora cordifolia leaves and stems in these extraction solvents as compared to other extraction solvents which also reflects in HPTLC finger print profile. The presence of these secondary bioactive phytochemicals signifies the importance of this medicinal plant as an efficient source of therapeutic agents which may prove useful in developing new specialized drugs with increased efficacy in the near future.

SFE-CONV-1958

Extraction and Characterization of Mucilage from Abelmoschus Esculentus Fruits and its Formulation as Microspheres

Tanmoy Banerjee, Moumita Chowdhury

Guru Nanak Institute of Pharmaceutical Science and Technology, Kolkata, India.

Natural polysaccharides and their derivatives are widely used in pharmaceutical formulation due to their low cost, easy availability, biodegradable and non toxic nature. They are not only used as excipients but also as solid monolithic matrix systems, implants, films, beads, micro particles, nanoparticles, thus their presence plays a fundamental role in determining the mechanism and rate of drug release from the dosage form. The ethno medicinal plant Abelmoschus esculentus L. belonging to the family Malvaceae has long been used for its medicinal benefits and is also known to contain complex polysaccharide called mucilage. In the present work, mucilage was extracted from the fresh fruit of Abelmoschus esculentus L. It was isolated using solvent precipitation method and characterized for its morphological properties. Different identification tests for mucilage were carried out. The fresh fruits were found to contain 0.8% w/w of mucilage. Various physicochemical properties like solubility, swelling index, melting point and pH of mucilage were studied. Some of the pharmaceutical properties of mucilage like powder flow property, compressibility index, angle of repose, bulk density were also measured. The mucilage obtained was used for preparing microspheres by ionotropic gelation method. The results indicate that mucilage obtained from the fruits of Abelmoschus esculentus can be used as excipient in pharmaceutical dosage form and also for preparing microspheres to control the release of drug from dosage form.

SFE-CONV-1959

Invitro propagation of important medicinal plant Tinospora cordifolia -Marker based berberine content determination and pathogen killing properties.

Avijit Chakraborty, Indranil Santra, Tuhin Chatterjee, Biswajit Ghosh*

Department of Botany, Ramakrishna Mission Vivekananda Centenary College, Rahara, Kolkata 700118

Tinospora cordifolia is an important medicinal plant with large account of bioactivity. *In vitro* propagation of this medicinal plant done on MS medium supplemented with various concentration of kinetin and 6- Benzylaminopurine for multiplication. Shoot tips are introduced on medium as explant and better growth found in the medium supplemented with 6- Benzylaminopurine 5.0 mg/L concentration with 16.5 \pm 0.25 shoots per explant. Activated charcoal is provided in the medium to absorb the leached products from the

explant. Regenerated plants were successfully acclimatised and transferred to field for growth. The somatic chromosome number of the regenerated plants was 2n=22, same as mother plant. The meiotic metaphase-I also revealed 11 pairs of bivalent chromosomes. The active compound present in the plant is berberine and responsible mainly for its bioactivity is quantified by high performance thin layer chromatography (HPTLC). Dried stem is subjected to methanolic reflux extraction and separated through TLC on pre-coated silica gel 60F 254 plates with a solvent system ethyl acetate: formic acid: water (8:1:1) and scanned in UV 366nm. The content of berberine was found to be 16.53±0.11 mg/gm DW. Antibacterial activity was carried out against eight multidrug resistant pathogenic respiratory tract infecting (RTI) bacteria which were isolated from patients with RTI infection. Methanolic extract was studied using agar cup diffusion method against four pathogenic strains of both Klebsiella pneumoniae and four Escherichia coli. Maximum inhibition was found 15 ± 0.67 mm against Klebsiella pneumoniae among the bacteria tested. Result suggests that extract has a significant activity against all the pathogenic strains and can be explored further with a prospect of development as a potential drug.

SFE-CONV-1960

Anatomical Study and Phytochemical Screening of *Tinospora cordifolia* (Guduchi) Stem

Deboleena Paria*, Shreya Ghosal, Sreya Dutta, Rajesh Bolleddu, Kalyan Hazra, Dr. Jayram Hazra

Central Ayurveda Research Institute for Drug Development (CARIDD), 4-CN Block, Sec-V, Bidhannagar, Kolkata-700091

Tinospora cordifolia (Willd.) Miers is known as Guduchi, with significant importance in the traditional medicinal systems. It is an evergreen perennial climber belongs to the family Menispermaceae. It is also known as 'Rasayana' mostly used in Ayurveda that protects against infections and develops immune system in human body. The present study provides pharmacognostical features based on its macroscopy, anatomical features and phytochemical analysis using phytochemical screening tests. Guduchi stem showed wheel shaped appearance at the transverse cut section. The macro and microscopic descriptions of stem part were supplemented with photomicrographs wherever necessary. The stem extract of T. cordifolia expressed the presence of several phytochemicals viz., alkaloids, flavonoids, glycosides, carbohydrates, phenols, saponins, tannins, amino acids. The result of phytochemical screening tests revealed that diterpines and flavonoids are positive in all extracts of stem of T. cordifolia, but amino acid, protein and saponins only present in methanol and ethanol extracts. These studies justify the medicinal value present in T. cordifolia stem. The present investigation further proposed that the phytochemicals present in stem of T. cordifolia can be used as natural antioxidants in medicinal system.

- School of Natural Product Studies, Jadavpur University — 58

Powder Microscopy, Phytochemical Profiling of *Tinospora cordifolia* (Guduchi) Leaf

<u>Shreya Ghosal</u>, Deboleena Paria, Sreya Dutta, Rajesh Bolleddu, Kalyan Hazra, Jayram Hazra Central Ayurveda Research Institute for Drug Development, CCRAS, Bidhannagar, Kolkata-700091

Since the beginning of human civilization, medicinal plants have been used for its therapeutic value. In traditional systems of medicine, different parts (stem, leaf, root, flower, seed) of *Tinospora cordifolia* (Willd.) Miers (Family: Merispermaceae) commonly known as Guduchi are used. In Ayurveda it is reported that the juice or decoction of leaves is administered orally with honey in fever. Guduchi is a glabrous, succulent, climbing shrub native to India. The macroscopy, powder microscopy, phytochemical analysis of Guduchi leaves were carried out. Result showed that the leaves are simple, alternate, exstipulate, having long petioles, lamina broadly ovate or ovate cordate (heart- shaped), and deeply cordate at base. No trichomes were found. Phytochemically various extracts showed the presence of diverse phytochemicals such alkaloids, flavonoids, glycosides, carbohydrates, saponins, protein, amino acids might have contributed for the potent anthelmintic activity. Anthelmintics are those agents that expel parasitic worms (helminthes) from the body, by either stunning or killing them. The investigation further proposed that the phytochemicals present in leaves of *T. cordifolia*, which can be used as natural antioxidants in medicinal drugs.

SFE-CONV-1962

Influence of solvents on the recovery of polyphenols and bioactivity of *Clerodendrum colebrookianum* Walp.

Srijani Dasgupta, Deepika Sarkar, Prashanta Kumar Deb, Biswatrish Sarkar

Dept. of Pharm. Sciences & Tech., Birla Institute of Technology, Mesra, Ranchi-835215.

Clerodendrum colebrookianum Walp. is a perennial shrub which is native to South and Southeast Asia. It is widely used by the indigenous people of Northeast India as a remedy for treatment of various diseases like diabetes, hypertension, stomach ache, jaundice, cough and rheumatism. This study is aimed to understand the impact of solvents on the extraction of polyphenols and biological potential of Clerodendrum colebrookianum Walp. Fresh young leaves were air dried and ground to make into coarse powder. 15 gm of powdered leaf material was extracted with 150 ml of different solvents (Methanol, 95% methanol, ethanol, 95% ethanol, ethyl-acetate and acetone) separately using cold maceration technique at ambient temperature. Extractive value, total phenolic content (TPC) and total flavonoid content (TFC) was analysed. The antioxidant activity was evaluated thereafter using DPPH and ABTS assay. Also enzyme inhibition (α-glucosidase and pancreatic lipase) potential of the extracts were investigated and compared. It was observed that, 95% methanol extract was showed maximum extractive value, polyphenol content and as well as highest bioactivity in terms of antioxidant and enzyme inhibition. Hence, it can be concluded that, 95% methanol may be the most suitable solvent for extraction of bioactive phytochemicals from Clerodendrum colebrookianum Walp.

School of Natural Product Studies, Jadavpur University 59

Ultrasonic assisted rapid extraction of surface Anthocyanin from *Ocimum tenuiflorum* Linn. and screening of its biological activity

<u>Deepika Sarkar</u>, Srijani Dasgupta, Prashanta Kumar Deb, Biswatrish Sarkar^{*} Dept. of Pharm. Sciences & Tech., Birla Institute of Technology, Mesra, Ranchi-835215.

Ocimum tenuiflorum Linn. is commonly known as Krishna Tulsi. It is the most commonly used medicinal herb of India to cure wide ranges of health compilations including cold and cough, liver abnormalities, diabetes and cardiovascular dysfunction. This study was initiated to extract selectively the anthocyanins present in the surface of aerial parts of Ocimum tenuiflorum Linn. and to investigate their in-vitro bioactivity. The fresh plant material of Ocimum tenuiflorum was collected and washed with running tap water. The intact plant material was then kept for extraction with methanol in a ultrasonic bath at ambient temperature for 15 min. The extract was then concentrated and purified using repeated wash with organic solvents. Chemical analysis of anthocyanin fraction was performed to confirm the presence of anthocyanin and also quantified the anthocyanin content. Further antioxidant and enzyme inhibition capacity of the anthocyanin fraction also was assessed. Results obtained from the experiments indicated that significant quantity of anthocyanin present in the surface of aerial parts of Ocimum tenuiflorum Linn. Also, it exhibited significant antioxidant and enzyme inhibition potential when compared with the appropriate standards. Therefore, it can be concluded that, this ultrafast method of extraction of surface anthocyanin is an effective strategy to extract anthocyanins with minimum interference of other untargeted non anthocyanin phytochemicals.

SFE-CONV-1964

Metabolite profiling and evaluation of antimicrobial potential of *Piper schmidtii* Hook. fil. Fruit extract

Amit Kar, <u>Rupesh Banerjee</u>, Debayan Goswami, Subhadip Banerjee, Pulok K Mukherjee* School of Natural Product Studies, Jadavpur University, Kolkata 700032, India

As mentioned in Indian system of medicine including Ayurveda, several medicinal plants and formulation are used to prevent and the mangement of diseases. *Piper schmidti* Hook fil., is belonging to the Piperaceae family and widely used as spices. *Piper schmidti* used traditionally for the treatment of fever, headaches, nausea, skin infection etc. The present study was aimed to investigate to identify the metabolites present in this plant extract along with their evaluation for antimicrobial activity. UPLC-QTOF-MS analysis was performed to identify the major phyto-constituents in this extract. Evaluation of antimicrobial potential was also performed against gram positive and gram negative bacterial strains by disk diffusion and micro-dilution method. *B. subtilis* and *S.aureus* showed zone of inhibition of 19.12±0.09 mm and 17.17±0.09 mm; with MIC value 128 ± 1.11 µg/ml and 256 ± 1.19 µg/ml respectively. UPLC-QTOF-MS analysis showed the presence of sevral active phytoconstituents. The findings of this study suggested that *Piper schmidti* fruit extract possess good antimicrobial activity and may be used for the management of infectious diseases.

----- School of Natural Product Studies, Jadavpur University ------ 60




With Best Compliment from:

INSTRUMENTATION INDIA

P-44, Rabindra Sarani 3rd Floor, Room No. – 308 Kolkata – 700001

Manufacturers & Dealers in:

Scientific Instruments & Chemicals

Specialist in: Laboratory Balance

Office: 033 2237 0847; 033 2234 3186; Fax: 033 2234 3186; Resi: 033 2651 3964

Email: instrumentationindia@vsnl.net Website: instrumentation.net

Proprietor: Mr. Pintu Sarkar Mobile: +91 9433010636; +91 9830182866

List of Participants

Abhijit Mukherjee Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha Abirami Raja SRM University, Sikkim Achintya Mitra CARIDD, Kolkata Adarsha Mondal CIPT&AHS, Uluberia Ademola C. Famurewa Amala Cancer Research Centre Thrissur Kerala Aditi Garq BIT, Mesra, Ranchi Aditi Pal Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha Aditya Sarkar Brainware University, Barasat Aishwarya Biswas Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha Aita Singh Rai SRM University, Sikkim Akansha Bhutani BIT, Mesra, Ranchi Akash Koley CIPT & AHS, Uluberia **Alok Nayak** CIPT & AHS, Uluberia **Amit Kumar Dixit** CARIDD, Kolkata Amit Paul **GNIPST**, Panihati Amitabha Dey Bioassay Laboratory, Emami Ltd. Amrita Basak GNIPST, Panihati

Anagh Mukherjee Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha Aniket Kumar PGIMS, Godda Anindita Banerjee Serampore College, University of Calcutta Anirudha Chatterjee Jadavpur University, Kolkata Anirup Jana CIPT&AHS, Uluberia Anjana Sinha BIT, Mesra, Ranchi Ankit Majie GNIPST, Panihati Anup Kumar Sarkar Parnasree Sustha, Kolkata Anurag Das GNIPST, Panihati Anwesha Mukherjee Rajib Gandhi Memorial Ayurveda College and Hospital, Hooghly Archana Kumari Srivastava Bioassay Laboratory, Emami Ltd. Arka Prava Ghosh PGIMS. Kolkata Arkapravo Halder CIPT&AHS, Uluberia Arnab Banerjee Serampore College, University of Calcutta Arnab Kumar Guin GNIPST, Panihati Arnab Pratihar CIPT&AHS, Uluberia Arpan Batabyal Brainware University, Barasat

Arpan Maity Brainware University, Barasat Arpan Roy CIPT&AHS, Uluberia Arpita Mondal CIPT&AHS, Uluberia Arunava Das CIPT&AHS, Uluberia Arup Chatterjee CIPT&AHS, Uluberia Arya Ghosh CIPT & AHS, Uluberia Ashit Dey Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha Atanu Hazra Brainware University, Barasat **Avijit Chakraborty** Ramakrishna Mission Vivekananda Centery College, Rahara Ayan Pal CIPT&AHS, Uluberia Ayush Seal Jadavpur university, Kolkata **Baiahunlang Kharhunai** CIPT&AHS, Uluberia **Balaram Ghosh** CIPT&AHS, Uluberia Bapan Halder CIPT&AHS, Uluberia **Bijoy Paria** CIPT&AHS, Uluberia **Biprojit Bhowmick** CIPT&AHS, Uluberia **Biswajit Sau** CIPT&AHS, Uluberia **Biswarup Maity** CIPT&AHS, Uluberia **Chandrima Dutta** Netaji Subhas Chandra Bose Institute Of Pharmacy, Chakdaha

Chayan Kumar Das CIPT&AHS. Uluberia Debangana Bhattacharya Jadavpur University, Kolkata Debangi Sarkar CIPT&AHS, Uluberia Debarka Paul CIPT&AHS, Uluberia **Debashis Chaudhury** CIPT&AHS, Uluberia Debasish Nag Department of Biotech, University Of Kolkata **Deboleena Paria** CARIDD, Kolkata Debrup Bhowmik Jadavpur University, Kolkata **Deepayan Kar** CIPT&AHS, Uluberia Deepika Sarkar BIT, Mesra, Ranchi **Deepsetu Roy** CIPT&AHS, Uluberia **Dibya Das** JIS University, Agarpara **Dibyendu Malik** CIPT&AHS, Uluberia **Dipitendu Sekhar Biswas** Netaji Subhas Chandra Bose Institute Of Pharmacy, Chakdaha **Dipsundar Sahu** CARIDD, Kolkata Dolan Rani Das GNIPST, Panihati **Duttatreya Ghosal** CIPT&AHS, Uluberia **Ekbal Ali Molla** CIPT&AHS, Uluberia Fahmida Faizah BIT, Mesra, Ranchi

School of Natural Product Studies, Jadavpur University

Gaurav Ranjan Brainware University, Barasat Gour Gopal Maiti Parker Robinson, Kolkata Himalaya De CIPT&AHS, Uluberia Jagaran Saha **GNIPST**, Panihati Jannatul Ferdous Dhaka, Bangladesh Jesmina Mondal CIPT&AHS, Uluberia Kalyan Garai Brainware University, Barasat Kaniska Dutta CIPT&AHS, Uluberia Karuna Chettri SRM University, Sikkim Kataha Banerjee CIPT&AHS, Uluberia Kaustav Roy CIPT&AHS, Uluberia Kavita Bharati **GNIPST**. Panihati Kharka Prasad Kami SRM University, Sikkim **Kingchum Lepcha** SRM University, Sikkim **Koushik Bankma** Netaji Subhas Chandra Bose Institute Of Pharmacy, Chakdaha **Koushik Paul GNIPST**, Panihati Koyel Mandal CIPT&AHS, Uluberia Krishna Kumari Gurung SRM University, Sikkim Krishnendu Dakua Brainware University, Barasat

Kunal Datta Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha Kunal Khan GNIPST, Panihati Lalrinpunia CARIDD, Kolkata Lalit Narayan Parker Robinson, Kolkata Laxmi Rai SRM University, Sikkim Laxmidhar Barik CARIDD, Kolkata Leena Raju Dhoble Department of Pharmaceutical sciences R.T.M.N.U. Nagpur Leksang Dorji Bhutia Jadavpur University, Kolkata Madhumita Banerjee CIPT&AHS, Uluberia Madhurima Bag CIPT&AHS, Uluberia Mamata Ghosh Netaji Subhas Chandra Bose Institute Of Pharmacy, Chakdaha Manajit Bora CARIDD, Kolkata Manas Barman CIPT&AHS. Uluberia Manha Kani Pasi SRM University, Sikkim Manisha Biswas CIPT&AHS, Uluberia Manosi Das CARIDD, Kolkata Manpreet Singh GNIPST, Panihati Mansi Agrawal BIT, Mesra, Ranchi Masud Sk Brainware University, Barasat

Maudgal Abhishek Jadavpur central road, Building NO-53 **MD** Toufik CIPT&AHS, Uluberia **Md Wasim Karim** CIPT&AHS, Uluberia **Minakshi Hore** BIT, Mesra, Ranchi Moli Das CIPT&AHS, Uluberia Monali Chakraborty PGIMS, Godda Monalisa Malakar CIPT&AHS, Uluberia Moumita Dasgupta Department of Biotech, University Of Kolkata **Mozammel Haque** Jadavpur University, Kolkata Nanda Kumari Biswakarma SRM University, Sikkim Nikita Nayak BIT, Mesra, Ranchi Nilanjana Ghosh BIT, Mesra, Ranchi Nirmalya Gantait CIPT&AHS, Uluberia Nishan Hazra Brainware University, Barasat Nur Mohammad Seikh CIPT&AHS, Uluberia Nurjahan Khatun CIPT&AHS, Uluberia Pallab Ghosh Himalaya Pharmacy Institute, Sikkim Pallavi Chakraborty Jadavpur University, Kolkata Paramita Barman **GNIPST**. Panihati Pema Lamu Tamang SRM University, Sikkim

Perbina Rai SRM University, Sikkim Piyali Pyne CIPT&AHS, Uluberia Piyush Makkar BIT, Mesra, Ranchi P.K. Mallick IPA Poulami Patra GNIPST, Panihati **Prabish Mitra** CIPT&AHS, Uluberia Pracheta Acharya BIT, Mesra, Ranchi **Prakash Darjee** SRM, University, Sikkim Prasun Manna CIPT&AHS, Uluberia **Prativamoy Mondal** CIPT&AHS, Uluberia Preetam Manna CIPT&AHS, Uluberia Pritha Das CIPT&AHS. Uluberia Pritha Janah Jadavpur university, Kolkata Priyanka Mandal Netaji Subhas Chandra Bose Institute Of Pharmacy, Chakdaha Priyasa Chakraborty CIPT&AHS, Uluberia Privodarshi Mitra NSHM, Kolkata Purnima Tamang SRM, University, Sikkim **Rahul Gupta** SRM University, Sikkim Rajarshi Paul Serampore College, University of Calcutta

Rajat Das SRM University, Sikkim **Rajendra Kumar Mukherjee** Jadavpur University, Kolkata **Rajesh Bolleddu** Central Ayurveda Research Institute, Bidhannagar **Rakesh Karmaker** Jadavpur University, Kolkata **Rakesh Kumar Gupta** BIT, Mesra, Ranchi **Raksha Ray** PGIMS, Godda **Ranjana Das** Jadavpur University, Kolkata **Ratna Mandal** CIPT&AHS. Uluberia **Reshmi Mukherjee** Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha **Rhitaja Biswas** Rajib Gandhi Memorial Ayurveda College and Hospital, Hooghly **Rikayan Das** Jadavpur university, Kolkata **Risav Das** CIPT&AHS, Uluberia **Rishyani Mukherjee GNIPST**, Panihati **Rita Roy** SRM University, Sikkim **Ritabrata Halder** BIT, Mesra, Ranchi **Ritam Basak GNIPST**. Panihati **Ritasree Denre** CIPT&AHS, Uluberia **Rohit Guin** CIPT&AHS, Uluberia **Rohit Kumar Ravte** CARIDD, Kolkata

Rohit Sharma CARIDD, Kolkata **Roushan Bhaskar** PGIMS, Godda Rubia Khatun CIPT&AHS, Uluberia Sabitabrata Das Parnasree Sustha, Kolkata Sagar Maiti GNIPST, Panihati Sahabaj Ali Khan Brainware University, Barasat Saikat Bagchi GNIPST, Panihati Saikat Polley CIPT&AHS, Uluberia Samata Pradhan CIPT&AHS, Uluberia Samiran Ghora Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha Sana Aftab BIT, Mesra, Ranchi Sandeep Garg BIT, Mesra, Ranchi Sandhya R Das Dhaka, Bangladesh Sangita Metya CIPT&AHS, Uluberia Sanjeeta Gurung SRM University, Sikkim Sanjib Kumar Ghosh Society for Gokulnagar education, Burdwan Sanju Bhowmick PGIMS, Howrah Sanju Mahapatra CIPT&AHS, Uluberia Santanu Basak CIPT&AHS, Uluberia

Santanu Samanta CIPT&AHS. Uluberia Saptaparna Manna CIPT&AHS, Uluberia Saptarshi Kumar Samanta CIPT&AHS, Uluberia Saradindu Biswas CIPT&AHS. Uluberia Sarjamul Sk CIPT&AHS, Uluberia Saroj Kumar Debnath CARIDD, Kolkata Satadru Nag **GNIPST**, Panihati Sattwik Das **Bengal College of Pharmaceutical** Sciences & Research, Durgapur Sayan Barman Jadavpur University, Kolkata Sayan Chatterjee **GNIPST**, Panihati Sayan Jana CIPT&AHS, Uluberia Sayantan Bera BSRGMAC&H, Kolkata Sayantan Bhattacharya NSHM, Kolkata Shamsod Forzana CIPT&AHS. Uluberia Shibshis Sarkar Dhaka, Bangladesh Shivangi Chettri SRM University, Sikkim Shouvik Pal CIPT&AHS. Uluberia Shouvik Sarkar Technio India University, Kolkata Shreya Bhattacharjee Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha

Shreya Ghosal CARIDD. Kolkata Shreya Ghosh CIPT&AHS, Uluberia Shubhajit Biswas CIPT&AHS, Uluberia Shubhangi Gupta Technio India University, Kolkata Shuchismita Mitra BIT, Mesra, Ranchi Shuvam Sill Adamas University, Barasat Shyamal Kumar Biswas CIPT&AHS, Uluberia Siddhartha Singh Serampore College, University of Calcutta Simran Shaw 35, Karbala temple lane, Kolkata SK Akibul Hasan CIPT&AHS, Uluberia SK Riaz CIPT&AHS, Uluberia Sneha Bag GNIPST, Panihati **Snehaneel Mitra** Mitra Kuthi, NSC Bose Road, Pratapgarh, Kolkata Snehasis Biswas CIPT&AHS, Uluberia Sofia Khanam Department of Pharmaceutical sciences R.T.M.N.U. Nagpur Soham Chakraborty CIPT&AHS. Uluberia Soham Pal Kakinara, Hooghly Sohini Chatterjee Bhowanipur, Kolkata Soma Chowdhury Jagannathpur, East Mednipur

Somenath Roy Parker Robinson, Kolkata Sonali Mukherjee BSRGMAC&H Sougata Singha CIPT&AHS, Uluberia Souhita Pal CIPT&AHS, Uluberia Soumalya De **GNIPST**, Panihati Soumava Jana CIPT&AHS, Uluberia Soumik Das CIPT&AHS, Uluberia Soumik Roy GNIPST, Panihati Soumitra Das NSHM, Kolkata Soumya Chakravortty CIPT&AHS, Uluberia Soumyajit Nandi CIPT&AHS, Uluberia Sounak Ghosh Netaji Subhas Chandra Bose Institute Of Pharmacy, Chakdaha Sourav Nath Netaji Subhas Chandra Bose Institute Of Pharmacy, Chakdaha Sourav Pal CIPT&AHS, Uluberia Souvik Debnath Brainware University, Barasat Souvik Haldar CIPT&AHS, Uluberia Sraddha Majumder **GNIPST**, Panihati Sreya Banerjee Chandannagar, Hoogly Sreya Dutta CARIDD, Kolkata

Kalyan Hazra CARIDD, Kolkata Srijani Dasgupta Brainware University, Barasat Sruti Baqchi Ghosh CIPT&AHS, Uluberia Subhajeet Chakraborty Brainware University, Barasat Subhajit Mandal CIPT&AHS, Uluberia Subhendu Saha 4, Banrod building, New Subhedar, Nagpur Sucheta Mondal BHU, Paschim Bardhaman Suchismita Mukherjee GNIPST, Panihati Sudeshna Majhi CIPT&AHS, Uluberia Sudipta Das Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha Sudipta Kumar Das Parker Robinson, Kolkata Sujata Sharma SRM University, Sikkim Suman Naskar Rajib Gandhi Memorial Ayurveda College and Hospital, Hooghly Suman Ray GNIPST, Panihati Suman Thakuri SRM University, Sikkim Sumit Prasad Bhakat Brainware University, Barasat Sumit Sen Brainware University, Barasat Sumon Sheel CIPT&AHS, Uluberia Supratim Biswas GNIPST, Panihati

School of Natural Product Studies, Jadavpur University

Supratim Ghosh **GNIPST**, Panihati Supritti Ghosh Hantal, Howrah Suraj Jana CIPT&AHS, Uluberia Survasis Giri CIPT&AHS, Uluberia Susmita Sarkar CIPT&AHS, Uluberia Swapnanil Chakrabarty Brainware University, Barasat Swarup Sen BST, Hooghly Syed Mohammad Abdullah BIT, Mesra, Ranchi **Tania Khatoon** Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha **Tanishk Saini** BIT, Mesra, Ranchi **Tanmay Mohanta** Himalaya Pharmacy Institute, Sikkim **Tanmoy Banerjee** GNIPST, Panihati **Tannawee Singh** Rajib Gandhi Memorial Ayurveda College and Hospital, Hooghly **Tathagata Mondal** Brainware University, Barasat **Thendup Sangay Bhutia** SRM University, Sikkim **Tias Das** CIPT&AHS, Uluberia **Titas Sarkar** CIPT&AHS, Uluberia **Tiyas Chatterjee** CIPT&AHS, Uluberia **Trayee Biswas** Bangabasi Morning College, Kolkata

Trina Chakraborty Jadavpur University, Kolkata **Urmistha Sarkar** Netaji Subhas Chandra Bose Institute of Pharmacy, Chakdaha **Urmita Biswas** University of Kolkata, Kolkata Varnita Karmakar CIPT&AHS, Uluberia Vijay Kothari Institute of Science, Nirma University, Ahmedabad Vikas Yadav Jadavpur University, Kolkata Zainab Irfan CIPT&AHS, Uluberia





SOCIETY FOR ETHNOPHARMACOLOGY (SFE-INDIA)

"Globalizing local knowledge and localizing global technologies" 23/3 Saktigarh, Jadavpur, Kolkata 700 032, India

Affiliated to



International Society for Ethnopharmacology

sfeindian@gmail.com

www.ethnopharmacology.in

JOIN SFE-INDIA Renew your membership

Explore the OpportunityWe look forward to continue our bonding