

# E-ABSTRACT BOOK

## 4<sup>th</sup> Convention Society for Ethnopharmacology, India September 9-10, 2017



### NATIONAL SYMPOSIUM

*“Ashwagandha”*

&

### Ethnopharmacology Conclave

*“Uses of Medicinal Plants by Traditional Healers  
of India - Local Health Tradition”*

Venue: Jadavpur University, Kolkata

*Organized by:*

**School of Natural Product Studies**

Jadavpur University, Kolkata, India

[www.jaduniv.edu.in](http://www.jaduniv.edu.in)

*In association with:*

**Society for Ethnopharmacology, India**

23/3 Saktigarh, Kolkata, India

[www.ethnopharmacology.in](http://www.ethnopharmacology.in)

*We recognize the seminal contribution of*

**Prof. Tuhinadri Sen**

*and dedicate this convention  
in his memory*



Society for  
Ethnopharmacology

# 4<sup>th</sup> Convention SFE-INDIA - 2017



Jadavpur University  
Kolkata, India

**National Symposium**

*"Ashwagandha"*

**&**

**Ethnopharmacology Conclave**

*"Uses of Medicinal Plants by Traditional Healers of India  
- Local Health Tradition"*

**September 09-10, 2017**

**Venue: Jadavpur University, Kolkata**



***Secretariat***

**School of Natural Product Studies**

**Jadavpur University, Kolkata, India**

**Tele-fax: 033 2414 6046**

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**Website: [www.jaduniv.edu.in](http://www.jaduniv.edu.in)**

**WE ARE THANKFUL TO THE FOLLOWING ORGANIZATIONS  
FOR THEIR SUPPORT**



**Science Engineering Research Board  
(SERB)**

(Statutory Body Established Through an Act of  
Parliament : SERB Act 2008)

**Department of Science and Technology  
Govt. of India, New Delhi**



**Indian Council of Medical Research  
(ICMR)**

**Govt. of India, New Delhi**



**Emami Ltd.  
Kolkata**



**Ixoreal Biomed Inc.  
Hyderabad**

From Ixoreal Biomed



**Parker Robinson Pvt. Ltd.  
Kolkata**

## 4<sup>th</sup> Convention: SFE – INDIA, 2017

*National Symposium*

*“Ashwagandha”*

&

*Ethnopharmacology Conclave on*

*Uses of Medicinal Plants by Traditional Healers of India – Local Health Tradition*

September 09-10, 2017

**Organized by:**

**School of Natural Product Studies**  
Jadavpur University, Kolkata, India  
[web: www.jaduniv.edu.in](http://www.jaduniv.edu.in)

**In Association with:**

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



4<sup>th</sup> National Convention of Society for Ethnopharmacology, India (SFE - INDIA) is being organized by the School of Natural Product Studies (SNPS), Jadavpur University during September 09-10, 2017. The theme of the convention is focused on “Ashwagandha” and Uses of Medicinal Plants by the Traditional healers of India – Local Health Tradition”. On behalf of the School of Natural Product Studies and the organizing committee, I would like to convey my warm welcome to you all for the 4<sup>th</sup> convention of SFE -INDIA.

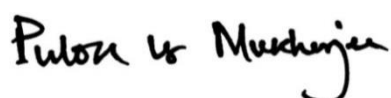
With the history of one of the oldest civilization harbors many traditional alternative and complementary medicines for the health care, India has a rich heritage on use of Traditional medicine in healthcare. Botanicals serve as the source of therapeutically active molecules for many years. Ashwagandha (*Withania somnifera*), one of the most popular Indian medicinal plants and also considered to be nature's gift to mankind, has been an important herb in the Ayurvedic and indigenous medical system for over 3000 years. In Ayurveda, Ashwagandha is considered as a “rasayana” herb, which works on a nonspecific basis to increase health and longevity. Ashwagandha has been used to treat variety of diseases and human ailments. This is also a crucial herb that contributes a huge market potential throughout the globe. Hence the herbal miracle like Ashwagandha may be considered as a potential candidate for drug discovery and development. Drug discovery and development from natural products remains a challenging scientific task, which requires expertise, experience and multidisciplinary research. We would like to highlight the potential plants of India, mostly used in healthcare through such special conference and events to highlight their beneficial role and validation in all aspects.

In several rural areas, Local health Tradition (LHT) is practiced for serving several basic needs of primary healthcare. LHT are the health practices, transmitted through an

incredibly effective system of oral transmission inherited through family lineage. The LHT are the repository of diverse, region, ecosystem and ethnic community specific, knowledge, skill and experience.

On this above background, this convention will be organized to highlights different aspects for the dissemination of knowledge, promotion and development of the herbal miracle- Ashwagandha. This convention will focus on focus on several contemporary issues on the drug discovery & development from medicinal plants with special reference to Ashwagandha together with their quality evaluation, validation and safety related aspects and the efforts of Traditional healers in exploring drugs from our local health tradition from India to conserve Lok Swasthya Parampara". The convention will provide an ideal platform for interaction and dissemination of knowledge & ideas between scientists, professionals and traditional healers in different areas of Ethnopharmacology and medicinal plant research towards drug discovery and development.

I would like to thank you all for your valued participation and interest to make this event successful. I wish you all a very effective scientific interaction during this program and hope to have an effective meeting. I convey my sincere thanks to different government and private agencies and other organizations for their kind support in organizing this event. I am very much thankful to the University authority for their support to organize 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 national convention.



**Prof. Pulok K Mukherjee, PhD, FRSC**  
Organizing Secretary  
4<sup>th</sup> Convention: SFE-INDIA 2017 &  
Director  
School of Natural Product Studies  
Jadavpur University, Kolkata 700032, India

# PROGRAM SCHEDULE

## 4<sup>th</sup> Convention Society for Ethnopharmacology, India

September 9-10, 2017



### NATIONAL SYMPOSIUM

*"Ashwagandha"*

&

### Ethnopharmacology Conclave

*"Uses of Medicinal Plants by Traditional Healers  
of India - Local Health Tradition"*

Venue: Jadavpur University, Kolkata

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Jadavpur University, Kolkata, India

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*We recognize the seminal contribution of  
Prof. Tuhinadri Sen  
and dedicate this convention  
in his memory*

**Day 1: Saturday: September 09, 2017**  
**Venue: Gandhi Bhavan, Jadavpur University, Kolkata**

**REGISTRATION: 08:30 AM - 10:00 AM**

**INAUGURATION OF THE PROGRAMME: 10:00 AM - 11:45 AM**

**Prof. Suranjan Das**, *Vice Chancellor, Jadavpur University, Kolkata*  
**Prof. A.S. Verma**, *Pro Vice Chancellor, Jadavpur University, Kolkata*  
**Dr. (Mrs.) Manju Sharma**, *Former Secretary Department of Biotechnology,  
Govt. of India*  
**Ms. Shomita Biswas**, *CEO, National Medicinal Plant Board, New Delhi*  
**Dr. C.K Katiyar**, *Chairman, 4th Convention & National Seminar 2017 &  
CEO, Healthcare & Technical, Emami Ltd., Kolkata*  
**Prof. Samita Sen**, *Dean, Faculty of ISLM, Jadavpur University, Kolkata*  
**Dr. Pratim Banerji**, *President, Society for Ethnopharmacology, India, Kolkata*  
**Prof. Chiranjib Bhattacharya**, *Dean, Faculty of Engineering Technology,  
Jadavpur University, Kolkata*  
**Prof. Biswajit Mukherjee**, *Head, Dept. of Pharmaceutical Technology,  
Jadavpur University, Kolkata*  
**Mr. B.K.Sarkar**, *Vice President, Society for Ethnopharmacology, India, Kolkata*  
**Mr. Indraneel Das**, *Vice President, Society for Ethnopharmacology, India, Kolkata*  
**Prof. Sitesh C Bachar**, *Organizing Secretary, 5th SFE Congress, Dhaka.*  
**Prof. Pulok K Mukherjee**, *Organizing Secretary & Director, School of Natural  
Product Studies, Jadavpur University, Kolkata*

***Inaugural address by:***

Title: "Biotechnology - Excitement and Relevance for Human Welfare"

**Dr. Manju Sharma**

Padma Bhushan Awardee

Former Secretary, Department of Biotechnology

Ministry of Science & Technology, Govt. of India, New Delhi

Principal Advisor to the Dept. Science and Technology, Gujarat

Distinguished Women Scientist Chair, NASI, Allahabad

***Introduced by:***

**Mr. Indraneel Das**, Vice President, Society for Ethnopharmacology, India

**11:45 AM - 12:00**

**High Tea**

## Plenary Lectures: Session I: 12:00 - 01:30 PM

Speaker	Title
<b>Lecture: 1</b>	
<b>Dr. Ram Vishwakarma</b> Director CSIR - Indian Institute of Integrative Medicine Jammu, India	Contribution of CSIR-Indian Institute of Integrative Medicines in <i>Withania somnifera</i>
<b>Chairperson:</b> <b>Dr. C.K.Katiyar</b> , CEO (Tech). Emami Ltd., Kolkata	
<b>Lecture: 2</b>	
<b>Dr. Arunabha Ray</b> Director, Vallabhbhai Patel Chest Institute, & Dean Faculty of Medicine, University of Delhi, New Delhi	Newer insights into the adaptogenic effects of <i>Withania somnifera</i> : possible role for nitric oxide
<b>Chairperson:</b> <b>Dr. Debprasad Chattopadhyay</b> , Director, National Institute of Traditional medicine, Belgaum	
<b>Lecture: 3</b>	
<b>Mr. Kartikeya Baldwa</b> Director, Ixoreal Biomed Inc. Hyderabad, India	Global Potential of Ashwagandha
<b>Chairperson:</b> <b>Dr. D P Ghosh</b> , Albert David Ltd., New Delhi	
<b>01:30 PM - 02:15 PM</b>	<b>Lunch Break</b> (Venue: University Guest House)
<b>Plenary Lectures: Session II: 02:30 PM - 03:45 PM</b>	
Speaker	Title
<b>Lecture: 4</b>	
<b>Prof. Bhushan Patwardhan</b> Director, Interdisciplinary School of Health Sciences, Savitribai Phule Pune University Pune, India	Ashwagandha: A Future Global Blockbuster Drug from Ayurveda
<b>Chairperson:</b> <b>Dr. Jayram Hazra</b> , Director, National Research Institute of Ayurvedic Drug Development, Kolkata	
<b>Lecture: 5</b>	
<b>Dr. Mohd. Aslam</b> Advisor, Dept. of Biotechnology, Ministry of Science and Technology, Govt. of India New Delhi	Biotech Initiatives on Medicinal Plants and Phyto-pharmaceuticals.
<b>Chairperson:</b> <b>Dr. Alka Mukne</b> , Editor, Pharma Times, IPA, Mumbai	
<b>03:15 – 03:30 PM</b>	<b>TEA</b>

## Plenary Lectures: Session III: 03:30 PM – 05:00 PM

Speaker	Title
<b>Lecture: 6</b>	
<b>Dr. Sukhdev Swami Handa</b> Former Director Indian Institute of Integrative Medicines (CSIR), Jammu, India	“Ashwagandha”-Promising Potential for Drug Development through Phytopharmaceutical Route
<b>Chairperson:</b>	
<b>Dr. Pratim Banerjee</b> , President, Society for Ethnopharmacology, India	
<b>Lecture: 7</b>	
<b>Dr. P. Manivel</b> Acting Director, ICAR-DMAPR Anand, Gujarat, India	Improvement of Ashwagandha ( <i>Withania                      somnifera</i> Dunal) in India: Present and future
<b>Chairperson:</b>	
<b>Dr. A. Bandhopadhyay</b> , Former Scientist, ICAR, Government of India, New Delhi	
<b>Lecture: 8</b>	
<b>Dr. Neelam Sangwan</b> Senior Principal Scientist CSIR-CIMAP, Lucknow	Newer insights into the adaptogenic effects of <i>Withania somnifera</i> : possible role for nitric oxide
<b>Chairperson:</b>	
<b>Dr. SC Mandal</b> , Directorate of Drugs Control, Govt. of WB	
<b>Lecture: 9</b>	
<b>Mr. Ritesh Oza</b> Product Specialist BUCHI India Pvt. Ltd., Mumbai	Pressurized Solvent Extraction - Medicinal Plants and Natural Products
<b>Chairperson:</b>	
<b>Dr. Saroj Pal</b> , Directorate of ISM Drugs Control, Govt. of WB, Kolkata	

## Poster Presentation Session I: 02:30 PM – 03:45 PM

Abstract Number		
<b>SECTION A</b>		
Chairperson: <b>Dr. Sanmoy Karmakar</b> , Professor, Dept. of Pharm. Tech., Jadavpur University, Kolkata <b>Saubhik Haldar</b> , Asst. Prof., Dept. of Chemistry, Jadavpur University, Kolkata <b>Dr. T K Gopal</b> , Asst. Professor Sri Ramachandra University, Chennai	SFE/CONV/17/-01 SFE/CONV/17/-03 SFE/CONV/17/-09 SFE/CONV/17/-10 SFE/CONV/17/-11 SFE/CONV/17/-12	SFE/CONV/17/-13 SFE/CONV/17/-14 SFE/CONV/17/-16 SFE/CONV/17/-18 SFE/CONV/17/-19 SFE/CONV/17/-20
<b>SECTION B</b>		
Chairperson: <b>Dr. Dadasaheb Kokare</b> , Asst. Professor RTM Nagpur University, Nagpur <b>Dr. T. Kumaran</b> , Asst Professor, Sri Ramachandra University, Chennai <b>Dr. Sudipto Poddar</b> , Professor, Rajiv Gandhi Memorial Ayurvedic College & Hospital, Rambati, WB	SFE/CONV/17/-21 SFE/CONV/17/-22 SFE/CONV/17/-23 SFE/CONV/17/-24 SFE/CONV/17/-25 SFE/CONV/17/-26	SFE/CONV/17/-29 SFE/CONV/17/-30 SFE/CONV/17/-31 SFE/CONV/17/-32 SFE/CONV/17/-33 SFE/CONV/17/-34

### SECTION C

Chairperson:

**Dr. Md. Shah Amran**, Professor, Faculty of Pharmacy  
University of Dhaka, Dhaka

**Dr. Nishikant Raut**, Asst. Professor, RTM Nagpur  
University, Nagpur

**Dr. Saikat Dewanjee**, Asst. Professor, Dept. of Pharm.  
Tech., Jadavpur University, Kolkata

**Dr. E Susithra**, Asst. Professor,  
Vels University, Chennai

SFE/CONV/17/-35

SFE/CONV/17/-36

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SFE/CONV/17/-39

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SFE/CONV/17/-41

SFE/CONV/17/-42

SFE/CONV/17/-43

SFE/CONV/17/-44

SFE/CONV/17/-45

SFE/CONV/17/-46

## Poster Presentation Session II: 03:45 PM – 05:00 PM

### Abstract Number

### SECTION D

Chairperson:

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

**Mr. Prabir Banerjee**, Inspector of Drugs, Govt. of WB

**Dr. Ketousetuo Kuotsu**, Asst. Professor, Dept. of Pharm.  
Tech., Jadavpur University, Kolkata

SFE/CONV/17/-47

SFE/CONV/17/-48

SFE/CONV/17/-49

SFE/CONV/17/-51

SFE/CONV/17/-52

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SFE/CONV/17/-54

SFE/CONV/17/-55

SFE/CONV/17/-56

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SFE/CONV/17/-58

SFE/CONV/17/-59

### SECTION E

Chairperson:

**Dr. Achintya Mitra**, National Research Institute of  
Ayurvedic Drug Development, Kolkata

**Mr. Amitava Das**, CEO, ID Kansultanci Services  
New Delhi

**Dr. Tejendra Bhakta**, Asst. Professor, Regional Institute of  
Pharmaceutical Science & Technology, Agartala

**Ajay G. Namdeo**, Poona College of Pharmacy,  
Bharati Vidyapeeth Deemed University Pune, MH

SFE/CONV/17/-60

SFE/CONV/17/-61

SFE/CONV/17/-62

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SFE/CONV/17/-66

SFE/CONV/17/-67

SFE/CONV/17/-68

SFE/CONV/17/-69

SFE/CONV/17/-70

SFE/CONV/17/-71

### SECTION F

Chairperson:

**Dr. LK Ghosh**, Professor, Dept. of Pharm. Tech., Jadavpur  
University, Kolkata

**Dr. Somenath Roy**, Ex-Professor, Dept. of Physiology,  
Vidyasagar University, WB

**Ramesh Chandra Uniyal**, Head, Bio-resources  
Development (BRD), Emami Ltd., Kolkata

**Dr. Yerra Rajeshwar**, Head, Dept. of Med. Chem.,  
School of Pharmacy, Mekelle University, Ethiopia.

SFE/CONV/17/-73

SFE/CONV/17/-74

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SFE/CONV/17/-79

SFE/CONV/17/-80

SFE/CONV/17/-81

SFE/CONV/17/-83

SFE/CONV/17/-84

SFE/CONV/17/-85

SFE/CONV/17/-86

SFE/CONV/17/-87

**SFE-India meeting at the Seminar Hall of School of Natural Product  
Studies, Jadavpur University at 04:00 PM**

**Day 2: Sunday, September 10, 2017**  
**Venue: Dr. HL ROY Auditorium, Jadavpur University, Kolkata**

**Ethnopharmacology Conclave**  
**“Uses of Medicinal Plants by Traditional Healers of India**  
**– Local Health Tradition”**

**INAUGURATION OF THE PROGRAMME: 09:30 AM - 10:30 AM**

**Ms. Shomita Biswas**, CEO, National Medicinal Plant Board, New Delhi  
**Dr. P.K.Ghosh**, Pro-Vice Chancellor, Jadavpur University, Kolkata  
**Dr. Pratim Banerji**, President, Society for Ethnopharmacology, India  
**Dr. Hariram Murthy G.**, School of Health Sciences, Trans disciplinary University, Bangalore, India  
**Dr. CK Katiyar**, Chairman, 4<sup>th</sup> Convention, Society for Ethnopharmacology, India  
**Dr. Prasanta K Sarkar**, Director, State Medicinal Plant Board, Govt. of West Bengal, Kolkata  
**Mr. B K Sarkar**, Vice President, Society for Ethnopharmacology, India  
**Prof. Md. Abdur Rashid**, Faculty of Pharmacy, Dhaka University, Bangladesh  
**Mr. Indraneel Das**, Vice President, Society for Ethnopharmacology, India  
**Dr. Prakash R Itankar**, Coordinator, Nagpur Local Chapter, Society for Ethnopharmacology, India  
**Mr. Nirmal K Awasthi**, Secretary, Traditional Healers Association, Chhattisgarh

**Speaker**

**Title**

***Inaugural Lecture by:***

**Prof. Md. Abdur Rashid**  
Faculty of Pharmacy  
Dhaka University, Bangladesh

Chemical and Biological Studies of *Nicotiana plumbaginifolia* (Solanaceae)

**Session IV: 10:30 PM – 11:30 AM**

**Interactive session with Traditional Healers**

***Chairpersons:***

**Dr. Neena Sharma**  
Associate Vice President  
Emami Ltd., Kolkata

**Dr. Prakash Itankar**  
Associate Professor  
Dept. of Pharmaceutical Sciences  
R. T. M. Nagpur University, Nagpur

**Speaker**

**Title**

**Dr. Debjani Roy**  
Advisor, Quality Council of India  
New Delhi

Good Agricultural Practices (GAP) and Good Field Collection Practices (GFCP) in medicinal plants

**Dr. D. Chamundeeswari**  
Principal, Faculty of Pharmacy  
Sri Ramachandra University, Porur, Chennai

Different aspects on development of Ethnopharmacology- Indian Perspective

**Traditional Health Practitioner I**

Uses of Medicinal Plants

**Traditional Health Practitioner II**

Uses of Medicinal Plants

## Session V: 11:30 PM – 12:30 PM

### Interactive session with Traditional Healers

#### Chairpersons:

**Dr. Hariram Murthy G**

School of Health Sciences  
Trans-Disciplinary University  
Bangalore, Karnataka

**Dr. Amit Agarwal**

Director  
Natural Remedies Pvt. Ltd.  
Bangalore, Karnataka

Speaker

Title

**Dr. Sathyanarayan L**

Associate Professor  
Poona College of Pharmacy  
Bharati Vidyapeeth Deemed University  
Pune, MH

Ancestral Food for Diabetes mellitus- Freedom from medicines

**Traditional Health Practitioner III**

Uses of Medicinal Plants

**Traditional Health Practitioner IV**

Uses of Medicinal Plants

## Oral Presentation: Session I: 12:30 PM – 01:30 PM

#### Chairpersons:

**Dr. Arun Bandyopadhyay**, Scientist F, Indian Institute of Chemical Biology, Kolkata

**Dr. Tuhin Kanti Biswas**, JB Roy State Ayurvedic Medical College And Hospital, Kolkata

**Muthusamy A**

Department of Plant Sciences, Manipal  
University, Manipal, Karnataka.

Strategies for in vitro production of bioactive molecules from Ashwagandha [*Withania somnifera* (L.) Dunal]

**Ajay G. Namdeo**

Poona College of Pharmacy,  
Bharati Vidyapeeth Deemed University  
Pune, MH

Metabolic Characterization of *Withania somnifera* from Different Regions of Pune Using NMR Spectroscopy

**Rajesh. Bolleddu**

NRIADD,  
Ministry of AYUSH, Govt. of India  
Kolkata, WB

Pharmacognostical and Phytochemical Standardization of Ayurvedic Crude Drugs

**Hetalben Amin**

NRIADD,  
Ministry of AYUSH, Govt. of India  
Kolkata, WB

Ashwagandha: an Ayurvedic ethnomedicinal values

**Priyadarshini Mallick**

Dept. of Microbiology  
Dhruba Chand Halder College  
Barasat, WB

In vivo anti-inflammatory potential of biocompatible membrane containing *Ocimum sanctum* extract

**Priyanka Chakraborty**

BCDA College of Pharmacy & Technology,  
Hridaypur, North 24 Pgs, W.B

Analgesic activity of methanolic extract of tubers of *Arisaema tortuosum* (Wall.) Schott.

01:30 PM - 02:30 PM

**Lunch Break**  
(Venue: University Guest House)

## Oral Presentation: Session II: 02:30 PM – 03:30 PM

### Chairpersons:

**Dr. Pallab Kanti Haldar**, Jt. Director, School of Natural Product Studies, Jadavpur University, Kolkata  
**Prof. Mradu Gupta**, Professor-in-charge, Institute of Post Graduate Ayurvedic Education & Research at SVSP, Kolkata

<b>C. Bothiraja</b> Poona College of Pharmacy Bharati Vidyapeeth Deemed University, Pune, Maharashtra	Development of cancer targeting polymeric micelles for bioactive phytomolecule fisetin
<b>Siddhartha. S Ghosh</b> J.B.Roy State Ayurvedic Medical College and Hospital, Kolkata, WB.	Evaluation of Pharmaceutical Process on Chemical Estimates and Trace Elements in Copper Containing Minerals.
<b>Suresh Kumar Jaiswara</b> Institute of Post Graduate Ayurvedic Education & Research, Shyamadas Vaidya Shastra Pith., Kolkata, West Bengal	Pharmacological Evaluation of Wound Healing Potential of an Ayurvedic Formulation by in vivo Excision and Incision Wound Models.
<b>Achintya Mitra</b> NRIADD Ministry of AYUSH, Govt. of India Kolkata, WB	Clinical Evaluation of Therapeutic Effect of Aswagandha Extract in Chronic Stressed Subjects
<b>Tasmina Rahman</b> Department of Pharmacy Jahangirnagar University Dhaka, Bangladesh.	Effect of Ashwagandharista on different hematological parameters at different dose level utilizing Sprague-Dawley rats
<b>Kavita Tyagi</b> National Medicinal Plants Board, Ministry of AYUSH, Govt. of India New Delhi	Study of Phyto-Chemical Constituents and cytological studies of <i>Achyranthes aspera</i> Linn. under the influence of industrial Effluent.

## Valedictory Program & Distribution of Prizes: 03:30 PM -04:30 PM

### Awards for Best Oral & Poster Presentation

**Dr. Shanta Datta**, Director, National Institute of Cholera and Enteric Diseases, Kolkata  
**Dr. PP Lahiri**, Registrar, Jadavpur University, Kolkata  
**Dr. Jayram Hazra**, Director, National Research Institute of Ayurvedic Drug Development, Kolkata  
**Dr. Pratim Banerji**, President, Society for Ethnopharmacology, India  
**Mr. Birendra K Sarkar**, Vice-President, Society for Ethnopharmacology, India  
**Mr. Indraneel Das**, Vice-President, Society for Ethnopharmacology, India  
**Dr. DC Pal**, Advisor, Parker Robinson Pvt. Ltd., Kolkata  
**Prof. Asis Mazumdar**, Director, School of Water Resources Engg., Jadavpur University, Kolkata  
**Dr. Prakash R Itankar**, Coordinator, Nagpur Local Chapter, SFE-India  
**Dr. D. Chamundeeswari**, Coordinator, Chennai Local Chapter, SFE-India  
**Dr. Sathiyarayan L.**, Coordinator, Pune Local Chapter, SFE-India  
**Dr. Alka Mukne**, Editor, Pharma Times, IPA, Mumbai  
**Dr. Pallab Kanti Haldar**, Joint Organizing secretary, 4<sup>th</sup> Convention: SFE-India

যাদবপুর বিশ্ববিদ্যালয়

PROFESSOR SURANJAN DAS  
M.A. (Cal), D.Phil (Oxon)  
VICE-CHANCELLOR  
অধ্যাপক সুরঞ্জন দাস  
উপাচার্য  
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OFFICE OF THE VICE-CHANCELLOR : AUROBINDO BHAVAN ANNEXE

### MESSAGE

I congratulate the School of Natural Product Studies Jadavpur University, Kolkata, for organizing the 4th Convention of Society for Ethnopharmacology; National Symposium on "Ashwagandha" Ethnopharmacology Conclave on "Uses of Medicinal Plants by Traditional Healers of India - Local Health Tradition" in association with the Society for Ethnopharmacology, India (SFE-India) during September 9-10, 2017 at Jadavpur University, Kolkata. On my own behalf and on behalf of the University, I sincerely welcome all the participants in this Seminar which should provide an opportunity for effective interaction in the areas of medicinal plant research.

I am sure this symposium will focus on several contemporary issues on drug discovery & development from medicinal plants and will also highlight on how Local Health Tradition with the traditional healers of different regions of India can contribute to the process of drug development and discovery.

I wish the Convention every success.

*Suranjan Das.*

Suranjan Das

Prof. Pulok K Mukherjee  
Organizing Secretary  
4<sup>th</sup> Convention, SFE-India &  
Director  
School of Natural Product Studies  
Jadavpur University, Kolkata

যাদবপুর বিশ্ববিদ্যালয়

**Prof. Ashish S. Verma, Ph.D.**  
Pro-Vice-Chancellor



**\*JADAVPUR UNIVERSITY**  
KOLKATA-700032, INDIA

OFFICE OF THE PRO-VICE-CHANCELLOR : AUROBINDO BHAVAN ANNEXE

### Message

I am happy to note that the School of Natural Product Studies, Jadavpur University is organizing the 4<sup>th</sup> Convention of the Society for Ethnopharmacology, India (SFE-India) as well as National symposium on "Ashwagandha" along with Ethnopharmacology Conclave on "Local Health Tradition" on September 9-10, 2017 at Jadavpur University, Kolkata. On my personal behalf and on behalf of Jadavpur University, I would like extend warm welcome to all the participants and experts as well as researchers in this area. This symposium and conclave may prove to be an excellent a platform for the exchange numerous thought provoking ideas during this meeting.

Ashwagandha is a one of the most commonly used plant in India. The name "Ashwagandha" is the combination of two Sanskrit words "Ashwa" meaning horse and "Gandha" meaning smell. So it means that it smell like horse. It has been shown that Ashwagandha has been in use for more than 3000 years mainly to relieve stress, enhance energy as well as to improve concentration (thought process). In the modern science Ashwagandha is considered as "adaptogen". Since, Ashwagandha is more commonly used to manage body stress so it can be comfortably classified a adaptogen. Ashwagandha is very commonly used as supplement even though traditionally Ashwagandha is known to have numerous health benefits along with significant medicinal importance. But a more vigorous researches are warranted to further explore and enhance the medicinal significance of this plant.

This seminar will focus on several contemporary issues on Ashwagandha and learn more knowledge from local health traditions. The scientific deliberations during this convention will certainly add values by inculcating the renewed interest for researches on Ashwagandha and other plants of medicinal significance.

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

  
21/8/17  
Ashish S Verma

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 XXXIII of 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

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सत्यमेव जयते

**वैद्य राजेश कोटेचा**  
**Vaidya Rajesh Kotecha**



विशेष सचिव  
भारत सरकार

आयुर्वेद, योग व प्राकृतिक चिकित्सा  
यूनानी, सिद्ध एवं होम्योपैथी (आयुष) मंत्रालय  
आयुष भवन, 'बी' ब्लॉक, जी.पी.ओ. कॉम्प्लेक्स,  
आई.एन.ए. नई दिल्ली-110023

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GOVERNMENT OF INDIA  
MINISTRY OF AYURVEDA, YOGA & NATUROPATHY  
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### **MESSAGE**

It is my pleasure to note that the School of Natural Product Studies Jadavpur University, Kolkata is organizing the 4<sup>th</sup> Convention of Society for Ethnopharmacology with the National Symposium on "Ashwagandha" and Ethnopharmacology Conclave on "Local Health Tradition" in association with the Society for Ethnopharmacology, India (SFE-India) during September 9-10, 2017 at Jadavpur University, Kolkata.

I greatly appreciate the endeavor of the School of Natural Product Studies and Society for Ethnopharmacology, India in this view to arrange this symposium focusing on several contemporary issues on the drug discovery & development from medicinal plants with special reference to Ashwagandha, which is a very potential plant in AYUSH. I am sure this symposium of single plant with different aspects will be very interactive and useful in all aspects. I am happy to note that this program will also be highlighted through discussion on Uses of medicinal plant in Local Health Tradition with the traditional healers of the different region of India to explore the use of medicinal plants in health care.

Due to prior commitment I will not be able to join the convention. My hearty congratulations to Prof. Pulok K Mukherjee and his team for this unique approach on symposium and discussion on Asawagandha, which I am sure, will be a very effective interaction for the promotion and development of medicinal plant research.

I wish this convention a great success.

( Vaidya Rajesh Kotecha )

Dated the 24 August, 2017, New Delhi

शोमीता बिस्वास (आई.एफ.एस.)  
मुख्य कार्यकारी अधिकारी  
**SHOMITA BISWAS (I.F.S.)**  
CHIEF EXECUTIVE OFFICER



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



### *Message*

India lives in villages as vision shapes the mission of a nation. Plants of various kinds have made the countryside unique due to distinct climate & lay of the land across our country. Human being with their special instinct has started using these plants for food, clothing and shelter as well as to cure ailments since time immemorial.

The knowledge of plant parts for its therapeutic uses for various forms of disorders & afflictions reached to its glorious peak several thousand years ago due to dedication and wisdom of few enlightened saints & seers of our motherland. Thus it became an integral part of our indigenous social & religious ethos and shaped the cultural tradition of India's plural society.

Unfortunately, the ameliorative and soothing effect of all these plant parts was undermined by British Colonial rule and that else resulted surge of modern synthetic drugs. The notion has now been dispelled by most countries of the world as they have realized flip side of continuous use of modern medicine. Further, complementing effects of traditional system of health is also being acknowledged worldwide.

It gives me immense pleasure and satisfaction to learn that Jadavpur University in association with the "Society for Ethnopharmacology, India" is taking a lead to popularize & revive the "Local Health Traditions" for wider acceptance along with contemporary & relevant issues to promote the worth of herbal health care with special reference to "Ashwagandha".

I wish the "4th Convention of the society for Ethnopharmacology" and National Symposium on "Ashwagandha" will appeal to one and all.

(Shomita Biswas)



*if the wisdom is herbal,  
many ailments are curable*

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কলকাতা - ৭০০ ০৩২, ভারত



\*JADAVPUR UNIVERSITY  
KOLKATA - 700 032, INDIA

**FACULTY OF INTERDISCIPLINARY STUDIES, LAW & MANAGEMENT**

**MESSAGE**

It gives me immense pleasure to note that the School of Natural Product Studies, Jadavpur University, Kolkata, is organizing the fourth Convention of Society for Ethnopharmacology; National Symposium on "Ashwagandha", Ethnopharmacology Conclave on "Local Health Tradition", is being organized by the School of Natural Product Studies, Jadavpur University, in association with the Society for Ethnopharmacology, India (SFE-India) during 9-10 September 2017 at Jadavpur University, Kolkata. I welcome you all to this exciting event.

This symposium will focus on several contemporary issues on drug discovery and development from medicinal plants together with their quality evaluation, validation and safety-related aspects with special reference to Ashwagandha. This program will also be highlighted through discussion on Loka Swasthya Parampara on several aspects of Local Health Tradition with the traditional healers of different regions of India.

The School of Natural Product Studies, Jadavpur University, is working on different integrated approaches towards drug discovery and development from natural resources to explore the wide biodiversity of India. The School is dedicated to the promotion of knowledge on natural products and the dissemination of information through educational programs, research and sharing of experiences on the scientific validation of herbs for betterment of healthcare in our society.

I am sure this convention will be a major step forward and will open up future prospects for research and dissemination on medicinal use of natural products. I convey my best wishes for the grand success of this convention.

**Samita Sen**

Dean

Faculty of Interdisciplinary Studies, Law and Management

Jadavpur University, Kolkata

To  
Prof. Pulok K Mukherjee  
Organizing Secretary  
4<sup>th</sup> Convention, SFE-India &  
Director  
School of Natural Product Studies  
Jadavpur University, Kolkata

\* Established on and from 24<sup>th</sup> December, 1955 vide Notification No. 10986-Edn/TU -42/55 dated 6<sup>th</sup> December, 1955 under Jadavpur University Act, 1955 (West Bengal Act XXXIII OF 1955) followed by Jadavpur University Act, 1981 (West Bengal Act XXIV of 1981)

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## Dr. Biswajit Mukherjee

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August 22, 2017

### MESSAGE

I am happy to know and share the information that the 4<sup>th</sup> Convention of Society for Ethnopharmacology; National Symposium on "Ashwagandha" & Ethnopharmacology Conclave on "Local Health Tradition" is being organized by School of Natural Product Studies, Jadavpur University in association with the Society for Ethnopharmacology, India (SFE-India) during September 9-10, 2017 at Jadavpur University, Kolkata. This symposium will focus on several contemporary issues on the drug discovery and development from medicinal plants together with their quality evaluation, validation and safety related aspects with special reference to Ashwagandha. This program will also be highlighted through discussion on Loka Swasthya Parampara on several aspects of Local Health Tradition with the traditional healers of different region of India.

I hope that the program will be fruitful for every participant. In anticipation, I congratulate the organizers. I wish the every success of the program.

Prof. Biswajit Mukherjee  
Head of the Department  
Department of Pharmaceutical Technology,  
Jadavpur University, Kolkata - 700032



emami limited

Society for Ethnopharmacology looking at potential of individual herbs in international market and quantum of research conducted on them have decided to start a new era by conducting "Symposium on single Herb" to provide platform to the researchers to disseminate their work as well as to project thorough review of the researches conducted on one single plant worldwide.

First in the series is the "National Symposium on Ashwagandha" which is being organised as 4<sup>th</sup> National Symposium by Society for Ethnopharmacology. This is the first ever effort of the Society in this direction and we hope that more similar single herb based symposia shall be held in future to bring confluence of researchers at one forum.

**Chandra Kant Katiyar**

Chairman 4<sup>th</sup> Convention,  
Society For Ethnopharmacology, National Symposium on "Ashwagandha"  
and  
CEO-Technical, Emami Ltd. Kolkata.



## **SOCIETY FOR ETHNOPHARMACOLOGY**

**Affiliated to International Society for Ethnopharmacology, UK**  
**e-mail: [sfeindian@gmail.com](mailto:sfeindian@gmail.com); Tele-Fax: +91 - 33 2414 6046**  
**Website: [www.ethnopharmacology.in](http://www.ethnopharmacology.in)**

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### **Message**

Society for Ethnopharmacology, India is registered under the West Bengal Society Registration act and also affiliated to the International Society for Ethnopharmacology. The society was formed in 2013 and has made its presence throughout the country, which provides networking opportunity for development and promotion of medicinal plants and Ethnopharmacology. The Society works on dissemination of knowledge, promotion and development of medicinal plants and Ethnopharmacology through different local chapters made in different parts of India. Major The SFE-India as a growing organization, we encourage new members to join us in our efforts of making a healthier tomorrow, capitalizing on the very rich heritage and culture that is so ethnic, so ancient.

the 4<sup>th</sup> Convention of Society for Ethnopharmacology; National Symposium on "Ashwagandha" Ethnopharmacology Conclave on "Local Health Tradition" is being organized by School of Natural Product Studies, Jadavpur University in association with the Society for Ethnopharmacology, India (SFE-India) at Jadavpur University, Kolkata during September 9-10, 2017. This symposium will focus on several contemporary issues on the drug discovery & development from medicinal with special reference to Ashwagandha. This program will also be highlighted through discussion on uses of medicinal plants by traditional healers of the different region of India to explore their expertise led to drug development.

In this regard, we, the members of SFE - India, express our appreciation and gratitude to the administration, faculty members and the students of the School of Natural Product Studies and Jadavpur University in their gallant efforts at organizing the 4<sup>th</sup> National Convention and making it a grand success.

*Pratim Banerji*

**Dr. Pratim Banerji**  
President  
Society for Ethnopharmacology  
Kolkata, India

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## **SOCIETY FOR ETHNOPHARMACOLOGY**

**23/3 Saktigarh, Kolkata 700032, India**  
*(Registered under Society Registration Act)*

## 4<sup>th</sup> Convention: SFE – INDIA, 2017

*National Symposium*

*"Ashwagandha"*

&

*Ethnopharmacology Conclave on*

*Uses of Medicinal Plants by Traditional Healers of India – Local Health Tradition*

September 09-10, 2017

**Organized by:**

**School of Natural Product Studies**  
Jadavpur University, Kolkata, India  
[web: www.jaduniv.edu.in](http://www.jaduniv.edu.in)

**In Association with:**

**Society for Ethnopharmacology (SFE - INDIA)**  
23/3 Saktigarh, Kolkata  
[www.ethnopharmacology.in](http://www.ethnopharmacology.in)

**Venue: Jadavpur University, Kolkata**



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## School of Natural Product Studies

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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
- Utilization of the knowledge of the traditional medicine based healthcare system
- Traditional medicine inspired drug discovery and development
- Evidence based approaches for development of traditional medicine.
- Chemo profiling of natural products and development of analytical techniques for quality control, and standardization of herbal medicine
- Metabolomic studies on medicinal plants for scientific validation and documentation
- Phytochemical, pharmacological, microbiological and high throughput screening of natural products
- 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 – Globalizing local knowledge and localizing global technology

The school is working in the area of metabolomic approaches for the quality and safety evaluation of natural products for establishing molecular mechanisms and drug interactions leading to synergy research and development of evidence base approaches for new generation of phyto-pharmaceuticals. In this field of research over 224 research and review articles has been published in various national and international peer reviewed impact journals; over 25 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
- Metabolomic study and marker profiling of medicinal plants
- 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***

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The school has made several outstanding, including globally acclaimed contributions for development from natural resources including Ayurveda, ethno pharmacology, 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 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.
- ii. **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.
- iii. **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.
- iv. **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.

- v. **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.
- vi. **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.
- vii. **South African Medical Research Council (MRC), Cape Town**-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", Sanctioned from Department of Science and Technology, Government of India, New Delhi (Vide letter no INT/IBSA/01-04/2010(i); dated 18/05/2011).
- 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", Sanctioned from Department of Science and Technology, Government of India, New Delhi (Vide letter no INT/IBSA/01-04/2010(i); dated 18/05/2011)
- 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

The school has organized more than 15 potential national and international conferences, workshops, seminars with the involvement of the scientists all over the world as follows:

- ❖ **4<sup>th</sup> International Congress of the Society for Ethnopharmacology, India (SFEC-2017)**, Surat, on "*Healthcare in 21st century: Prospectives of Ethnopharmacology & Medicinal Plant Resaerch*" being organized by Uka Tarsadia University, Bardoli, Surat, Gujarat, India during February 23-25, 2017. The congress has evidenced participation of over 1000 delegates from 20 countries with more than 500 scientific presentations.

- ❖ **International Conclave on Ethnopharmacology in 7<sup>th</sup> World Ayurveda Congress & Arogya Expo, Kolkata**, on "International Conclave on Ethno Pharmacology Traditional Health Practices", being organized by Vigyan Bharti Foundation, Bangalore, India during December 02-03, 2016.
- ❖ **3<sup>rd</sup> 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.
- ❖ **3<sup>rd</sup> International Congress of the Society for Ethnopharmacology (SFEC 2016)**, Raipur on "*Ethnopharmacology and Evaluation of Medicinal Plants - Global Perspectives.*" being organized by National Centre for Natural Resources (NCNR), Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India during February 19-21, 2016. The congress has evidenced participation of over 400 delegates from 15 countries with more than 300 scientific presentations.
- ❖ **2<sup>nd</sup> 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.
- ❖ **2<sup>nd</sup> International Congress of the Society for Ethnopharmacology, India (SFEC - 2015)**, on "Validation of Medicinal Plant and Traditional Medicine–Global Perspectives" was organized Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, Maharashtra, India, during February 20-22, 2015. The congress has evidenced participation of over 700 delegates from 25 countries with more than 500 scientific presentations.
- ❖ **National Seminar [2014]**, 1<sup>st</sup> 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.
- ❖ **1<sup>st</sup> International Congress of the Society for Ethnopharmacology India (ICSE - 2014)**, on "Globalizing traditional medicines: Present and future prospects" was organized at Sri Ramachandra University, Chennai, India, during March 7-9, 2014. The congress has evidenced participation of over 700 delegates from 20 countries with more than 300 scientific presentations.
- ❖ **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.
- ❖ **12<sup>th</sup> 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).

The school has been working for the dissemination of knowledge on various issues related to globalization of traditional medicine with international coordination and collaboration.



## **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](http://www.ethnopharmacology.in)**



*Affiliated to*



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), UK. 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 12<sup>th</sup> 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 major highlights 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 as follows:

- 1) SFE - Lifetime Achievement Award - "Bisheswar Saha Memorial Award"
- 2) SFE - Outstanding International Ethnopharmacologist Award - "Pranab Banerji Memorial Award"
- 3) SFE - Outstanding National Ethnopharmacologist Award - "Harihar Mukherjee Memorial Award"
- 4) SFE - ZANDU Award for "Best Research on Plant Drugs"
- 5) SFE- Young Ethnopharmacologist Award - "Dr. PK Debnath memorial Award"
- 6) Dr. Tuhinadri Sen Oration Award
- 7) SFE - Herbal Industry Leader Award
- 8) SFE - Outstanding Service Award
- 9) SFE – Special Recognition Award
- 10) SFE - Travel Grant 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:

- ❖ Mission of the society is Globalization of traditional medicine and natural products – "Globalizing local knowledge and localizing global technology".
- ❖ Dissemination of knowledge for promotion and development of Ethnopharmacology and medicinal plants (herbs).
- ❖ 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, HMs, 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, Chennai, Manipal, Nagpur, Belgavi, Dehradun, Pune, Raipur, Lucknow 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 2013. These activities of SFE-INDIA have been shown in Table 2.

**Table 1: Details of the local chapter coordinators of SFE-India**

Name of the Chapter	Name of the Coordinator Details
Belgaum, Local Chapter	Dr. Pramod HJ Coordinator, Belgaum, Local Chapter & Head-Pharm. Biotechnology KLE University, Belgaum, Karnataka, India
Chennai, Local Chapter	Dr. D Chamundeeswari Coordinator, Chennai, Local Chapter & Principal, Faculty of Pharmacy, Sri Ramachandra University, Porur, Chennai, India
Dehradun, Local Chapter	Dr. Preeti Kothiyal Coordinator, Dehradun, Local Chapter Director, Shri Guru Ram Rai Institute of Technology & Science, Patel Nagar, Dehradun.
Guwahati, Local Chapter	Dr. Chandana Barua Coordinator, Guwahati, Local Chapter & Professor, Dept. of Pharmacology & Toxicology College of Veterinary Science, Khanapara, Guwahati, India
Lucknow, Local Chapter	Dr. AKS Rawat Coordinator, Lucknow, Local Chapter & Scientist Dept of Pharmacognosy & Ethnopharmacology; CSIR-National Botanical Research Institute, Lucknow, India
Manipal, Local Chapter	Dr. N Udupa Coordinator, Manipal, Local Chapter & Principal, Manipal College of Pharmaceutical Sciences, Manipal, Karnataka, India
Nagpur, Local Chapter	Dr. Prakash R Itankar Coordinator, Nagpur, Local Chapter Associate Professor Department of Pharmaceutical Sciences, R. T. M. Nagpur University, Nagpur, MH, India
Pune Local Chapter	Dr. Sathiyarayanan L. Coordinator, Pune Local Chapter Associate Professor Dept of Pharmaceutical Chemistry Bharati Vidyapeeth University Poona College of Pharmacy, Pune, MH, India
Raipur, Local Chapter	Dr. Shailendra Saraf Coordinator, Raipur, Local Chapter & Professor, Pharmaceutical Sciences Pt. Ravishankar Shukla University, Raipur, CG

- SFE-India Nagpur Local Chapter was organized a “National Conference of Traditional Community Health Practitioners for Conservation of Lokswasthya parampara” on 22nd July 2017 in association with Maharashtra State Biodiversity Board, Forest Development Corporation of Maharashtra, at Mission India Campus, Khadgaon, Nagpur. This program was attended by about 800 delegates comprising healers, physicians of various pathy, scientists, researchers from various institutes and students. SFE-India thanks to Dr. Prakash R Itankar, Coordinator, Nagpur, Local Chapter and his team for organizing this event.
- National level Conference was organized by Chennai local chapter of SFE-india on “Current Perspectives in Herbal Drug Regulations- Global Scenario” at Sri Ramchandra University, Porur, Chennai during June, 27-29, 2017. This program was attended by about 300 delegates including different prominent scientists and researchers throughout India. SFE-India is thankful to Dr. D. Chamundeeswari, Coordinator, SFE-India Chennai local chapter for organizing this event.
- Grand opening of the 18th International Congress of International Society of Ethnopharmacology (ISE) and the 5<sup>th</sup> International Congress of the Society for Ethnopharmacology (SFE), India (ISE-SFEC 2018) jointly in association with Society for Ethnopharmacology, India during January 13-15, 2018 in Dhaka, was made through an impressive opening programme at Dhaka University on 21st May, 2017. This conference was organized by “Department of Pharmacy, Dhaka University, Bangladesh on ““Drug Discovery and Development from Natural Sources”” This programme was very well accepted. This grand opening of ISE SFEC - 2018 was made through a very interactive seminar which was attended by over 200 participants. Mr. B K Sarkar, Mr. Indraneel Das and Dr. Pulok K Mukherjee from SFE-India joined the programme. SFE-India thanks to Dr. Sitesh C Bachar and his team for organizing this event.
- The 4<sup>th</sup> International Congress of Ethnopharmacology was held at Uka Tarsadia University, Bardoli, Surat, Gujarat, India during February 23-25, 2017 with the theme “Health care in 21st Century: Perspective of Ethnopharmacology and Medicinal Plant Research”. The program was jointly organized by the Society for Ethnopharmacology, India (SFE, India) and the C.G. Bhakta Institute of Biotechnology & Maliba Pharmacy College, Uka Tarsadia University, Bardoli, Surat, Gujarat. The 4th International Congress of Society for Ethnopharmacology focused on recent advances in Ethnopharmacology and related aspects. The Congress was attended by over 1000 delegates from several countries and different states of India with 78 plenary and special lectures, 105 oral and 400 poster presentations on diverse fields of the medicinal plants and ethnopharmacological research. SFE-India thanks to Dr. Ramar Krishnamurthy and his team for organizing this event.

- The International Conclave on “Ethnopharmacology, Ethno-medicine and Traditional Health Practices: Learning from the Nature: Tradition to Innovation” was organized by Society for Ethnopharmacology, Kolkata, India (SFE-India) jointly with School of Natural Product Studies, Jadavpur University, Trans disciplinary University, Bangalore and World Ayurveda Foundation, Bengaluru, Karnataka at Science City Auditorium, Kolkata as a part of 7th World Ayurveda Congress & AROGYA Expo (7th WAC), during December 3-4, 2016. The major thrust areas of the conference included Ethno-medicine, Ethnopharmacology & Drug development – Global perspectives, Traditional to Modern Pharmaceuticals. 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 3<sup>rd</sup> International Congress of the Society for Ethnopharmacology (SFEC 2016) was organized by National Centre for Natural Resources (NCNR), Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India, during February 19-21, 2016. Prof. S K Pandey, Vice Chancellor, Pt. Ravishankar Shukla University was the Chairman, Dr. Atanu K Pati, was the organizing secretary and Dr. Shailendra Saraf, Coordinator, SFE-India, Raipur, Local chapter was the Joint organizing secretary of the 3<sup>rd</sup> International Congress of SFEC 2016, Raipur.
- 3<sup>rd</sup> Convention and the National Seminar on “Analytical techniques for drug discovery & development from natural products” was organized School of Natural Product Studies, Jadavpur University in association with Society for Ethnopharmacology, India (SFE-India) at KP Basu Auditorium, Jadavpur University, Kolkata on September 24, 2016. The seminar was attended by more than 180 delegates with above 40 scientific deliberations.
- A one day national workshop on “Hands on training using Power lab for natural product study”, sponsored by AD Instruments, Pvt. Ltd., New Delhi, was organized by the Guwahati local chapter on September 6, 2016 in the Department of Pharmacology & Toxicology, CVSc, Khanapara. The workshop was attended by 35 students from concerned discipline. SFE-India thanks to Dr. Chandana Baruah, Coordinator, SFE-India Guwahati local chapter for organizing this event.
- SFE-India, Pune Local chapter organised 1<sup>st</sup> International Conference: “Advances in Asian Medicines (ICAAM - 2016) on “Ethnopharmacology and Validation of Traditional Medicine” during January 4, 2016 at Pune, India. More than 300 delegates participated in this event with above 100 scientific presentations, which make this event grand success. SFE-India is thankful to Dr. Sathiyarayanan L., SFE-India Coordinator, Pune Local Chapter for organizing this event successfully.

- SFE – India Chennai local chapter of SFE-India organized a national conference on “Pharmacovigilance of AYUSH Drugs” during January 19, 2016 at Sri Ramachandra University, Porur, Chennai. This event was a very successful event with the participation of more than 500 delegates from all over the country and above 50 scientific presentations were made. SFE-India is thankful to Dr. D. Chamundeeswari, Coordinator, SFE-India Chennai local chapter for organizing this event.
- One day National Seminar on “Ethnopharmacology: Perspectives for Development of Ayurveda” was jointly organized by the National Research Institute of Ayurvedic Drug Development (NRIADD, CCRAS, Ministry of AYUSH, Government of India) in association with the Society for Ethnopharmacology, India (SFE-India) on 19<sup>th</sup> March 2016. More than 150 delegates participated in this event with above 32 scientific presentations, which make this event grand success. The Society is thankful to Dr. Jayram Hazra, Director, NRIADD, Kolkata & his team for organizing this event.
- Several invited lectures by disguised speakers was 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.
- 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.

**Table 2: Activities of local chapter & SFE-India HQ of SFE-India**

<b>EVENT DETAILS</b>	<b>Date</b>
<p><b>SFE meet</b>  “Promotion of Ethnomedicine”  <b>Venue: Poona College of Pharmacy, Bharati Vidyapeeth University, Pune</b></p>	August 05, 2017
<p><b>National Conference of Community Health Practitioners on</b>  “Conservation of Lok Swasthya Parampara”  <b>Venue: R. T. M Nagpur University, Nagpur, MH, India.</b></p>	July 22, 2017
<p><b>National level Conference on</b>  Current Perspectives in Herbal Drug Regulations- Global Scenario  <b>Venue: Sri Ramchandra University, Porur, Chennai</b></p>	June, 27-29, 2017
<p><b>ISE SFEC National Conference 2017</b>  A Preparatory conference to The 18th International Congress of International Society for Ethnopharmacology &amp; the 5th International Congress of the Society for Ethnopharmacology, India (ISE-SFEC 2018)  “Drug Discovery and Development from Natural Sources”  <b>Venue: Department of Pharmacy, Faculty of Pharmacy University of Dhaka, Bangladesh</b></p>	May 21, 2017
<p><b>4<sup>th</sup> International Congress of Ethnopharmacology on</b>  “Health care in 21st Century: Perspective of Ethnopharmacology and Medicinal Plant Research”.  <b>Venue: Uka Tarsadia University, Bardoli, Surat, Gujarat</b></p>	February 23-25, 2017
<p><i>7<sup>th</sup> World Ayurveda Congress &amp; Arogya Expo</i>  <b>International Conclave on</b>  “Ethnopharmacology, Ethno-medicine and Traditional Health Practices: Learning from the Nature: Tradition to Innovation”  <b>Venue: Science City, Kolkata</b></p>	December 3-4, 2016
<p><b>3<sup>rd</sup> International Congress of the Society for Ethnopharmacology (SFEC 2016)</b>  “Ethnopharmacology &amp; Evaluation of Medicinal Plants - Global Perspectives”.  <b>Venue: National Centre for Natural Resources (NCNR), Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India</b></p>	February 19-21, 2016
<p><b>3<sup>rd</sup> National Convention on</b>  “Analytical Techniques for Drug Discovery and Development from Natural Products”  <b>Venue: KP Basu auditorium, Jadavpur University, Kolkata, India.</b></p>	September 24, 2016

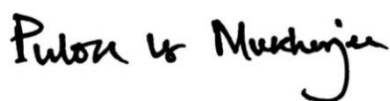
<p align="center"><b>National Seminar on</b></p> <p align="center"><b>“Ethnopharmacology: Perspectives for Development of Ayurveda”</b></p> <p align="center"><b>Venue: National Research Institute of Ayurvedic Drug Development (NRIADD) Kolkata</b></p>	<p>March 19, 2016</p>
<p align="center"><b>National workshop on</b></p> <p align="center"><b>“Hands on training using Power lab for natural product study”</b></p> <p align="center"><b>Venue: Department of Pharmacology &amp; Toxicology, CVSc Khanapara, Assam</b></p>	<p>September 6, 2016</p>
<p align="center"><i>Advances in Asian Medicines (ICAAM - 2016)</i></p> <p align="center"><b>International Conference on</b></p> <p align="center"><b>“Ethnopharmacology and Validation of Traditional Medicine”</b></p> <p align="center"><b>Venue: Pune, India</b></p>	<p>January 4, 2016</p>
<p align="center"><b>National conference on</b></p> <p align="center"><b>“Pharmacovigilance of AYUSH Drugs”</b></p> <p align="center"><b>Venue: Sri Ramachandra University, Porur, Chennai.</b></p>	<p>January 19, 2016</p>
<p align="center"><b>2<sup>nd</sup> National Convention on</b></p> <p align="center"><b>“Integrated Approaches for promotion and Development of Herbal Medicine”</b></p> <p align="center"><b>Venue: Triguna Sen Auditorium, Jadavpur University, Kolkata, India.</b></p>	<p>December 5-6, 2015</p>
<p align="center"><b>1<sup>st</sup> Regional Seminar on</b></p> <p align="center"><b>“Pharmacovigilance of Natural Products - A Preliminary Approach“</b></p> <p align="center"><b>Venue: Guwahati Medical College, Guwahati, Assam.</b></p>	<p>September 26, 2015.</p>
<p align="center"><b>Seminar on</b></p> <p align="center"><b>“Enabling Environment for Women's Development in Pharmacy and Allied Field”</b></p> <p align="center"><b>Venue: HL Roy Auditorium, Jadavpur University, Kolkata, India.</b></p>	<p>September 05, 2015</p>
<p align="center"><b>2<sup>nd</sup> International Congress of Society for Ethnopharmacology, India (SFEC 2015) on</b></p> <p align="center"><b>“Validation of Medicinal Plants and Traditional Medicines – Global Perspectives”</b></p> <p align="center"><b>Venue: R. T. M Nagpur University, Nagpur, MH, India.</b></p>	<p>February 20-22, 2015</p>
<p align="center"><b>1<sup>st</sup> National Convention on</b></p> <p align="center"><b>“Opportunities in Medicinal Plant Research”</b></p> <p align="center"><b>Venue: Triguna Sen Auditorium, Jadavpur University, Kolkata, India.</b></p>	<p>November 29-30, 2014</p>

<p align="center"><b>National Conference on</b>  <b>“Ethnopharmacology in Drug Development: Prospects and Challenges”</b>  <b>Venue: Bundelkhand University, Jhansi, India</b></p>	<p><b>November 6-7, 2014</b></p>
<p align="center"><b>International Conference on</b>  <b>“Frontiers in Pharmaceutical Science &amp; Research”</b>  <b>Venue: Columbia Institute of Pharmacy, Raipur, India</b></p>	<p><b>October 11-12, 2014</b></p>
<p align="center"><b>1<sup>st</sup> International Congress of Society for Ethnopharmacology, India (ICSE 2014) on “Globalizing Traditional Medicines: Present and Future Prospects”</b>  <b>Venue: Sri Ramachandra University, Porur, Chennai, India</b></p>	<p><b>March 7-9, 2014</b></p>

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

We are happy to welcome you all to the 4<sup>th</sup> Convention, National Symposium on Ashwagandha and the Ethnopharmacology conclave on “Uses of Medicinal Plants by Traditional healers of India – Local Health Tradition at Jadavpur University, Kolkata during September 09-10, 2017. We thank to the organizing committee especially the members of School of Natural Product Studies, Jadavpur University for organizing this convention with involvement of eminent speakers, delegates and traditional healers.

We cordially invite you all to join SFE-India in our efforts of making a healthier tomorrow, capitalizing on the very rich heritage and culture that is so ethnic, so ancient and yet so Indian.



**Prof. Pulok K Mukherjee, PhD, FRSC**  
**Secretary**  
 Society for Ethnopharmacology, India  
 23/3 Saktigarh, Jadavpur, Kolkata 700032



**Dr. Pratim Banerji**  
**President**  
 Society for Ethnopharmacology, India  
 23/3 Saktigarh, Jadavpur, Kolkata 700032



# SOCIETY FOR ETHNOPHARMACOLOGY

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Associates



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**Dr. Kasturi Basu**  
Associates



**Mr. Subhadip Banerjee**  
Associates



**Mr. Bhaskar Das**  
Associates



**Mr. Prasanta K Maitra**  
Associates

Homage to People's President of India  
Dr. APJ Abdul Kalam



Inaugural lecture of Dr. APJ Abdul Kalam at the 12<sup>th</sup> International congress of the ISE on **"Dynamics of Ethnopharmacology"** available at [www.ethnopharmacology.in](http://www.ethnopharmacology.in)

*We are very much grateful and thankful to him for his great inspiration, which leads to the formation of Society for Ethnopharmacology, India (SFE- India).*

1<sup>st</sup> Regional Seminar Guwahati Local Chapter of SFE- India ; during September, 2015 at Gauhati Medical College Guwahati, Assam, India



1<sup>st</sup> International Confernece (ICAMM 2016) , A special program of Society for Ethnopharmacology , was organized by SFE-India, Pune Local Chapter during January 4, 2016 at Pune, India



1<sup>st</sup> National Convention of Society for Ethnopharmacology, India during November, 2014 at Gandhi Bhawan, Jadavpur University,, Kolkata, WB, India



2<sup>nd</sup> International Congress of Society for Ethnopharmacology , India (SFEC - 2015) during February, 2015 at RTM Nagpur University, Maharashtra, India



2<sup>nd</sup> National Convention of Society for Ethnopharmacology, India during December 5-6, 2015 at Triguna Sen Auditorium, Jadavpur University,, Kolkata, WB, India



3<sup>rd</sup> International Congress of Society for Ethnopharmacology, India (SFEC 2016) during February 19-21, 2016 at Pt. Ravishankar university, Raipur, Chhattisgarh, India



3<sup>rd</sup> National Convention of Society for Ethnopharmacology, India during September 24, 2016 at KP Basu Auditorium, Jadavpur University,, Kolkata, WB, India



International Conclave on "Ethno-medicine, Ethnopharmacology and Traditional Health Practices" during 7th World Ayurveda Congress & Arogyo Expo 2016 at Science City , Kolkata from December 3-4, 2016



4<sup>th</sup> International Congress of Society for Ethnopharmacology , India (SFEC - 2017) during February, 2017 at Uka Tarsadia University, Surat, Gujarat, India



Grand opening of 18th International Congress of International Society for Ethnopharmacology 5th International Congress of Society for Ethnopharmacology, India (ISE SFEC 2018) on May 22, 2017 at Dhaka University, Dhaka, Bangladesh



National Conference on "Traditional Community Health Practitioners for Conservation of Lokwashthya parampara" on 22nd July 2017 was organized by SFE-India, Nagpur Local Chapter at RTM Nagpur University, Nagpur, MH, India



Meeting of Society for Ethnopharmacology, India for "Promotion of Ethnomedicine" was organized by SFE-India, Pune Local Chapter on August 05, 2017 at Poona College of Pharmacy, Pune, MH



*Dr. Pratip K. Debnath*



**1946 - 2015**

Dr. Pratip K. Debnath was born on 13.9.1946 excelled academically as Professor of Kayachikitsa; Head, Department of Panchakarma, and In-Charge of Clinical Research, J B Roy State Ayurvedic Medical College & Hospital, Kolkata, and as a Consultant, National Research Institute of Ayurveda Drug Development Kolkata, Ministry of AYUSH. He was the founder Director of the 'Gananath Sen Institute of Ayurveda and Research on Reverse Pharmacology'. He acquired Ph.D from the Dept of Pharmacology, IMS, BHU and was the Fellow of the 'Indian Pharmacological Society and also the 'National Academy of Ayurveda'. He has credited with more than 150 publications, 10 Ph.D and several Books and Book chapters. He has been a founder of Core Committee, to establish Society for Ethnopharmacology in India He was also the President of ISC (Medical Section) and he has contributed remarkable research strides from fundamental philosophy of Ayurveda to evidence based science .

*In the memory of Dr. P K Debnath*

**Society for Ethnopharmacology, India (SFE-India)  
has instituted an award**

**"SFE -Young Ethnopharmacologist Award"**

**To recognize the young scientist/ researchers (upto 45 years) who has made significant research contribution for promotion and development of Ethnopharmacology and Medicinal Plants.**

*Prof. Tuhinadri Sen*



**1964 - 2016**

Prof. Tuhinadri Sen was born at Dhanbad, Jharkhand on the 31st of May 1964. Prof. Sen acquired his B.Pharm (Gold medalist) (1986), M.Pharm (1988) and Ph.D (1992) degrees from the Dept. of Pharmacy, Jadavpur University. He began his career at Delhi College of Pharmacy as Lecturer in Pharmacology and after sometime returned to Kolkata to join Jnan Ghosh Polytechnic. During his tenure there, he was awarded the prestigious Indo-French Post Vert fellowship. In 2001, Prof. Sen joined as a faculty of Dept. of Pharm Tech, Jadavpur University. Prof. Sen was later awarded with Erasmus Mundus fellowship to carry out his research work in Belgium and Ireland.

Prof. T Sen was the Joint Director of the School of Natural Product Studies, Jadavpur University, Kolkata. He has visited South Africa and Brazil for trilateral collaborative project work supported by DST, New Delhi. He has made a wide range of research contribution in several areas including regional plants to flora and fauna of the Sundarbans; G protein coupled receptors, quorum sensing and bacterial biofilms. Prof. Sen was a dedicated educationist and philanthropist. He would work untiringly for his students and always thought of ways to help them excel. Prof. Sen has left behind a legacy motivating young students and researchers. May God give strength to his bereaved family – his wife Dr. Suchandra Sen and daughters Ms. Trinayani Sen and Ms. Tathambika Tejeswini Sen.

*In the memory of Prof. Tuhinadri Sen*

**Society for Ethnopharmacology, India (SFE-India)  
has instituted an award**

**"SFE - T Sen Oration Award"**

**To recognize the scientist/ researchers from industry and academia (upto 55 years) who has made significant research contribution for promotion and development of Ethnopharmacology and Medicinal Plants.**



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### ANNUAL AWARDS

#### SOCIETY FOR ETHNOPHARMACOLOGY, KOLKATA, INDIA

Society for Ethnopharmacology is affiliated to the International Society for Ethnopharmacology. SFE-India is constituted by the academicians, researchers and industrialists for dissemination of knowledge and expertise for promotion and development of medicinal plants & other natural-products with the vision of globalizing local knowledge and localizing global technologies.

To recognize the outstanding contribution in the area of medicinal plant research & Ethnopharmacology, the Society has instituted several awards. Nominations are invited for the following awards of the Society for Ethnopharmacology (SFE-INDIA), Kolkata which will be conferred during the Annual International Congress of SFE-India (SFEC). For Nomination and other details please visit: [www.ethnopharmacology.in](http://www.ethnopharmacology.in)

Last Date for nomination is October 10, 2017

### NAME OF THE AWARDS

<b>SFE - Lifetime Achievement Award - 2018</b> <i>"Bisheswar Saha Memorial Award"</i>	<b>SFE - Outstanding National Ethnopharmacologist Award - 2018</b> <i>"Harihar Mukherjee Memorial Award"</i>
<b>SFE - Outstanding International Ethnopharmacologist Award - 2018</b> <i>"Pranab Banerji Memorial Award"</i>	<b>SFE - ZANDU Award - 2018</b> <i>"Best Research on Plant Drug"</i>
<b>SFE - T. Sen Oration Award - 2018</b> <i>"Prof. T Sen Memorial Award"</i>	<b>SFE - Young Ethnopharmacologist Award - 2018</b> <i>"Dr. PK Debnath Memorial Award"</i>
<b>SFE Herbal Industry Leader Award - 2018</b>	<b>SFE - Best Poster &amp; Paper Presentation Award - 2018</b> <i>"Manujusree Pal Memorial Award"</i>
<b>SFE - Outstanding Local Chapter Award - 2018</b>	<b>SFE - Outstanding Service Award - 2018</b>

*For further details please contact:*

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We gratefully acknowledge the support received from:

**Mr. Sibeswar Saha  
&  
Mrs. Sibylle U Saha**

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**Mr. Sibeswar Saha**  
(MENTOR - SFE - INDIA)



**Mrs. Sibylle U Saha**  
(MENTOR - SFE - INDIA)



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UPCOMING EVENTS OF SFE- INDIA

**ISE-SFEC 2018**



**18<sup>th</sup> International Congress of  
International Society  
for Ethnopharmacology**  
[www.ethnopharmacology.org](http://www.ethnopharmacology.org)

**5<sup>th</sup> & International Congress of  
Society for  
Ethnopharmacology, India**  
[www.ethnopharmacology.in](http://www.ethnopharmacology.in)

Dhaka, Bangladesh; January 13-15, 2018

***"Ethnopharmacology & Drug Development:  
Innovation meets Tradition"***

*Organized by*

**Department of Pharmacy, Faculty of Pharmacy  
University of Dhaka  
Dhaka - 1000, Bangladesh  
[www.du.ac.bd](http://www.du.ac.bd)**

*In association with*

**Society for Ethnopharmacology, India  
Saktigarh, Jadavpur, Kolkata, India  
[www.ethnopharmacology.in](http://www.ethnopharmacology.in)**

## **Inaugural Lecture:**

### **"Biotechnology - Excitement and Relevance for Human Welfare"**

#### **Dr.(Mrs.) Manju Sharma**

Former Secretary to the Govt. of India

Department of Biotechnology

Principal Advisor to the Dept. Science and Technology, Gujarat

Distinguished Women Scientist Chair, NASI, Allahabad



Dr. Manju Sharma was born at Kanpur on 13 Feb 1940, obtained her M.Sc (Botany) in 1961 from Lucknow University with Birbal Sahni Memorial Gold Medal and did her Post-Doc at Purdue University, USA, where she worked on rubber plant yield, which helped the rubber plantations in Malaysia. She was a visiting scientist at the Institute of Plant Anatomy and Cytology, Copenhagen. At Forest Research Institute, Dehradun she established a co-relation between silicon content and hardness of wood. She co-authored a monograph on "Indian Medicinal Plants" published by ICMR and published many research papers, prepared several special papers, policy reports and documents on various aspects of Science and Technology.

Since 1974 she joined the Department of Science and Technology, Planning Commission, Scientific Adviser to the PM, and Department of Biotechnology and played a key role in promoting S & T in general and Biosciences in particular. She has initiated many successful programmes including biomass production and conversion; biofertilisers; photosynthesis research; plant tissue culture; biosphere reserves; "Silent Valley" and its conservation; transgenic research in crops; germplasm conservation; medicinal and aromatic plants; food biotechnology; diagnostics, new vaccines; human genetics etc. She has contributed immensely, in many cases, from conceptualization to the implementation. As Secretary of the Island Development Authority, she prepared technical reports for sustainable development of Lakshadweep and Andaman & Nicobar Islands. She has promoted and guided the development of biotechnology in many States as Advisor to the Chief Ministers. She is a nominated member of State Planning Board, Government of Himachal Pradesh and Chairperson of the Vision Group, Government of Orissa; and Member of the Biotechnology Advisory Council, Govt. of Gujarat. She has conceptualized and set up the Biotech Consortium India Ltd. (BCIL) to bridge the gap between industry, academia and research.

Dr. Manju Sharma has extensive international experience as a resource person for UN Organizations, as a Regional Coordinator of Farmer-Centered Agricultural Resource Management (FARM) on Biotechnology and Biodiversity; coordination and monitoring of eight participating countries, establishment of gene bank for Medicinal and Aromatic plants, and act as the coordinator for G-15 countries. She was responsible for bilateral international agreements with US, Sweden, Tunisia, Russia, Slovenia etc. She was elected to the Executive Committee and Council of Indian Science Congress Association and served as Chairperson and Member Secretary of many scientific Committees, Task Forces and Research Advisory Councils. As General Secretary, Vice President, and President of the National Academy of Sciences (the only lady

————— **4th Convention: Society for Ethnopharmacology, India, 2017** —————

scientist as President) she has served with great dedication. She was responsible for establishment of several institutions like: National Institute of Immunology, New Delhi; Biomass Research Centers at NBRI, Lucknow and Madurai Kamaraj University; Plant Molecular Biology Unit at Delhi University and the Center for DNA Finger Printing and Diagnostics at Hyderabad, Plant Genome Research Center, JNU; National Brain Research Center, New Delhi etc. The DBT Institute of Bioresource and Sustainable Development in Manipur was her initiative. Her concept of National Bioresource Development Board in understanding the bioresources played a significant role.

As Secretary, DBT, she has taken many initiatives to convert idea into products and processes like diagnostic kits for AIDS; new drugs; vaccines; biofertilisers; etc. was transferred to the industry. Her effort relating to biotechnology based programmes for women, SC/ST, and rural areas, provide benefits to the poor like projects in Latur and Osmanabad earthquake affected regions have brought major benefits. Other important programmes launched by her include: Indian Genome Initiative, Genetic Counseling Units, low cost food for malnourished children, micropropagation parks, prospecting of bioresources, edible vaccines etc. She was responsible for important policy papers like Biosafety guidelines for transport of biological material, transgenics, vaccine trials, ethical policies for human genome research, approval for accession to Budapest Treaty etc. She planned several events to commemorate the Golden Jubilee of India's Independence including basic research, application and commercialization of biotechnology, with initiation of Golden Jubilee Fellowships, transfer of technologies for healthcare system, establishment of a Biovillage in Gujarat, a Golden Jubilee Women's Biotechnology Park at Chennai etc.

She has delivered hundreds of lectures including Zaheer Memorial Lecture; Annual Endowment Lecture in TNVASU, Chennai; Neyvelli Lignite Endowment Lecture, Pondicherry University; Tagore Memorial Lecture at IIT Khargapur; Dr Rev Fr. Joseph Inchackal SJ Endowment Lecture at Loyola College, Convocation Addresses at Tamilnadu Agriculture University, Central Institute of Fisheries Education, Tamil Nadu Veterinary and Animal Sciences University, Madurai Kamaraj University; Panjabrao Deshmukh Agricultural University, Acharya NG Ranga Agricultural University, Kuvempu University, Swami Ramanand Teerth Marathwada University, Vidyasagar University, Guru Nanak Dev University, North Bengal University etc. She has addressed the 34th Annual General Meeting of the Organisation of Pharmaceutical Producers of India and the Golden Jubilee lecture at the University of Agricultural Sciences, Dharwad; Haffkine Memorial Oration at Haffkine Institute, Pune; Sri Raghotham Reddy Memorial Lecture at Hyderabad; and Dr. Anji Reddy Gold Medal Oration at Chennai. She has received the VASVIK Award (1994); Norman E. Borlaug Award (1995) for her contributions in Agricultural science; and Distinguished Scientist Award from the Indian Science Congress Association. The Gujar Mal Modi Science Foundation has conferring her GM Modi Science Award 2002 as an outstanding researcher, science promoter and manager.

She was the General President of Indian Science Congress Association in 1998; President of Association of Microbiologists of India for 1999; President of Vigyan Parishad, Allahabad, and honored by the Andhra Pradesh Academy of Sciences as Distinguished Scientist on "International Year of Women". In recognition

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#### **4th Convention: Society for Ethnopharmacology, India, 2017**

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of her contributions the Society of Biosciences conferred KN Bahl Memorial Gold Medal-1997; FIE's National Award-1998; Shri Om Prakash Bhasin Award 1998; 5th National Science and Technology Award 1998, Asutosh Mukherjee Memorial Award 2000-2001, and a member of Hall of Fame at International Conference on "Women: Biotechnology, Environment & Non-Conventional Energy" organized by IICT and the Third World Organization of Women Scientists. The Institute of Directors, New Delhi conferred her Distinguished Fellow Award 2001. She was elected as the President of Orchid Society of India and Fellow of Indian Society of Agricultural Biochemists. All India Conference of Intellectuals honored her DELHI RATAN in 2003. She is a Fellow of Third World Academy of Sciences; Fellow of National Academy of Agricultural Sciences. She has been conferred Honorary D.Sc. by Sri Venketeswara University, Tirupati; Sri Krishnadevaraya University, Andhra Pradesh; Lucknow University, Lucknow; Chhatrapati Shahu Ji Maharaj University, Kanpur; Bundelkhand University, Jhansi and Narendra Dev University of Agriculture & Technology, Faizabad. She has been conferred Indian Science Writers' Association (ISWA) Fellowship 2000 and National Academy of Sericulture Sciences Fellowship 2003. Indian Women Scientists Association felicitated her life time contribution for biotechnology, and as a source of inspiration for young women scientists. The Indian Science Congress Association conferred Dr BP Pal Memorial Award 2001; Government of Madhya Pradesh conferred Pt. Jawaharlal Nehru National Award 2000 and Govt. of Uttar Pradesh with Vigyan Gaurav award. The 'Ojaswini', a women magazine has conferred Ojaswini Shirsh Alankaran 2002; Indian Science Congress Association (ISCA), conferred 'Special Distinction Medal 2003'; and Life Time Achievement Award in 2004. The Alumnae Society of University of Lucknow felicitated her for life time contributions in science and technology in 2003.

As Secretary, DBT she has established number of research institutions, which helped in promoting advanced research on all aspects of Biotechnology. Strengthening and expanding the infrastructure for bioinformatics, and human resource development. For recognizing the scientists at various levels, she instituted many awards and fellowships. She was instrumental in shaping biotechnology research and application as well as international collaborations with USA, Russia, Denmark, and many developing countries, setting up an Indo-Russian Centre for Biotechnology in Moscow, Biotechnology Centre in Syria and approval of UNESCO for a Regional Biotechnology Training Centre are some examples.

#### **ACTIVITIES AND RESPONSIBILITIES AFTER SUPERANNUATION**

After superannuating as Secretary, DBT in February 2004, she was appointed as Adviser to the Minister of Science & Technology for 3 months and prepared policy notes on Biosafety, simplification of administrative and financial procedures of science departments, integration of S & T and inculcation of scientific temper and awareness. She was the guest faculty of IIT Delhi for one semester and motivated young students on biotechnology and technical issues. She act as adviser to many research institutions for the implementation of biotechnology based projects. She is very active and spreading the need of biotechnology research and application through various mechanisms includes her close interaction with many state governments. On 10th December 2004 she has received a life time achievement award from BIOSPECTRUM.

As founder President & Executive Director, she established Indian Institute of Advanced Research in Gandhinagar, under Puri Foundation of Education in India with a state-of-the-art facility to attract bright

————— **4th Convention: Society for Ethnopharmacology, India, 2017** —————

researcher from India and abroad, which was inaugurated by the President of India on 28th April, 2006. She is the Principal Adviser on Biotechnology to the Government of Gujarat; Government of Uttaranchal to establish Uttaranchal Science Technology and Education Centre. She was appointed Co-chair of Advisory Panel on 'Women for Science' by the Inter Academy Council, a highly prestigious assignment of international level due to her because of her keen interest in promoting women in taking up science as career and submitted her globally acclaimed report in 2006, and consider as a 'Role Model' to women scientists globally. She is a member of the Board of Governors of United Nations University– Institute of Advanced Science (UNUIAS) in Tokyo; member of Agriculture Biotechnology Advisory Group of USAID, Chair of Research Advisory Council of CIMAP, Lucknow, member of Governing body of Guru Teg Bahadur University, and Advisory Committee of IIT Delhi; chaired the Research Advisory Committee of Biological Sciences of Shriram Institute for Industrial Research and as chairman of Governing body; member of Academic Council of Indian Agriculture Research Institute; Governing Council of Tata Energy Research Institute, New Delhi; Member Board of Directors of Biotech Consortium India Ltd; Chairman of Biotechnology under the Third World Academy of Sciences; member of the TWAS Committee on 'Women for Science'; Board of Governors of Security and Intelligence Services (India) Ltd; member of a high level Advisory Committee for National Disaster Management Authority chaired by the Prime Minister of India.

She achieved tremendous international recognition as member and chairperson of various international committees. One of the important activities is to address large number of young students and scientists and women, particularly farming community, which is one of her goal to enthuse more and more young people for taking science as a career. Since 2004 she is the Chairman of Governing Body, Miranda House (Delhi University) and Research Council of CIMAP (Lucknow). She is a member of the Court of BHU, JNU and NEHU and the Academic Council of Gulbarga University and Vanasthali Vidyapeeth. She is a member of the Advisory Committee of IIT, Mumbai. As the Fellow and Past President of National Academy of Sciences, she continues to contribute in the growth of the Academy in all scientific activities. She received NASI's Platinum Jubilee Gold Medal for her lifetime contributions in Academy's growth from the Prime Minister of India on 6th October, 2006; National Senior Women Bioscientist Award, and Padma Bhushan by Govt. of India in 2007. Recently she received Archana Sharma Memorial Award of NASI, Allahabad. From Purdue University, Indiana, USA she received an Honorary Doctorate in Science in May 2012; and Honorary Doctorate from Orissa University of Agriculture & Technology in December 2011. Presently she is holding the distinguished women scientist Chair of NASI.

Dr. Manju Sharma has left her mark as a researcher, science promoter and manager in all the areas she dealt with and the positions she occupied. She has dedicated over the 30 years to the promotion and application of science with the deepest commitment and outstanding performance. After superannuation, she is devoting all her time through professional organizations and academies for spreading the message of science for the younger students, scientists and in particular women, for which she received tremendous respect and affection. She has made very valuable and laudable contributions towards national development through her dedication, hard work, sustained efforts, far-sighted vision and commitment for science and technology and its application for human welfare.

**SHORT BIOGRAPHY OF SPEAKERS**

**Sukhdev Swami Handa**

SS Handa, an alumnus of University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh; Ph.D. from London School of Pharmacy, London(1972-75); Postdoctoral (1979-82) at the Dept. Pharmacology & Pharmacognosy, University of Illinois at the Medical Centre, Chicago,USA; served as Lecturer, Reader, Professor and as Director Indian Institute of Integrative Medicines (IIIM), CSIR. He has been Senior Specialist, "Sustainable Industrial Utilization of Medicinal and Aromatic Plants" (March 2005 – Dec 2008) at the 'United Nations Industrial Development Organization'(UNIDO), International Centre for Science(ICS) & High Technologies, Area Science Park, Trieste, Italy. He has served as a Scientific Adviser at Zandu Pharmaceutical Works, Mumbai (2000 to 2007) and then was on its Board of Directors (2007-2008). Consultant to Emami Group Health Care since 2009 till date & Pharmaceutical Consultant Glaxo Smith Kline(GSK) Asia Pacific since(2010-17). \*Chairman, Ayurvedic Pharmacopoeia of India (2007-12); \*Chairman Pharmacopoeia Commission for Indian Medicines (2010-2013) & Chairman Scientific Body, Pharmacopoeia Commission for Indian Medicines (2010-2017); \*Chairman, Medicinal Plants Task Force(2003-2014) at Department of Biotechnology, Ministry of Science & Technology, Govt of India; Continues since 2001 to be the\*Chairman Scientific Advisory Group, Task Force & Technical Review Committees of Medicinal Plants Division of Indian Council of Medical Research, New Delhi. Prof Handa is a recipient of 'Ranbaxy Research Award (1997) in Pharmaceutical Sciences; 'IDMA – APA Eminent Pharmaceutical Analyst Award (2002); Dr.K.M.Parikh IASTAM Award (2003); Life time award of Excellence in Pharmacognosy & Phytochemistry (2010) by the Society of Pharmacognosy; Schroff Memorial National Award 2011 for his outstanding contributions as scientist & expert on medicinal plants; Bisheswar Saha Memorial Award (2014) Society for Ethnopharmacology. Elected Fellow of National Academy of Indian Medicines (1989) and also Elected Fellow of the National Academy of Sciences, India (1993). Prof. Handa is the Chairman of the India-USP Expert Panel (since 2007), Expert Committee (BDS) member of the United States Pharmacopoeia & also continues to be Member of the Expert Advisory Group (EAG) of the Herbal & Complimentary Medicines of the British Pharmacopoeia Commission.



**Ram Vishwakarma**

Dr. Ram Vishwakarma is Director of Indian Institute of Integrative Medicine Jammu. Prior to joining IIIM, he worked (2005-2009) as Vice-President at Piramal Life Sciences, Mumbai on NCE discovery on cancer, inflammation and drug-resistant infections. Prior to that, he was a staff-scientist at NII, New Delhi working on chemical-biology of GPI anchors. He did his Ph.D. from CDRI, Lucknow and post-doctoral work from University of Cambridge on biosynthesis of Vitamin B12. He has expertise in new drug discovery, medicinal chemistry, organic synthesis, chemical biology and glycobiology, and has over 200 publications and 35 patents. He is an elected fellow of the National Academy of Sciences and was awarded Sun Pharma (Ranbaxy) Research Award (2014) in the Pharmaceutical Sciences.



### **Prof. Arunabha Ray**

Prof. Arunabha Ray, MD, Ph.D., FAMS is Director, Vallabhbhai Patel Chest Institute, University of Delhi. He is also Director-Professor and Head, Department of Pharmacology at Vallabhbhai Patel Chest Institute. In addition, Prof. Ray is Dean, Faculty of Medical Sciences, University of Delhi. He is also member of Executive Council and Academic Council of the University of Delhi. Prof. Ray is a medical graduate (MBBS) from the Calcutta University, with MD and PhD degrees in Pharmacology from the Faculty of Medicine, University of Delhi, with valuable postdoctoral training/experience in the Canada and USA.



He has more than 38 years of teaching and research experience in basic and clinical pharmacology at undergraduate (MBBS) and postgraduate levels, and is actively involved in the teaching and supervising biomedical research activities. In view of his expertise in his area of research, he has been globally recognized and invited to several national/international conferences to speak and/or chair sessions and universities/organizations as visiting scientist/guest speaker. He is expert member/chairperson at several academic/research committees at organizations like ICMR, DST, DBT, AYUSH, DRDO, CDSCO etc. as well as reputed medical institutions/universities in the country and abroad. As recognition for his contributions in the area of medical education and biomedical research, he has been the recipient of several awards and honors from apex scientific and professional bodies, viz. Achari Prize, Uvnas Prize, Young Asian Pharmacologist Prize, Prof. BN Ghosh Oration Award, Prof. SB Pandey Oration Award, and Prof. NS Dhalla Oration Award. He has contributed actively to several professional organizations/societies eg. IUPHAR, International Academy of Cardiovascular Sciences (IACS), Indian Pharmacological Society, Society of Pharmacovigilance (India), Indian Immunological Society, Society of Toxicology (India), He is Founder-President of Delhi Pharmacological Society and Founder-Secretary of Society for Nitric Oxide and Allied Radicals (SNOAR). In view of his contributions in the field of medical/biomedical teaching and research, Prof. Ray was elected Fellow of the National Academy of Medical Sciences (FAMS, 2005), Fellow of the Indian Pharmacological Society (FIPS, 2007) and Fellow of the International Academy of Cardiovascular Sciences (IACS, Canada, 2016). He has more than 200 publications, is author of several text and reference book chapters, is editor of 04 books in his areas of expertise, and author of a Textbook in Pharmacology.

### **Kartikeya Baldwa**

Kartikeya Baldwa is the C.E.O at Ixoreal Biomed, the maker of KSM-66, the highest concentration full-spectrum root extract of ashwagandha available today. Ixoreal is part of the "Baldwa Group", a consortium of companies diversified into logistics, chemicals, power, textiles, real-estate, agriculture and jewelry, with \$350 million in annual revenue. Mr. Baldwa spearheaded the development of KSM-66, all the way from assembling the initial team of scientists, to the acquisition of farms and capital infrastructure and to market launch and product validation by regulatory bodies. KSM-



66 Ashwagandha is the best-selling ashwagandha on the world market today and has more than 40% of the global market share in ashwagandha extracts. Today, KSM-66 is a multi-million dollar product and appears in more than 500 finished products of major dietary supplement companies across the globe. It has

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#### 4th Convention: Society for Ethnopharmacology, India, 2017

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brought Ayurveda to a wider global recognition. Mr. Baldwa has made ashwagandha widely visible and has it beyond capsules and tablets into foods and beverages and other delivery mechanisms. He worked in the Information Technology practice for a year at Deloitte Consulting before starting Ixoreal. Mr. Baldwa studied chemical engineering at Osmania University in India and then business management at the Graduate School of Business at Stanford University in California. He has also attended advanced management programs at Indian School of Business in Hyderabad and Anderson Business School in Los Angeles. He stands 32 year old today and is the recipient of "Young Entrepreneur Award 2015" by iCOVE.

#### **Bhushan Patwardhan**

Professor Bhushan Patwardhan brings over 30 year experience in research and development in the area of evidence based Ayurveda, ethnopharmacology, drug discovery & development and integrative medicine. He is a Fellow of National Academy of Sciences (India) and National Academy of Medical Sciences (India). He worked as academic head of Manipal Education Group; Director, Institute of Ayurveda and Integrative Medicine, Bengaluru; Vice Chancellor, Deemed University in Pune, and visiting Professor at Indian Institute of Advanced Studies, Shimla. He has worked on Boards of several Universities and member of important national committees of the University Grants Commission, Council for Scientific & Industrial Research, Department of Science & Technology, Department of Biotechnology, and Indian Council of Medical research. He has worked on several policy making bodies and also has worked on Taskforces of National Knowledge Commission, Planning Commission, and Ministry of AYUSH. He was invited as temporary consultant to the World Health Organization Geneva. He is recipient of many orations, awards has delivered invited lectures at many national and international His recent scholarly books 'Integrative Approaches for Health' and 'Innovative Approaches to Drug Discovery' both published by Academic Press Elsevier have received excellent reviews. He has guided 19 PhD students, 8 Indian Patents, 2 US Patents and over 120 research publications with Scholar h-Index 40 and over 6041 citations.



#### **Mohd. Aslam**

Dr. Mohd. Aslam is M.Sc., M. Phil. and Ph.D. in Botany and currently working as Advisor (Scientist 'G') in the Department of Biotechnology (DBT). He is involved in planning, coordination and monitoring of various R&D programmes in the areas of Bioresources, Plant and Environmental Biotechnology. Currently, he is spearheading the Division of Terrestrial Ecosystem and Environmental Biotechnology and handling programmes such as Value-added Biomass and Products from Natural Sources, Translational Research in Products and Processed from Medicinal & Aromatic Plants, Technology Development in Silk and Environmental Biotechnology. He is also working as the nodal officer in DBT for two institutions – Institute of Bioresources and Sustainable Development (IBSD), Imphal, Manipur and International Centre for Genetic Engineering and Biotechnology (ICGEB), New Delhi and



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**4th Convention: Society for Ethnopharmacology, India, 2017**

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also for Biotech Industry and Research Assistance Council (BIRAC), New Delhi. He is Director in BIRAC and Indian Vaccine Corporation Ltd (IVCOL).

**P. Manivel**

Dr P. Manivel, Principal Scientist (Plant Breeding) & Director (Acting), ICAR-Directorate of Medicinal and Aromatic Plants Research, Anand has more than 25 years research experience. He has associated in development of 10 high yielding varieties/hybrids including the first-ever indigenous French fry potato variety (KufriFrisona) and the first processing potato variety (Kufri Himsona) exclusively for higher hills in India, besides the first castor hybrid (TMVCH-1) for Tamil Nadu. The cultivation of his processing potato varieties Kufri Chipsona-3 in north Indian plains and Kufri Himsoa in higher hills has helped in sustaining the continuous supply of potato to processing industries in India. Besides, he has associated in development of more than 18 valuable genetic stocks/mutants (14 has been resisted with NBPGR, New Delhi) in potato, groundnut and medicinal plants. The two groundnut varieties, viz., Girnar 2 and Girnar 3 developed by his team have significantly contributed to increased groundnut production in our country. First time in isabgol he has developed three high yielding varieties (Vallabh Isabgol-1, Vallabh Isabgol-2, Vallabh Isabgol-3) with distinct marker characters. He has developed simple screening techniques for tolerance to drought and iron deficiency chlorosis in groundnut, besides DUS guidelines for groundnut. Further, his contribution in adding knowledge to basic science in the field of genetics of different quantitative and qualitative traits, physiology of drought tolerance and reproductive biology of groundnut/potato are worth mentioning. His team has been awarded two J.P.A. Gold medals for the best research paper. Attended more than 16 trainings and 25 conferences/ symposium at national and international level and bagged many best poster awards. He also backed few awards like the best citizen of award from International Publishing House and the Best Scientist award from PEARL foundation. He is life member of more than 15 scientific societies and academies and published more than 250 publications which include research articles, proceedings papers, book chapters, bulletins, popular article, abstract, etc. He is Fellow of the National Academy of Biological Sciences, Indian Society of Genetics and Plant Breeding and Member fellow of National Academy of Sciences, India.

**Neelam Singh Sangwan**

Dr Sangwan was born in Lucknow (U.P.), India on 2 January 1966. Educated at SSV School, Pioneer Montessori School, Lucknow, 1969-74; NKV Degree College, 1975-81; University of Lucknow; 1985; CSIR-Central Institute of Medicinal and Aromatic Plants (CIMAP), 1985-89; B.Sc 1983; M.Sc, 1985; Ph.D 1989. Senior Scientist (F), Central Institute of Medicinal and Aromatic Plants (CIMAP-CSIR), Lucknow 2009 to date. Scientist B, CSIR-Complex, Palampur (Now Institute of Himalayan Bioresource Technology, Palampur) 1989-91; Scientist-B, 1991-94, Scientist-C, 1994-99, Scientist E-I, 1999-2004, and Scientist E-II, 2004-09, CSIR-CIMAP, Lucknow. Visiting Scientist at The Samuel Roberts Noble Foundation,



————— **4th Convention: Society for Ethnopharmacology, India, 2017** —————

Oklahoma, USA, 2005-2006; INSA-Royal Society Visiting Scientist at John Innes Centre, Norwich, UK, 2000. She is awarded Dr. K.S. Krishnan Fellowship, Dept. of Atomic Energy, 1988; INSA Young Scientist Medal 1994; DST-BOYSCAST Fellowship; ISCA Prof Hiralal Chakravorty Award, 2007; CSIR-Technology Award in Life Sciences-2015; Women Leader In Crop Science and Agriculture- Member Delegation under Newton-Bhabha programme, Cambridge University, Cambridge, UK, 2016. Her research interest includes Plant Biochemistry, Biotechnology and genomics, Secondary metabolism in medicinal and aromatic plant, Plant Metabolomics; Phytopharmaceuticals, Ashwagandha Biology, chemotype development.

**Mr. Ritesh Oza**

Mr. Ritesh Oza is Product Specialist at BUCHI India Pvt Ltd. BUCHI is a leading worldwide supplier in analytical solutions for natural products research like Evaporation, Purification and Extraction. He provides strategic support in technical and marketing projects for customers in existing markets along with the development of new market sub-segments. He holds an MSc in Bioanalytical Sciences from Mumbai University.



**Sathiyarayanan L**

Dr. Sathiyarayanan is Head, Centre for food testing laboratory and an Associate professor in Pharmaceutical Chemistry, at Bharati Vidyapeeth Deemed University, Poona College of Pharmacy, Pune, Maharashtra, India. He graduated from The Tamilnadu Dr MGR Medical University Chennai, Tamilnadu, and completed PhD from Bharati Vidyapeeth Deemed University, Pune, India. He has published over 60 research papers in peer reviewed international journals and national journals and presented around 50 papers in various conferences. His areas of research interest include Pharmaceutical Analysis, bio analysis, herbal drug standardization techniques, herb-drug interactions and Phytoformulations. He received the prestigious 'Career award for young teacher' from the All India Council of Technical Education, New Delhi, India, a statutory body of government of India for his research project, The Best Researcher Award 2013 from Bharati Vidyapeeth Deemed University for the year 2013, Dr. P.D sethi award of merit two times in the year 2011 and 2012. His international visits include Switzerland, UK, Germany and Greece for research collaboration with renowned universities. He is in editorial board of some journals including Pharm.Methods, and worked in pharmcog reviews and pharmacogmag editorial team. He is the reviewer for several international journals and national journals. He is the member, Board of study and Faculty of Pharmacy, Bharati Vidyapeeth Deemed University, Life member - Association of Pharmacy Teachers of India, Indian Pharmaceutical Association, member and Co-ordinator for Society of Ethnopharmacology India-Pune Chapter. He is the council member of IPA Pune branch. He delivered more than 35 invited lectures in various programs including international & national conferences, AICTE Quality Improvement Programme for teachers, national level seminars, patient counseling programme for pharmacists and personality development programs in various institutions. He is the In-charge for the FDA-Maharashtra approved PCP- Public Testing Laboratory, through which he provide consultancy to industries in and around Pune. He has chaired sessions at International conferences and he was co-chairman of scientific



————— **4th Convention: Society for Ethnopharmacology, India, 2017** —————

committee for 19<sup>th</sup> Annual national convention of Association of Pharmaceutical Teachers of India (APTI) held at Pune, Maharashtra.

**Md. Abdur Rashid**

Dr. Md. Abdur Rashid is a Fellow of RSC. He obtained B. Pharm. (Hons.) and M. Pharm. degrees from University of Dhaka, in 1981 and 1982 securing the first class 1st position. He received Ph.D. from University of Strathclyde, U.K. in 1992. Dr. Rashid worked at the US-NCI from 1993-1995 and 1997-2011. He served as the Dean of the Faculty of Pharmacy, University of Dhaka, General Secretary of Bangladesh Pharmaceutical Society and member of Pharmacy Council of Bangladesh. He published over 390 research papers and 10 books including the “Fundamentals of Pharmacy and Pharmacy Practices”. According to Google Scholars, he has 4430 citations (h-index 32, i10-index 129). Currently he is a member of ASP, PSE, ISE and SFE, India. Dr. Rashid is the recipient of several awards and prestigious gold medals. He delivered invited, key note and plenary lectures and chaired sessions in many national and international seminars and conferences.



**Dr. D. Chamundeeswari**

Graduated in 1988 having 24 years of teaching experience, awarded Young Scientist from DST, in 2007, Outstanding contribution award, Society for Ethnopharmacology, India chapter, Kolkata in 2014 and Dr. Sergio G. Litewka Gold medal for filing patent from Sri Ramachandra University in 2015. So far published 76 papers in reputed journals and obtained funds from DST, LSRB, DRDO, AYUSH New Delhi. Served as resource person in various national level conferences and seminars. As coordinator, Chennai chapter of Society for Ethnopharmacology and coordinator, POWER from Tamil Nadu, member of Peer team, NNC, Bengaluru and Chairperson, Board of Studies (Pharmacy) and Pharmacy Education Unit, SRU. Organised various conferences at national and international level and a member of FICS, APTI, IHPA and IACP. Trainer Associate and Master trainer for UGC sponsored workshop for the module “Women and Research” in Capacity Building for women Managers in Higher Education.



**Dr. Prakash Itankar**

Dr. Prakash Itankar is working as a professor at the Department of Pharmaceutical Sciences, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur. He did his PhD and M Pharm from Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur. He has near about 7 years of industrial and 13 years of teaching experiences. Dr. Itankar has published 29 research articles in national and international esteemed journals, one patent and one book. He guided 2 PhD students and 37 M. Pharm students. He has presented scientific papers in different national and international conferences. He appointed as a reviewer



————— **4th Convention: Society for Ethnopharmacology, India, 2017** —————

in different renowned national and international journals. Still in his career he has organized 21 conferences/seminars/symposiums. He is member of different national and international reputed societies.

**G. Hariramamurthi**

Prof. G. Hariramamurthi is a Program Advisor in School of Health Sciences, Institute of Trans Disciplinary Health Sciences and Technology; Trans Disciplinary University has been working since 1995 with Foundation for Revitalization of Local Health Traditions (FRLHT), Bangalore. He has been responsible for establishment of a pioneering nationwide network of folk health practitioners associations across 18 States. He has also led a team responsible for design and development of a nationwide Home Herbal Garden Programme resulting in establishment of more than 210,000 Home Herbal Gardens across more than 10,100 villages across 7 selected Indian states. He has earlier worked in HMT (International) Limited (From Jun. 1979 to Dec. 1993) in various capacities namely Manager-Administration, Deputy Manager-Coordination, Marketing Planning, Marketing Promotion, Senior French Translator and Translator. He has participated in a number of International Conferences and presented papers.



**ABSTRACT OF SPEAKERS**

**Contribution of CSIR-Indian Institute of Integrative Medicines in *Withania somnifera***

**Ram Vishwakarma\***

\* Work has been contributed by various researchers at CSIR-IIIM, Jammu  
CSIR-Indian Institute of Integrative Medicines, Canal Road, Jammu Tawi-18001, India

Over the last two decades, *Withania somnifera* has been one of the prioritised plants at CSIR-IIIM, Jammu. A strong genetic resource base with well-defined morphological, chemical and molecular markers has been established. This resource was exploited to breed elite varieties by manipulating its versatile sexual system of mixed mating. Concurrently, these activities were supplemented with preclinical pharmacological studies and isolation and characterization of chemical reference standards. These efforts paved way for the development of health promoting formulations using *Withania somnifera* as a platform. Additionally, comprehensive investigations have also been carried out related to various strategic pathway genes, promoters and elicitors in corroboration with metabolite production and substrate pool diversion for enhanced withanolide yields. Molecular deciphering of various components in relation to homologous and heterologous pathway modulations involving *Agrobacterium* mediated transformations has also been successfully developed to understand the regulatory aspects of withanolide biosynthesis. Currently, identification of transporter gene families is being mined to unravel their role in withanolide transport. All these aspects and some critical questions with specific action points will be covered during the forthcoming conference.

**“Ashwagandha”-Promising Potential for Drug Development through Phytopharmaceutical Route**

**S.S.Handa**

Former Director, CSIR-Indian Institute of Integrative Medicines, Canal Road, Jammu Tawi-18001, India

The Government of India has issued 8th amendment to Drugs & Cosmetics Rules to insert a category of new drugs titled “Phytopharmaceutical drugs”. This amendment came into effect from 30th November, 2015. In rule 2 of the Drugs and Cosmetics Rules, 1945 (hereinafter referred to as the said rules), after clause (ea) the following clause inserted: • (eb)“Phytopharmaceutical drug” includes purified and standardized fraction with defined minimum four bio-active or phyto-chemical compounds (qualitatively and quantitatively assessed) of an extract of a medicinal plant or its part, for internal or external use of human beings or animals for diagnosis, treatment, mitigation or prevention of any disease or disorder but does not include administration by parenteral route.’ In rule 122-E of the said rules, in clause (a), after the words “bulk drugs substance”, the words “or phytopharmaceutical drug” inserted. In Schedule Y of the said rules, after APPENDIX IA, the Appendix 1B has been incorporated. Ashwagandha represent roots of *Withania somnifera* (Linn.) Dunal (family Solanaceae) has a long history of use in traditional medicine particularly Ayurveda as per Charak-Samhita/ Sushruta-Samhita (1000 BC), Kashyapa-Samhita (600AD), Charakadatta (1100AD) & others as nootropic (Medhya Rasayan), Immunomodulator (Rasayana), as adaptogen and in neurological diseases, insomnia, cardiac disorders, abdominal diseases & others. Ayurvedic Pharmacopoeia of India (API 1990) mentions use of root powder in 3-6 g dose in oedema (Sotha), tuberculosis (Kwya), general debility (Klaibya) & its inclusion in. Most of the therapeutic activities mentioned in classical scriptures have been experimentally validated along with the bioactive constituents responsible-

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#### 4th Convention: Society for Ethnopharmacology, India, 2017

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nearly 35 withanolides occurring as C28-steroidal lactone having four cycloalkane ring structures, three cyclohexane rings and one cyclopentane ring; several sitoindosides & withanosides, 12 alkaloids etc. Withanolides from *Ashwagandha* have been found to possess very interesting pharmacological activities in vitro & in vivo, especially anti-tumour (antimitotic), anticancer, neuroprotective, antihypertensive, anti-stress, anti-obesity & in neurological disorders. Withanamides from *Withania somnifera* with promising effect in Alzheimer (AD)/dementia are the latest highlights. Current chemotherapy in AD includes cholinesterase inhibitors (Donepezil) & NMDA antagonist (Mamantine) which provide only symptomatic relief. Withanolide A(WA), Withanoside IV(WS IV), Withanoside VI (WS VI) renovated pre-synapses & post-synapses, after A beta (25-35) injury in mice on oral administration of (WA),(WS IV) & (WS VI) 10uM/kg/d for 12 days. Withanamide A & C were found to shield neuronal cells from beta-amyloid induced cell damage; withanamides also prevent fibril formation. There is an urgent need to take such studies forward to clinical evaluation using purified fraction of withanoside & withanamide of the active material in AD and dementia. Preliminary clinical trials undertaken with *Ashwagandha* crude extract exhibited beneficial effects in osteoarthritis, chronic stress, insomnia and this needs serious phyto-chemical inputs to take these forward through Phytopharmaceutical route. Present presentations will include parameters of Phytopharmaceutical route of drug development.

#### Global Potential of Ashwagandha

##### Kartikeya Baldwa

C.E.O at Ixoreal Biomed, Hydrabad

*Ashwagandha* has grown very rapidly across the globe over the last three years. The increase in interest in *ashwagandha* can be attributed primarily to an increase in awareness. Once a formulator or a manufacturer is made aware of *ashwagandha*, the herb almost sells itself because of its compelling set of benefits. Also driving global demand is the recent availability of clinical data and high-quality suppliers. This talk will describe some of the benefits of *ashwagandha* that have global appeal and present some macro market figures. This talk will also describe the infrastructure development, basic clinical research, regulatory compliance and marketing, using KSM-66 *Ashwagandha* as a case study. KSM-66 is the best selling branded *ashwagandha* root extract on the global market. One important lesson learned from the experiences of Indian Ayurveda companies selling abroad is that beyond offering science, sourcing and manufacturing, it is important to communicate these value propositions in a manner that is appealing to those on the global stage. The KSM-66 team worked very hard to develop a documentary video that achieves this. This documentary, excerpts from which will be shown during the presentation, has been received very well by the U.S. media and elsewhere.

#### Newer insights into the adaptogenic effects of *Withania somnifera* : possible role for nitric oxide

##### Arunabha Ray and Kavita Gulati

Department of Pharmacology, Vallabhshai Patel Chest Institute, University of Delhi, Delhi-110 007

Stress and stress-related disorders are a major cause of morbidity and mortality worldwide. Adaptogens are agents of herbal origin derived from medicinal plant sources which help to cope with and attenuate such stress effects. A variety of medicinal plants with adaptogenic potential are known to protect against the deleterious effects of stress and its effects on the biological system by bolstering immunity, altering brain neurochemistry, reducing oxidant damage and preventing ageing, By acting as adjuvants, they could

actually help in positively modifying the course or pattern of stress related disorders, and their ability to assist the body to resist damaging effects of stress and restore normal physiological milieu are crucial to their beneficial effects. *Withania somnifera* is a classical medicinal plant widely used in Indian traditional systems of medicine with adaptogenic properties whose roots and aerial parts have been effectively used. Nitric oxide (NO) is a multifaceted molecule with a wide array of physiological effects. Our earlier studies unequivocally demonstrated an important role for NO during stress and stress-related disorders. Herb-drug interactions are an important area of ethnopharmacological research and interactions between traditional and modern medicinal concepts are being critically evaluated. The present study thus investigated the possible role of NO in the anti-stress effects of WS extract in rats. Restraint stress (RS) was used as the experimental stressor and the effects of WS pretreatment and its interactions with NO were assessed on stress-induced neurobehavioral, immunological and cellular/molecular markers. Chronic RS induced anxiogenic responses in the elevated plus maze test with open arm entries and time being markedly reduced after RS. WS treatment prior to RS attenuated this response. Pretreatment with the NO synthase inhibitor, 7-nitroindazole, blocked the anti-anxiety effects of WS, whereas, sub-effective doses of NO mimetic (L-arginine) and WS potentiated such anxiolysis. WS treatment was also associated with elevations in NOx (stable NO metabolites) and reductions in MDA and ADMA levels in brain homogenates. In rats immunized with KLH, RS induced suppressions in both humoral and cell mediated immune responses, which were attenuated by WS treatment. Stress induced elevations in levels of pro-inflammatory cytokines (TNF- $\alpha$  and IL-6) and reductions in IL-4 and IFN- $\gamma$  levels were also differentially affected by WS pretreatment. These immunological changes were accompanied by elevations in plasma MDA and ADMA and lowered NOx levels. These immunological and biochemical changes seen after WS were reversed after L-NAME pretreatment, whereas, L-arginine potentiated the stress ameliorating effects of WS. Molecular studies showed that NOS gene expression in brain and blood were complexly affected by RS and NO modulators induced significant alterations in all three forms of NOS. These results suggest that NO mediated signaling mechanisms may be involved in the adaptogenic effects of WS and highlights the significance of herb-drug interactions during stress.

#### **Ashwagandha: A Future Global Blockbuster Drug from Ayurveda?**

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Ethnopharmacology route is considered as an attractive proposition for new drugs and dietary supplements. Currently, the focus of new drug discovery is shifting from addressing single target to modulating multiple targets. Natural products provide an array of bioactives with diversity of structures and activities. While many potential bioactive candidates from botanical sources are known, very few like artemisinin have emerged as pharmaceutical global blockbusters. Ginseng represents a global success story that shows how high quality scientific research and systematic marketing can make a global blockbuster. Out of about 2 billion USD global market Korean ginseng share is about 1.2 billion USD. Most of the ginseng market is for dietary supplements. Indian Ashwagandha may be considered as a potential blockbuster. Ashwagandha is extensively used in Ayurveda as Rasayana. Our work indicates that therapeutically Ashwagandha may be better than Ginseng especially because of antiinflammatory activity in

addition adaptogenic and immunomodulatory activities. Ashwagandha can be used as therapeutic adjuvant in immunocompromised conditions. Network pharmacology studies on Ashwagandha have indicated its promise in diseases like cancer and Alzheimer's disease. Recent studies have also indicated role of Ashwagandha in management of metabolic disorders including diabetes and obesity. We feel that Ashwagandha can be developed as a future blockbuster drug from Ayurveda. We need strategic concerted efforts as national mission involving top scientists, research institutes and industries.

#### **Chemical and Biological Studies of *Nicotiana plumbaginifolia* (Solanaceae)**

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*Nicotiana plumbaginifolia* Viv. is an annual herb belonging to the family Solanaceae, which grows abundantly in the weedy lands of Bangladesh. This plant possesses analgesic, antibacterial, anti-anxiety and hepatoprotective properties, and produces various phenolic compounds including flavonoids. The present study afforded determination of total phenolic and flavonoid contents, and for the first time, Extensive separation and purification of the methanolic leaf extract of *N. plumbaginifolia* led to the isolation and characterization of highly oxygenated flavonoids, e.g., 3,3',5,6,7,8-hexamethoxy-4',5'-methylenedioxyflavone (**1**), 3,3',4',5',5,6,7,8-octamethoxyflavone (**2**, exoticin), 6,7,4',5'-dimethylenedioxy-3,5,3'-trimethoxyflavone (**3**) and (3,3',4',5,5',8-hexamethoxy-6,7-methylenedioxyflavone (**4**) from the leaves of *N. plumbaginifolia*. All these flavonoids are rather rare natural products, and only found in a few genera, e.g., *Polygonum* and *Murraya*. The structures of the isolated flavonoids were elucidated by comprehensive spectroscopic analyses, e.g., UV, <sup>1</sup>H, <sup>13</sup>C NMR, DEPT, HSQC, HMBC and MS. The present study further allowed us for the first time to determine the total phenolic and flavonoid contents as well as anti-nociceptive activity of the crude extract. The total phenolic and flavonoid content were determined using Folin–Ciocalteu's reagent and aluminum chloride, respectively. The total flavonoid content was determined as 439.69 ± 0.87 mg<sub>QE</sub> /g<sub>extract</sub> which was relatively higher than measured total phenolic content (275.45 ± 2.75 mg<sub>GAE</sub> /g<sub>extract</sub>). On the other hand, the antinociceptive activity was assessed using acetic-acid induced writhing, hot plate, tail immersion, formalin and carrageenan-induced paw edema test, where the extract demonstrated significant antinociceptive activity.

#### **Improvement of Ashwagandha (*Withania somnifera* Dunal) in India: Present and future**

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Ashwagandha (*Withania somnifera* L Dunal; Solanaceae) is an important medicinal plant of India. It is widely used as an antioxidant, adaptogen, aphrodisiac, liver tonic, anti-inflammatory agent, astringent and more recently to treat ulcers, bacterial infection, venom toxins and cancer. The medicinal properties are due production of alkaloids such as withanolides, steroidal lactones and others. It is extensively cultivated due to demand of dry roots and leaves in local and international demand. Genetic improvement of ashwagandha for root yield and quality traits facilitates cultivation and quality production. Earlier, wild collections were used for cultivation. Systematic improvement was started later 1969 with the inception of All India Coordinated Project on Medicinal and Aromatic Plants (AICRPMAP). As a first step, germplasm collection was made across India and now more than 664 accessions were collected and maintained at different AICRP-MAP&B centers having wide genetic variability for morphological, biochemical, molecular

and secondary metabolite characters. The information on reproductive biology, breeding behavior, genetics of qualitative and quantitative traits, artificial hybridization methods, pure line breeding, development of DUS guidelines, in vitro culture of roots, tissue culture, transgenic studies, screening methods for disease and pest resistance is available. Breeding programmes at various centres under aegis of ICAR and CSIR have resulted in release of few promising varieties for commercial cultivation. The yield potential of these varieties ranged from 450-1000 kg/ha with alkaloid ranging from 0.25-0.50%. Four varieties viz., JA-20, JA-134, RAV-100 and GAA-1 were released for commercial cultivation in India through AICRPMAP & B project. The other varieties available for cultivation are Rakshita and Poshitha were developed from CSIR-CIMAP. ICAR-DMAPR has developed many pure lines with distinct characters viz., dwarf (< 30 cm, DWS 327), procumbent (DWS 6, DWS 217), male sterile (DWS 10), non-wavy leaf margin (DWS 12), yellowish leaves (DWS 16), compact plant with less fibrous root (DWS 23), downward curling leaves (DWS 37), triangular shape leaves (DWS 61), creamy colour berry (DWS 65), non-wavy and elongated leaves (DWS 69), broad leaves (DWS 110), big flowers (DWS 112), more hairs (DWS 114), open calyx (DWS 117), yellow colour young leaves (DWS 127), red berry, non-wavy leaves, tall and leaf margin entire (DWS 131), more wavy leaves (DWS 195), profuse branches (DWS 207), and long leaves (DWS 268). Plant tissue culture protocols have been standardized; molecular markers (RAPD, RFLP, AFLP and SSR) have also been reported in *Withania* and used for study the genetic diversity in the species. The future breeding should aim for development of chemotypes, location specific varieties, development high yielding, short duration varieties with good quality roots and drought resistance through artificial hybridization between selected parents and also through modern biotechnological tools.

#### **Understanding and profiling of ashwagandha (*Withania somnifera*) towards development of withanolide rich crop for pharmacological actions**

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Ashwagandha is one of the most reputed and acclaimed medicinal plant extensively used for various health related issues. The plant is reported to be in use since past more than 2000 years and currently more than 200 medicinal preparations use ashwagandha as one of the major ingredient. Various pharmacological actions are associated with ashwagandha such as anti-stress, immunomodulatory, nervine tonic, arthritis, insomnia, adaptogen, immunity etc. Most of the studies are of traditional belief and scientific validation of these are pre-requisite for application in modern medicine. Ashwagandha is known for occurrence of withanolides, which are unique structures of triterpenoidal ancestry. The major withanolides of the plant are withaferin A, withanolide D, withanone and withanolide A. There exist interesting diversity of these molecules in chemotypic as well as on tissue specific basis. In our efforts towards understanding ashwagandha biology in systematic, integrated and scientific manner, we initiated defining of plant by biochemical, metabolomic and genomics studies. Our studies revealed interesting pattern of co-relation of metabolites, transcriptomic data and genomics and the role of phytochemicals in pharmacological actions. Studies have shown that the individual molecules are specific for pharmacological actions and dedicated efforts are needed to establish the optimized extract for maximal health benefits. On one hand, novel and characterized ashwagandha varieties are needed for national use and on the other extract/molecules for preparation of drug are necessitated for each pharmacological property of the plant.

**Ancestral Food for Diabetes mellitus- Freedom from medicines**

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The present modern lifestyle of human being is a matter of debate considering the increased disease conditions. This necessitates the discovery of newer drugs and treatment strategies. However the side effects of the drugs are greater challenge and people always look for alternate therapies for treatment of various ailments. Traditional medicinal knowledge has been highly used in many places in India. Lack of scientific validation is a major hurdle for such practices to become popular. Most of the food materials such as turmeric, pepper, garlic etc have potent medicinal properties and such foods are traditionally used in regular food thus beneficial for healthy life. Our ancestral food habits and life style still have potency to cure or prevent diseases. There was no fast food culture or modern recipes those days when our ancestors lived and lead a healthy life. The diet of our ancestors consisted of high protein and fat rather than carbohydrates. The low carbs high fat diet causes many benefits especially for diabetes and obese patients. Such practices can be brought into limelight through scientific validation.

**Different aspects on development of Ethnopharmacology- Indian Perspective**

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Biodiversity of natural resources has served not only for the primary human needs but also for health care, since time immemorial. The Indian subcontinent, with the history of one of the oldest civilization, harbors many traditional health care systems. Plants with ethno pharmacological uses have been the primary sources of medicines. Herbal drugs are best suited for primary health care and infectious diseases like AIDS and other viral infections, MDR infections (e.g. T.B., Malaria), degenerative and gerontological conditions such as osteoporosis, chronic arthritis, neurological like Alzheimer, Parkinsonism, Anti-aging, metabolic disorders like diabetes, dyslipidemias, besides liver diseases, immunostimulants, anti-cancer. Drug discovery from plants involves a multidisciplinary approach combining botanical, ethnobotanical, phyto-chemical and biological techniques. Strategic options based on natural product drug discovery, ethno pharmacology and traditional medicines are re-emerging to offer good base as an attractive discovery engine. The development of these traditional systems of medicines with the perspectives of safety, efficacy and quality will help not only to preserve this traditional heritage but also to rationalize the use of natural products in the health care. Three pillars of ideal herbal drug and their rational use is Quality, safety and Efficacy. Hence Standardization & Quality Evaluation of Herbal drugs are much essential apart from Good Agricultural Practices (GAP), Good Collection/Harvesting and Post-Harvest Handling Practices (GCP/ GHP & GPHP), Good Laboratory Practices (GLP), Good Clinical Practices (GCP), Good Manufacturing Practices (GMP), Good Marketing Techniques (GMT). Reverse Pharmacology utilizes new technique, such as High Throughput Screening, virtual screening and a knowledge database containing the traditional uses of plants. Integrating Pharmacognosy and reverse Pharmacology in the research may provide an efficient and rapid tool for natural drug discovery. Some of the methods that can be adopted are Random selection followed by chemical screening, Random selection followed by one or more biologic assays, Follow-up of biologic activity reports, Follow-up of ethnomedical (traditional medicine) uses of plants, Literature from latin binomials, Ethnomedical information from various databases such as TKDL,

————— **4th Convention: Society for Ethnopharmacology, India, 2017** —————

NAPRALERT etc. In order to bring about 'fast tract herbal drug discovery of international marketability' the following multi-dimensional efforts need to be taken collectively by the governments at the centre and the state, Pharmaceutical industries, academic institutions and mainly the basic/clinical scientists adopting translational approaches. Best of industry-academia partnerships should be facilitated by governments as Public-Private Partnership (PPP) models.

**Pressurized Solvent Extraction - Medicinal Plants and Natural Products**

**Mr. Ritesh Oza**

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Pressurized Solvent Extraction (PSE) is a modern extraction method that has been developed as an alternative to traditional methods such as Soxhlet or maceration; it offers advantages with respect to extraction time and solvent consumption. BUCHI's SpeedExtractor enables the simultaneous extraction of six samples with maximum reproducibility and low solvent usage. Polyphenols and active compounds were extracted from Edelweiss, St. John's Wort and Thyme. The results obtained with the SpeedExtractor are in accordance with the results obtained using reference methods or in the literature.

# ORAL PRESENTATION

4<sup>th</sup> CONVENTION - 2017  
SOCIETY FOR ETHNOPHARMACOLOGY, INDIA

**National Symposium**  
*"Ashwagandha"*  
&  
**Ethnopharmacology Conclave**  
*"Uses of Medicinal Plants by Traditional Healers of India  
- Local Health Tradition"*

**SFE/CONV/17/-02**

**Strategies for *in vitro* production of bioactive molecules from Ashwagandha [*Withania somnifera* (L.) Dunal]**

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The impact of physical vigor as well as supplementation of biotic and abiotic compounds on plant cell, tissue and organ culture, facilitates significant variations in physiology and biochemistry which eventually lead to better germination of seeds and improved secondary metabolic contents in medicinal and aromatic plants (MAPs). In the present study, we have used two medicinally important herbs, *Phyllanthus* species and *Withania somnifera*. *Phyllanthus* species and *Withania somnifera* are valuable medicinal plants which have wide range of diversity and used in different regions of the world for the treatment of human diseases. The nodal, internodal and leaf explants of *Phyllanthus* and *Withania* were excised, surface sterilized and inoculated under aseptic condition onto Murashige and Skoog (MS) fortified with 2,4-D and KIN along with precursors such as cinnamic acid (CA) or phenylalanine (PA), and plant growth regulator (PGR) such as naphthalene acetic acid (NAA) for callus induction from *Phyllanthus*. The leaf and stem explants were excised from seedlings which was developed from He-Ne laser irradiated seeds. The 30 days old calluses from control as well as treatment groups were harvested and HPLC was performed for quantitative analysis for bioactive molecules of *Phyllanthus* species. The treatment with precursors, CA, PA and NAA showed significant enhancement in lignans and antioxidant contents. Furthermore, varied withanolides contents were observed from *Withania* callus cultures as well as from *in vitro* raised plantlets. The standardized protocol will be useful for large scale production of bioactive compounds to meet the demands of pharmaceutical industry. The details on methodology and results will be discussed.

**SFE/CONV/17/-04**

**Metabolic Characterization of *Withania Somnifera* from Different Regions of Pune Using NMR Spectroscopy**

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Ashwagandha or *Withania somnifera* (L.) Dun. (Solanaceae), known as Indian ginseng, is one of the most extensively used medicinal plants in Ayurvedic formulations for a variety of health-promoting effects. Considering the importance of this plant, it is necessary to investigate its holistic metabolite profile. However, with existing analytical methods like HPTLC and HPLC-UV (or MS), it is difficult to obtain information of the whole range of compounds appropriately. In this study, leaves, stems, and roots collected in diverse regions of India were evaluated by <sup>1</sup>H NMR spectroscopy and multivariate data analysis using Principal Component Analysis (PCA) and Hierarchical Clustering Analysis (HCA). An overview of a wide range of metabolites in a sample including amino acids, flavonoids, lipids, organic acids, phenylpropanoids, steroids, and sugars, can be obtained within very short time (less than 10min analysis time). Of the organs analyzed, the leaf exhibited the widest range of metabolites. Additionally, among the metabolites detected by <sup>1</sup>H NMR spectroscopy, the ratio between two major types of withanolides, those containing 4-OH and 5,6-epoxy groups (withaferin A-like steroids) and those containing 5-OH and 6,7-epoxy groups (withanolides A-like steroids), was found to be a marker for discriminating leaf samples.

**SFE/CONV/17-05**

**Pharmacognostical and Phytochemical Standardization of Ayurvedic Crude Drugs**

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The consumption of Ayurvedic medicine and other botanicals in the world has increased in recent years due to huge therapeutic effect and less adverse effects compared to other medicines. There is a global demand for medicines, pharmaceuticals, tonics, cosmetics and other products based on plant materials. Majority of crude drugs are collected without any consideration of quality. In a number of cases the part of the plant is adulterated or even substituted by a different part of the same plant or from a different botanical source. The most important things for consumers about medications are purity, safety, potency, and efficacy. Thereby, standardization and quality control of Ayurvedic crude drugs and raw material are always required. Normally, most of the attention is paid to quality indices including macro and microscopic examination, ash values, moisture content, extractive values, crude fiber, qualitative and quantitative chemical evaluation. World Health Organization (WHO) emphasized including the phytochemical evaluation of crude drug materials for developing standardized quality control profile of herbal medicine. These pharmacognostical and phytochemical standardization gives the quality assured herbal product.

**SFE/CONV/17-06**

**Ashwagandha: an Ayurvedic ethnomedicinal values**

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*Withania somnifera* (Ashwagandha) is very valued herb of the Indian Ayurvedic system of medicine as a Rasayana (rejuvenating). It is used in variety of disease processes and specially as a Nervine tonic. Considering these particulars many scientific studies were carried out and its adaptogenic / anti-stress activities were studied in detail. In experimental models it increases the stamina of rats during swimming stamina test and prevented adrenal gland changes of ascorbic acid and cortisol content produce by swimming stress. Pretreatment with *Withania somnifera* (WS) showed significance protection against stress induced gastric ulcers. It has anti-tumor effect on Chinese Hamster Ovary cell carcinoma. It was also found effective against urethane induced lung-adenoma in mice. In some cases of uterine fibroids, dermatosarcoma, long term treatment with *Withania somnifera* controlled the condition. It has a Cognition Promoting Effect and was useful in children with memory deficit and in old age people loss of memory. It was also found useful in neurodegenerative diseases such as Parkinson's, Huntington's and Alzheimer's diseases. It has GABA mimetic effect and was shown to promote formation of dendrites. It has anxiolytic effect, improves energy levels and mitochondrial health. It is an anti-inflammatory, anti-arthritis agent and was found useful in clinical cases of Rheumatoid and Osteoarthritis. Large scale studies are needed to prove its clinical efficacy in stress related disorders, neuronal disorders and cancers.

**SFE/CONV/17-07**

***In vivo* anti-inflammatory potential of biocompatible membrane containing *Ocimum sanctum* extract**

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*Ocimum sanctum* is one of the most common house hold herb in India. In Indian home, it is given a great religious importance. It is a well-established fact in that in Indian society we respect Tulsi plant because of its numerous medicinal properties. Tulsi plant has been used on daily basis to control the adverse effect of day-to-day illness. In India, two different types of Tulsi plant exists 1) Rama Tulsi, and 2) Shyama Tulsi. These local names were given to Tulsi plant which is simply based on the color of Tulsi plant. Tulsi is commonly known to grow in tropical climate and also found in African continent too. Apart from domesticated form of Tulsi, numerous wild varieties of Tulsi do exist too, which has remained largely unexplored for its medicinal exploitation. Tulsi has been shown to have numerous medicinal properties one of which is its anti-inflammatory effect too. Eugenol is one of the most commonly studied essential oil from Tulsi which has been reported to have anti-inflammatory properties. So far, no effort has been made either to evaluate or to commercialize the Eugenol in biocompatible devices of medical significance. Therefore, this study was designed to develop a bio-membrane containing Eugenol in its various forms and even the extract from Tulsi plant to evaluate *in vivo* anti-inflammatory effect in animal model. Our study suggests that the basic properties of Eugenol remain same irrespective of its exposure to various processes. Therefore, we can conclude that further studies are needed to develop it as one of the probable strategies to treat the inflammation in particular chronic inflammatory disease like arthritis, rheumatoid arthritis, etc. to name a few.

**SFE/CONV/17-08**

**Analgesic activity of methanolic extract of tubers of *Arisaema tortuosum* (Wall.) Schott.**

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*Arisaema tortuosum* (Wall.) Schott. tuber is the most common species of *Arisaema*. The aim of this study was to investigate the analgesic effect of methanolic extract of *Arisaema tortuosum* (MEAT) using acetic acid induced writhing and hot plate methods. The Hot plate method useful in the elucidating centrally mediated antinociceptive responses, while acetic acid induced writhing is the chemically induced pain of peripheral origin. The MEAT was used at a dose of 50, 100, 200 and 400 mg/kg body weight of swiss albino mice. The percentage inhibition of the abdominal constriction reflex was increased dose dependently in case of acetic acid induced pain and in the hot plate method model the extract at the dose of 400 mg/kg significantly increased the pain reaction time (PRT). MEAT showed significant ( $p=0.01-0.05$ ) response against all experimental models. These studies conclude that *Arisaema tortuosum* (Wall.) Schott. tuber possesses analgesic activity in a dose dependent manner.

**SFE/CONV/17/-15**

**Development of cancer targeting polymeric micelles for bioactive phytomolecule fisetin**

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Natural flavonoid fisetin (FS) has shown anticancer properties but its *in-vivo* administration remains challenging due its poor aqueous solubility and extensive *in-vivo* metabolism. This juncture demands an effective targeting delivery system to cancer for FS. The targeting legend was synthesized using folic acid (FA) and pluronic (PF) polymer through Carbonyl di- imidazole (CDI) chemistry. FS-loaded PF-FA (FS-PF-FA) micelles were prepared by film hydration method and evaluated *in-vitro*, *in-vitro* anticancer, pharmacokinetics and toxicity study in rats and compared with FS and FS-loaded pluronic (FS-PF) micelles. Stable FS-PF-FA micelles have smooth surfaces and spherical in shape possessing particle size, zeta potential and encapsulation efficiency of 103 nm, -26.7 mV and 82%. The release of FS indicated strong pH dependence. FS-PF-FA micelles demonstrated higher *in-vitro* anticancer activity in human breast cancer MCF-7 cells. The concentration of the drug needed for growth inhibition of 50% of cells in a designed time period (GI50) was 9.1 µg/ml for FS is 14.3 ± 1.2 µg/ml while it was greatly decreased to 9.8 ± 0.78 µg/ml, i.e., a 31.46% decrease for the FS-PF micelles. Furthermore, the GI50 value for FS-PF-FA was 4.9 ± 0.4 µg/ml (Fig 2), i.e., a 65.737% decrease compared to FS and 50% decrease compare to FS-PF. Moreover, Bioavailability of FS from FS-PF-FA micelles increased by 6 fold with long circulation time, slower plasma elimination and no sign of tissue toxicity. Developed FS-PF-FA micelles markedly improved anticancer efficacy, bioavailability and safety of FS and facilitate the administration of this flavonoid in the clinical setting.

**SFE/CONV/17/-17**

**Evaluation of Pharmaceutical Process on Chemical Estimates and Trace Elements in Copper Containing Minerals.**

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Herbomineral preparations have dominated the Ayurveda therapeutic s since the recent past period. The introduction of *Rasoushadhis* has set a land mark in the medical fraternity and has occupied prime place In the Ayurveda pharmacopeia. The uniqueness of Rasoushadhis is that though the dravyas contain same chemical content the indication and therapeutic administration varies. Copper containing dravyas are *Swarnamakshika, Tuttha and Tamra*. Though the elemental composition is same the chemical form of their presence change. Besides, the pharmaceutical process like Shodhana, Marana during the preparation of Bhasma, it has its own role in the final quantum of Copper and other Trace element content which also play a major role in the therapeutic activity and indication. Documented evidence about the changes is not available in the scientific community for the clear understanding of influence of the Samskara over the dravya for their varied therapeutic scope. In the present study effort has been put to understand scientifically evaluate copper containing dravya s viz Swarnamakshika, Tuttha ,Tamra before and after Shodana and Marana procedures over its percentage and trace element content.

**SFE/CONV/17/27**

**Pharmacological Evaluation of Wound Healing Potential of an Ayurvedic Formulation by *in vivo* Excision and Incision Wound Models.**

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In general, approaches that are commonly used for studying pharmacological effect of medicinal plants are either single bioassay or multiple bioassays. However, this approach is not always appropriate because of mostly being limited to testing for antimicrobial activity. An estimated 30-40% of experimental drug failures are due to inappropriate target (Butcher 2003) and hence it is important to develop a new and more target oriented screening techniques. In different Ayurvedic Classics about 164 medicinal plants, 24 metals & minerals and 18 animals products were described for their wound healing activities under the term '*Vranaropaka*' (Wound healer). The research drug has been mentioned in Sutrasthana of Charaka Samhita under Kusthaghna and Kandughna Mahakasayas. In the present study, the research drug was comprised of aqueous extract of equiproportionate dried powders of leaves of *Cassia tora* Linn., *Cassia fistula* Linn. and *Acacia catechu* Willd. and prepared in the form of ointment (freshly prepared) of strength 10% w/w using three different vehicles viz. *Madhu* (honey), *Goghrita* (Cow-ghee) and *Petroleum jelly* along with Framycetin ointment (1%) as standard reference drug. Two types of wound models were used in this study. A 5 cm long Linear Incision Wound and 6 mm diameter full thickness Circular Excision Wounds (Punch Wound) were created on either sides of vertebral column and inter-scapular area, respectively, in separate and properly grouped Wistar rats. The research drugs and standard reference drug were applied daily. The effects were observed on the basis of Physical parameters like Tensile strength (in Newton), Wound Index, Wound Contraction area in mm<sup>2</sup> Period of healing (in days) and Histopathological findings. The results of one parameter like Tensile strength (in Newton) were (5.35±0.022) with Standard reference drug and that of research drug with madhu as a vehicle were (4.67±0.067) which were highly significant (p<0.001). While ointment prepared with other vehicles like Goghrita and Petroleum jelly showed significant (p<0.01) results.

**SFE/CONV/17/28**

**Clinical Evaluation of Therapeutic Effect of *Aswagandha* Extract in Chronic Stressed Subjects**

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A Double blind, randomized and placebo controlled study was carried out in chronic stressed adults, to understand the impact on experiential and biochemical indicators of stress and anxiety as well as cardiovascular risk. Stress is a major component of present civilized society, causing adverse physiological conditions such as cognitive deficiencies, impaired glucose and lipid homeostasis, immunosuppression, sexual dysfunction, gastric ulceration, and alteration in serum cortisol and dehydroepiandrosterone sulfate (DHEAs) levels. The Ayurvedic system of medicine claims that *Aswagandha* promotes stress relief, health and longevity by potentiating the immune system, arresting premature aging, restoring homeostasis and increasing resistance to adverse environmental factors, collectively known as the antistress- adaptogenic effect as *Rasayana*. In the present clinical trial, Hamilton anxiety (HAM-A) serum concentrations of cortisol, DHEAs, C-reactive protein, FBG, total cholesterol, TG, LDL-C, VLDL-C, HDL-C and complete haemogram were done in three treated groups in different doses form and one placebo group in regular interval. This study determined that daily consumption of *Aswagandha* extract at three dosages (125 mg QD, 125 mg BID and 250 mg BID) reduced experiential feelings of stress CRP, pulse rate and blood pressure; and increased serum concentration of DHEAs in the chronically stressed adults who completed

the study. The 125 mg BID and 250 mg BID dosages also improved fasting blood glucose levels and lipid profiles for study participants in those groups. Cardiac risk ratios improved for the two higher dosage groups. The study revealed that daily use of Aswagandha would benefit people suffering from the effects of stress and anxiety without any adverse effects.

**SFE/CONV/17/50**

**Effect of Ashwagandharista on different hematological parameters at different dose level utilizing Sprague-Dawley rats**

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Ashwagandharista (ASG) is a classical Ayurvedic preparation which is used as an anabolic. The main objective of the study was to analyze its effect on different hematological parameters. The experiment was conducted on 80 male and female Sprague-Dawley rats weighing between 50-70 gm. Both male and female control and three different dose regimens for each sex containing Ashwagandharista (ASG) treated groups were utilized for the experiment. The formulation ASG, was administered chronically to Sprague-Dawley rats of both sexes with (0.625 ml/kg = low dose, 5.0 ml/kg=medium dose and 40.0 ml/kg=high dose body weight) peroral doses of the formulation every day for a period of 51 days. Blood was collected from the rats and analyzed utilizing hemolyzer. Statistically significant increase in wbc count in the female rat was noted in the lowest dose. Statistically significant increase in hemoglobin content in the female rat was noted in the mid-dose, on the contrary, statistically significant decrease in rbc count, hemoglobin content and hematocrit was noted in the male rat in the highest dose. Statistically significant decrease in the MCHC in the female rat was noted in both the mid and high doses. Statistically significant increase in the ESR in the male rat was noted in both the mid and high doses. Statistically significant increase in the bleeding time was noted in both the male and female rats, whereas statistically significant decrease in the clotting time was noted in the female rats only. This gender specific differentiation is may be due to some steroidal alkaloid which interferes with the gonadotropic activity.

**SFE/CONV/17/72**

**Study of Phyto-Chemical Constituents and cytological studies of *Achyranthes aspera* Linn. under the influence of industrial Effluent.**

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To carried out the Phyto-chemical constituents of *Achyranthes* Linn. growing in a highly polluted and non-polluted sites. The industrial effluent was analyzed by APHA method. The phytochemical constituents were analysed by Cromwell, 1955 & Trease and Evans, 1983 were followed. TLC was analysed by WHO, 1998. Chlorophyll was estimated according to Arnon, 1949. The physico-chemical parameters of analyzed effluent were found higher values as compared to standard values. Colour reaction tests showed the degree of changes in plants of polluted sites. The numbers of spots were decreased in the plant samples of polluted sites. a, chlorophyll b and total chlorophyll were decreased in those leaves which were collected from polluted sites. The root meristem study showed that MI and AMI get decreased in cycle industry effluent treated sets except at 25% concentration where the MI and AMI get enhanced. The mitotic anomalies increased with increasing effluent concentration. It may be concluded that the plants growing at non-polluted areas are not suitable for quality medicines, since, the study reveals quantitative alternations in the chemical constituents of plants growing in industrial areas and other parameters also found declining values in plants collected from polluted area.

**SFE/CONV/17/74**

**Evaluation of interaction potential of *Tinospora cordifolia* through metabolism mediated cytochrome P450 inhibition assay**

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*Tinospora cordifolia* is being used from a long time for the treatment of several diseases in Indian system of medicine. In the present study the inhibition potential of *Tinospora cordifolia* extracts and its constituent tinosporaside to cause herb-drug interactions through rat and human liver cytochrome enzymes was evaluated. Further metals content was estimated through atomic absorption spectroscopy. Bioactive compound was quantified through RP-HPLC, in order to standardize the plant extract. Interaction potential of the test samples were evaluated by CYP450-carbonmonoxide complex (CYP450-CO) assay with pooled rat liver microsome. Influence on individual recombinant human liver microsomes such as CYP3A4, CYP2D6, CYP2C9 and CYP1A2 isozymes were analyzed through fluorescence microplate screening assay and respective IC<sub>50</sub> values were determined. The content of tinosporaside was found to be 1.64% (w/w) in *Tinospora cordifolia* extract. Concentration dependent inhibition was observed through *Tinospora cordifolia* extract. Observed IC<sub>50</sub> (µg/ml) value were 136.45 (CYP3A4), 144.37 (CYP2D6), 127.55 (CYP2C9) and 141.82 (CYP1A2). Tinosporaside and extract showed higher IC<sub>50</sub> (µg/ml) value than the known inhibitors. Heavy metals were found to be within the prescribed limits as per WHO and US-FDA guidelines. Plant extract showed significantly higher IC<sub>50</sub> value than respective positive inhibitors against CYP3A4, 2D6, 2C9 and 1A2 isozymes. Present study concluded that consumption of *Tinospora cordifolia* may not cause any adverse effects when consumed along with other xenobiotics.

# POSTER PRESENTATION

4<sup>th</sup> CONVENTION - 2017  
SOCIETY FOR ETHNOPHARMACOLOGY, INDIA

National Symposium  
*"Ashwagandha"*  
&  
Ethnopharmacology Conclave  
*"Uses of Medicinal Plants by Traditional Healers of India  
– Local Heath Tradition"*

**SFE/CONV/17-01**

**Free Radical Sequestration of *Withania somnifera* (L.) Dunal**

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Ashwagandha or the 'Indian ginseng' (*Withania somnifera* (L.) Dunal; Solanaceae) is one of the most potent Ayurvedic drugs that has been used as long as 3000 years in the cure of various ailments. Ashwagandha root enhances the function of the brain as well as nervous system and improves the memory. This is also used to improve the functioning of the reproductive system. Studies have established that Ashwagandha drug possesses antioxidant, anxiolytic, memory enhancing, anti-venom, anti parkinsonian, anti-inflammatory, antitumor properties. Free radicals and reactive oxygen species (ROS) such as superoxide, hydroxyl radicals (OH<sup>•</sup>), hypochlorite, singlet oxygen (O<sup>•</sup>), nitric oxide etc. are generated in living organisms during metabolism, leading to several human diseases such as cancer, stroke, myocardial infarction, diabetes, and the aging process. Some of the sources for internally generated free radicals are; mitochondria, Xanthine oxidase, peroxisomes, inflammation, phagocytosis, Aachidonate pathways, exercise, etc. *W. somnifera* contains many alkaloids like aswagandhine, cuscohygrine, anahygrine etc.; steroidal compounds including withaferin A, withanolides A-Y etc. The principal active constituent comprises of withanoids. The withanoids class of phenolic compounds acts to prevent or reduce oxidative stress by scavenging free radicals. Mainly root bark are used therapeutic purpose, however studies have shown that bark of mature root, senescent leaves, fruits, mature leaves, stellar part of young roots, calyx, young stems, young root bark portion, stellar part of mature roots and immature leaves can be also utilized for the same. Recent year investigation has shown that methanolic extract of Ashwagandha is the most powerful regarding the antioxidant potential. In this context, it can be concluded that Ashwagandha is a potential herb that can be utilized in coping with stress and changing situations of the modern life.

**SFE/CONV/17--03**

**Chemometric Profiling and *In-silico* Approach for Skin Whitening Efficacies of *Bauhinia racemosa* Lamk. and *Bauhinia tomentosa* Linn.**

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This research work presents a study on chemical composition and tyrosinase inhibitory properties of the methanol extract of leaves of *Bauhinia racemosa* (MBR) and *Bauhinia tomentosa* (MBT). The major chemotypes of the MBR are myo-Inositol, 4-C-methyl-(14.50%) whereas 3-O-Methyl-d-glucose (91.89%) is present in MBT as major compound. Tyrosinase inhibition was investigated against monophenolase (L-tyrosine). IC<sub>50</sub> values of MBR and MBT were found 280±0.9 and 610±1.7µg/mL, respectively. Molecular docking studies revealed that the binding orientations of the phenolic principles were in the tyrosinase binding pocket and their orientations were located in the hydrophobic binding pocket surrounding the binuclear copper active site. Molecular docking analysis of the binding of myo-Inositol, 4-C-methyl- and active site residues of retrieval of protein (PDB ID: 1wx2) showed that ligand formed an extensive hydrogen bond network with ASN 191 and ALA 202 with H-bond interactions of 2.078Å°, 2.422 Å°, respectively. The compound, 3-O-Methyl-d-glucose formed hydrogen bond network with amino acid residues like SER 206, THR203 and ASN 191 with 1.983Å°, 2.761 Å° and 2.565 Å°, respectively. The standard compound, Kojic acid formed the hydrogen bond network with ASN 191 and SER 206 with H-bond interactions of 3.011 Å° and 1.955 Å°, respectively. The results suggested that both these compounds showing good

binding affinity with target receptor can be used as a lead molecule for inhibition of tyrosinase, and as a good source of skin-whitening agents for cosmetic and medicinal applications. Scavenging assay was also estimated for each of the extracts with the reference drug ascorbic acid. Total chromatographic profile was obtained for each extract. Presence of phytoconstituents such as flavonoids, polyphenols, terpenoids and glycoside in different extracts were found. The potent free radical scavenging activity was observed on DPPH radical scavenging assay. The different concentrations of all the extracts showed effective free radical scavenging activity on dose dependent manner.

**SFE/CONV/17/--09**

**Therapeutic efficacy of *Ashwagandha* (*Withania somnifera*) as potent rejuvenator**

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*Ashwagandha* is an important herbal medicinal plant widely used as Ayurvedic medicine in Indian subcontinent for different pathological manifestations since ages without any noticeable side effects. It has been used for various actions ranging from vitalizer, improve endurance and stamina, promote longevity, and improve immunity, male and female fertility. However, efficacy studies are needed to prove the clinical efficacy of this herb, especially as rejuvenator and physical performance. The present article summarizes some such attributes of *Ashwagandha*. Literature review was done through published works to gather information on nutritional and ethnic values and pharmacological properties of *Ashwagandha* as potent rejuvenator. The plant was found to possess significant adaptogenic, nootropic, rejuvenator, aphrodisiac, Anti stress, anxiolytic, spermatogenic etc actions. The phytoconstituents which are present in the plant are mainly witharin and somniferin which are responsible for the actions. The phytochemical constituents and isolated bioactive compounds of *Ashwagandha* can be investigated further to develop novel herbal drugs by using reverse pharmacological approaches especially in the treatment of liver diseases, arthritis, malignancies, infertility, neurological diseases.

**SFE/CONV/17/--10**

**Quality assessment of *Ashwagandha* (Root) through Physico-chemical and HPTLC Fingerprinting Profile**

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The herbal drugs and medicinal plant products have been widely used for thousands of years in many parts of the world. Medicinal plants constitute a source of raw material for both traditional and modern systems of medicine. In recent few decades, growth and popularity of herbal medicine and plant products have been taken a significant share of the health care. The importance of quality control and standardization of botanical products is of utmost concern for global acceptability of these drugs in the modern system of medicine. As herbal medicinal products are complex mixture that originate from biological sources, great efforts are necessary to guarantee a constant and adequate quality. In this connection *Ashwagandha* which is known as Indian ginseng have exciting potential for human health, specially its effects on mental, physical and emotional health. This study helps to assess the quality of *Ashwagandha* (Root) of three batches through Physico-chemical and HPTLC fingerprinting profile and finally batch III *Ashwagandha* (Root) found out the best one.

**SFE/CONV/17/-11**

**Ethnomedicinal Studies of Chakma and Marma Communities of Bandarban, Chittagong Hill Tracts, Bangladesh**

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The use of local medicinal knowledge is a part of traditional heritage in any rural areas of Bangladesh, especially among forest inhabitations. It has explicit emphasis on welfare of the highland communities of Chittagong Hill Tracts (CHT), Bangladesh. The present study was aimed to highlight the herbal medicinal knowledge of Chakma and Marma ethnic community and associated practice. An ethnomedicinal survey of the rural community, mainly Chakma and Marma from Boli Para, Bandarban, Bangladesh, was conducted from March 2017 to April 2017. The methods used for ethnomedicinal data collection were field interviews especially and plant interview techniques. Local (Bangla) names, habit, parts used, mode of preparation and medicinal uses of plants were recorded by interviewing the herbal practitioners (Kabiraj/Boidayas). A total of 13 plant species categorized under 11 families were documented for the treatment of various ailments. Among the total documented species were herbs (41%), shrubs (19%), trees (28%) and climbers (12%). Analysis of the parts used showed that leaves are mostly used in majority of medicinal plants, followed by roots, fruit, stems, bark, rhizome, flowers, bulbs, seeds, thorns and latex. The most common preparations include juice, paste and extract. This study also recorded new ethnomedicinal information. It can be concluded that data collected in the present study will be useful for any future ethnopharmacological research for the discovery of new drugs.

**SFE/CONV/17/-12**

**Reduction of invasiveness in breast cancer by *Withania* (Ashwagandha)**

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*Withania somnifera* (WS) root is a constituent of more than 200 formulations in various systems of medicine having a wide range of therapeutic activity. The biologically active crude extracts possess marked cytotoxicity & antiapoptotic activities against breast cancer cells. These evidences generate an interest of their potential for drug discovery. The cytotoxic and apoptotic effects of the Ethanolic extracts of WS in human breast cancer cell lines (MCF7 and MDAMB231) were established in our study. The cytotoxic effect was revealed by MTT assay in a dose-dependent manner. Better in the number of sub-G0 content even after exposure and culture with the Ethanolic WS root extract is confirming the apoptosis induction. Moreover the cell cycle arrest in the G2/M phase grounds for the apoptosis inhibition activity. But it was observed critically that the aqueous root extracts of *Withania* is ineffective in such significant induction of cytotoxicity or apoptosis. The results recommend for the possible use of the Ethanolic root extract of *Withania somnifera* in practise formula for breast cancer and other related disorders in future. *In-vivo* cytotoxicity studies of isolated of metabolites are under investigation.

**SFE/CONV/17/--13**

**Role of Pippali (*Piper longum*) in respiratory disease**

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COPD or chronic obstructive pulmonary disease is a challenging condition in the urban area of developing countries like INDIA. Number of patient of COPD are increasing day after day due to overloaded air pollution & smoking. Main pathogenesis of COPD is remodeling of alveoli due to rapid destruction of fibrous tissue. Tuberculosis is susceptible in a patient of COPD owing to loss of normal body defense mechanism. Target of treatment for COPD is supportive by means of natural procedure like respiratory rehabilitation therapy & use of natural product. Pippali (*Piper longum*) is a drug mentioned in classical Ayurvedic text for management of COPD, Vis-a-vis kasa roga. Pippali, having its active principle piperine, is responsible for rejuvenation of activities of lung tissue. Role of piperine is also reported to increase bio availability of Rifampicin for treatment of patient of tuberculosis. Detail description of pippali in lung tissue repairment & it's mode of action will be elaborated.

**SFE/CONV/17/--14**

**Development of partial pancreatectomy as pre-clinical diabetic model in Swiss albino mice**

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Diabetes mellitus is a group of metabolic disorder, characterized by hyperglycaemias that result from defective insulin secretion, action or both. For studies on diabetes, a large number of pharmacological agents, various surgical models and animals' models are used to understand the pathogenesis, complications, genetic and environmental influences. Partial pancreatectomy is a surgical model. The present study was aimed at investigation of restoration of euglycaemic status and  $\beta$ -cells proliferation. Swiss albino mice were used as animal models to study the effect of partial pancreatectomy on diabetes status. The evaluation was done by fasting blood glucose levels (FBG), lipid profile (by evaluation of total cholesterol level and HDL- level), serum amylase and biochemical assay like superoxide dismutase (SOD) and glutathione estimation. The results of the study indicate that  $\beta$ -cells of pancreas are regenerative or proliferative. It was observed that Pancreatectomised animals showed a rapid elevation of glycaemic status, starting from 15<sup>th</sup> post observational day, but the level of significance decreased gradually from 15<sup>th</sup> (  $p < 0.001$ ) to 60<sup>th</sup> ( $p < 0.05$ ) day. This was probably due to nesidioblastotic activity which shifted the fasting blood glucose level towards normoglycaemic status with  $\beta$ -cells regeneration. The biochemical and histopathological evaluations suggest that there is development of diabetic model in pancreatectomised group and diabetes status induced by pancreatectomy is curable to certain extent due to regeneration of  $\beta$ -cells.

**SFE/CONV/17/--16**

**Aswagandha and its effect over Geriatric patients**

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Aswagandha (*Withania somnifera*, Dunal) is a medicinal plant used on several systemic disorder. As per Ayurvedic texts, root and leaves are the common parts of used. It is of solanaceae family, it has tikta (bitter), katu (pungent) & Madhur (Sweeten) Rasas. It has the properties like laghu (light) snigdha (unctuous) but it possess the ushna (hot) virya (potency). In Ayurveda it is a potent Brighaniya (Nutritious) herbal agent. Commonly used as alterative, carminative, Nervine-Sedative and Regenerative. Aging is the usual phenomenon of life, in old age Natural degeneration or decaying is the common features, several ancient Ayurvedic classic have praised Aswagandha as an anti-aging agent for its Rasayana (immune modulation) action. Aswagandha along with milk is a potent tonic which resists early decaying. So in any sorts of degenerative arthropathy. Aswagandha gives relief and cure. There are several preparations like Arista, Asav, Avaleha, Kwath, Churna and oil are made by Aswagandha. Aswagandharishta, Aswagandha Avaleha, Aswagandhadi Taila e.t.c are the popular classical medicines (ethical preparations) usually found in the treatment of early decaying or jwara. As it is a Nervine Sedative. So, it prevents the memory loss and called as Medhya. It is a Rasayan or immunomodulator known to use in several convalescence period. It is very much effective for Physical & Mental fatigues. It enhances the spermatogenesis activity. So it could be stated as Brishya or Vajikarak. The present literary Review emphasizes the effect like Brighaniya, Brishya, Balya, Medhya e.t.c effect. Which are needed in old age to resist the aging process.

**SFE/CONV/17/--18**

**Role Of Aswagandha In Vyadhikshamatwa ( immuno deficiency)**

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In recent era most of the disease occurred due to lack of powerful immune system. Immunological factor plays a very important role for cure and prevention of many diseases. The most of the allergic reaction and infectious disease occurred due to weak immune system which is the burning problem round the globe. Immunology deals with science of resistance from disease and recovery from same infectious disease. Our classical rasayan therapy plays a significant role in contradiction of disease and enhancement of immune system. Aswagandha, also known as winter cherry is one of the most superior herbs in rasayan therapy. Aswagandha is rich source of complex and structurally diverse chemical molecules and also natural product based drugs widely using in different pathy all over the world. In Sanskrit Aswagandha means smelling like stallion of horse which indicate the user with the power like a horse. Aswagandha posses many vital qualities like reducing the stress, building of immune system. It is also included under brighaniya drugs in ayurvedic text that brighaniya herbs gives nourishment to sapta dhatu ( from rasa to shukra ) that sapta dhatu get nourished properly which gives fruitful result in the form of ojas (essence of dhatu) and this ojas is one of the important immunological factor in ayurveda which plays a crucial role in prevention and curing of disease. The health of a humans directly and indirectly depends on ojas. Aswagandha can be used in single and in combined form for building of immune system of unhealthy one and maintaining the health of healthy one.

**SFE/CONV/17/--19**

**A Clinical Study to Evaluate the Efficacy of Ashwagandha (*Withania Somnifera* Dunal.Linn) in the Management of Manasa Klaibya (Psychogenic Impotency)**

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In today's modernized era the life style becomes stressful. We are all running with more things to do then there are hours in the day, leaving ourselves feeling exhausted and often frustrated. Too much stress often saps away a person's libido by affecting hormones & mood and by interfering with the quality time that helps a couple stay connected. In psychogenic male impotencies; it's frequently associated with anxiety, fear of failure, and concerns about sexual performance. In Ayurveda, psychogenic impotence can be correlated with Manasa Klaibya described by susruta. For treating manas klaibya, the drug should possess the qualities of vajeekaran & at the same time it should be able to pacify the vitiated Manasika dosas. Ashwagandha is widely claimed to have potent aphrodisiac, sedative, & rejuvenative property. Experimental data prominently label this herb as antistress, anticonvulsant & tranquilizer. Based on these properties Ashwagandha was selected as a trial drug in the present study. Patients were advised to take ashwagandha curna 5 grams twice daily with cow's milk for 60days. Ashwagandha is described as vata-kaphahara, balya, sukrala, and godugdha as rasayan & ojovardhak in ayurvedic classics. Ashwagandha is the key drug for overcoming from this type of disease as it helps to enhance sukra & used in the management of various psychosomatic disorders. Rest will be discussed at the time of presentation.

**SFE/CONV/17/--20**

**A study of enriched Senna extract tablets w.r.t. Sennoside A and B.**

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Senna which is a traditionally known laxative has a great demand but is suffering from inherent drawbacks like nonavailability in the modern dosage form. Therefore, it was proposed to prepare tablets of enriched extracts of Senna optimized for the required percentage of its constituents Sennoside A and B. It was also envisaged to standardize the product making it acceptable for the modern for generation of end users. Maceration process was used for extraction of Senna leaves. Hydroalcoholic extracts were prepared in concentrations of 50%, 70%, 80% ethanol and 100% ethanol. It was observed that 70% ethanol enriched Senna extract resulted in higher yield value. Enrichment of extract for sennosides was done using Borntrager's process. In HPLC analysis, using sennoside B as the marker compound, it was found that 70% extract resulted in higher concentration of Sennosides. The tablets with wet granulation method were prepared. Evaluation parameters of Senna tablets were found to be within the standard limits of the Indian Pharmacopoeia. It was found that 70% enriched ethanolic extract of Senna resulted in higher %cumulative release of tablet ingredients at 90 minute time interval. Hence, 70% enriched Senna extract can be considered as the optimum concentration in terms of extraction, analysis, formulation and evaluation to achieve the desired pharmacological benefits of the product.

**SFE/CONV/17/--22**

**A Review On Guggulu (*Commiphora Wightii*) And Its Market Strategy**

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Guggulu (*Commiphora wightii*) is a common medicinal preparation widely used in Ayurveda since time immemorial. The quality extraction and preparation are important for proper therapeutic outcome as well marketing strategy. Many varieties of guggulu are available in market for the treatment of different diseases. Scientific validation for extraction and therapeutic evaluation are essentially needed for viable marketing of the plant.

**SFE/CONV/17/--23**

**Ashwagandha: The Golden Herbs of Twenty First Century**

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*Witanhia somnifera* commonly known as *Ashwagandha* (Winter cherry) is as important native plant of India. In Ayurveda, the ancient system of medicine, the roots are widely used from more than 400 years. Not only the roots but also the others parts of these plants like leaves, stem, flower, root, seeds, bark and even the whole plant are also have important therapeutic values. It has been recommended for the treatment of aphrodisiac, liver tonic, anti-inflammatory agent, astringent and more recently to treat bronchitis, asthma, ulcers, emaciation, insomnia and senile dementia etc. Animal research as well as clinical trials supports the therapeutic use of *Ashwagandha* for anxiety, cognitive and neurological disorders, inflammation and Parkinson's diseases. The dried roots of the plant are used in the treatment of nervous and sexual disorders. It is also used therapeutically as an adaptogen.

**SFE/CONV/17/--24**

**Phytochemical screening and analgesic activity of methanol extract of *Bauhinia acuminata* Linn. (Caesalpiniaceae)**

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In present study the phytochemical properties and analgesic activity of methanol leaves extract of *Bauhinia acuminata* Linn. (Caesalpiniaceae) was investigated. It showed the strong presence of alkaloids and flavonoids when tested by standard methods. The methanol extract (100, 200, 400 mg/kg) exhibited significant ( $p < 0.01$ ) analgesic activity when tested by hot plate method and acetic acid induced writhing model on experimental animals. Flavonoids are known to inhibit the enzyme prostaglandin synthesis, more specially the endoperoxide and reported to produce analgesic effect. The effect was found to be dose dependent manner and the results were comparable with the standard.

**SFE/CONV/17/--25**

**Scope of Research in Nasya Karma (Nasal instillation of medicine) with Aswagandha w.s.r. to neuro-psychiatric disorders – a Critical Review**

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The incidence of neuro-psychiatric disorders is on rising now a days. Aswagandha is considered as a very safe and effective adaptogen owing to the presence of many chemical constituents in it like triethylene glycol (Mahesh.K. Koushik et.al. 2017). Aswagandha is prescribed in Ashtanga Hrdaya to use internally along with ghee as one of the medium. It is very high time to make it deliver through a fastest drug delivery route which has immediate action on brain that should be completely safe and effective. Nasya karma, is now counted as fastest drug-delivery system because it by-passes portal system. It is believed to have direct action on brain since it is now firmly postulated that arachnoid matter sleeve extends along with olfactory nerve root quickly absorbs nano-particulate matter of aswagandha and will directly absorbed into CSF and cerebral circulation which may help in getting fast results for neuro-psychiatric disorders. Further if aswagandha is made into kalka form along with ghee, being lipid soluble can fastly cross B-B-B or Blood-Brain – Barrier. Further, during nasya karma with aswagandha, terminal nerves that extend along with olfactory nerve endings directly stimulate limbic system which is believed as emotional and behavioral center of brain mainly concerned with neuro-psychiatric disorders. The unique drug effect (adaptogen effect) of aswagandha along with its administration through fastest drug-delivery route (nasya-nasal instillation) can provide fast and effective solution to neuro-psychiatric disease spectrum.

**SFE/CONV/17/--26**

**Scientific basis for bio-potential of Ashwagandha (*Withania somnifera*) in Neuropsychiatric and Neurodegenerative disorders**

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Ashwagandha (*Withania somnifera*) is very revered herb of the Indian Ayurvedic system of medicine and is widely considered as the Indian ginseng. In Ayurveda, it is classified as a Rasayana (rejuvenator) and expected to promote physical and mental health, rejuvenate the body in debilitated conditions and increase longevity. Having wide range of activity, it is used to treat various kinds of disease processes and specially as a nervine tonic. The present review critically discusses the safety profile and pharmacological basis of the use of *W. somnifera* as an adaptogen, antistress, antiepileptic and protective in various central nervous system (CNS) disorders (particularly in epilepsy, stress, anxiety) and neurodegenerative diseases such as Parkinson's and Alzheimer's disorders, tardive dyskinesia, cerebral ischemia, and even in the management of drug addiction. The review also attempts to decode the proposed mechanism of action along with provide information on therapeutic claims of market products of *W. somnifera* in CNS disorders.

**SFE/CONV/17/--29**

**Critical analysis of major chemical constituents extracted from *Withania somnifera***

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*Withania somnifera* (L.)Dunal, known commonly as Ashwagandha or Indian ginseng is a plant of Solanaceae family. It is most widely used herb in Ayurvedic and indigenous medical system for over 3000 years. Over 35 chemical constituents had been identified in *Withania somnifera*. The secondary metabolites which had been found in the root of *W.somnifera* are alkaloids, steroidal lactones, glycosides, flavonoids, tannins, saponins. Majumdar and Guha(1933) investigated a species from Bengal and confirmed the presence of some various type of alkaloids like cuscohygrine, tropine, pseudotropine, anaferine, choline, visamine, hentriacontane, anahygrine, dlisopelletierine, nicotine. They also reported some other alkaloids which exclusively isolated in Aswagandha plant itself, such as somniferine, somniferinine, somnine, withamine, pseudowithamine, withanamine, withanamine, aswagandhine, withasomnine, withanine, withananine. Except those compounds the root of *W.somnifera* consists of steroidal lactones named withanolides and withaferin. The root is also a rich source of iron. Pharmacological activity of the alkaloids such as somniferine, visamine works on CNS system, respiratory system and also has hypnotic activity, nictinolytic activity and hypothermic activity. The glycowithanolides or withanosides has the property of CNS effector and immunomodulatory. Studies also shown that Aswagandha is effective on the treatment of stroke, dyskinesia and possesses a potential anti microbial, anti fungal and anti bacterial activity against *Staphylococcus aureus*, *pseudomonas aeruginosa* bacterial strain. Although the information of the abstract on *Withania somnifera* is quite promising for using it as a multipurpose medicinal agents. It has been used successfully in ayurvedic medicines for centuries. More clinical trials should be conducted to support its therapeutic uses.

**SFE/CONV/17/--30**

**Phytochemical and Preclinical Study of Vanari gutika for its Aphrodisiac Activity**

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The herbal formulation "Vanari Gutika" is used as potent aphrodisiac agent. However, there is no data available on its Physicochemical, Phytochemical and Preclinical profile; therefore an investigation was carried. Extraction and enrichment of the extract of *Mucuna pruriens* seeds was done, followed by in-house preparation of Vanari gutika. To standardize Vanari gutika, physicochemical evaluation, qualitative phytochemical study and quantitative phytochemical studies were done. Chromatographic evaluations i.e TLC, HPTLC and HPLC were done using suitable marker. Pre-clinical evaluation of the marketed and in-house formulation of Vanari gutika was done by using suitable animal model for aphrodisiac activity, followed by biochemical analysis of animal blood sample, histopathology of testis of the animals and epididymal sperm count of animal. Lastly, the comparison of the effect of vanari gutika in-house v/s marketed formulation was made. Disintegration time of in-house Vanari gutika was 6 hours and marketed formulation was 8 hours, this is attributed to the milk contained in the gutika and the frying in ghee which added a coat of oil/fat to the gutika. Ayurveda says Vanari gutika should be chewed, thus supporting its high disintegration time. Extractive value was found to be high in the aqueous medium. The pre-clinical studies revealed the aphrodisiac activity of Vanari gutika which was supported by epididymal sperm count, histopathological and biochemical tests.

**SFE/CONV/17/--31**

**Phytochemical And Pharmacological Investigation Of An Indigenous Medicinal Plant *Leucas Aspera* And Anti-Angiogenic And Pro-Apoptotic Activity Of Aqueous Extract Of *Leucas Aspera* In Cam Assay – A Review**

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*Leucas aspera* commonly known as 'Thumbai' has a wide variety of medical applications. The aqueous extract of *Leucas aspera* (leaf extract) was assessed for its various in vitro activities such as anti-inflammatory, anti-helminthic, anti-venom, anti-arthritic, anti-oxidant and antibacterial activity. The in vitro Anti-inflammatory activity was studied by human red blood cell (HRBC) membrane stabilization method by using various concentration of *Leucas aspera*. The crude extracts of the leaves of *Leucas aspera* showed statistically significant anti-inflammatory activity in in vitro assay. The crude aqueous leaves extract of *Leucas aspera* also showed that significant anti-helminthic effect causing death of the worm at all the concentrations but the time of death was different in each case. In-vitro anti-arthritic activity was carried out by bovine serum protein denaturation method and egg albumin denaturation method. The results suggested that the aqueous extract of *Leucas aspera* showed a very good anti-arthritic activity. Antioxidant and Antibacterial activity was also evaluated. The present study concluded that the plant can be formulated in broad spectrum antibiotics and also confirms the traditional uses in pathogenic disease. Angiogenesis is the creation of new blood vessels. The process of angiogenesis involves the migration, development, and differentiation of endothelial cells, which contour the inside wall of the blood vessels. The development of antiangiogenic agents to block new blood vessels growth will repress metastasis and encourage apoptosis of tumor. The present object focuses on phyto-constituents and antiangiogenic activity of the *Leucas aspera* leaves extract. Aqueous extract showed potent inhibitory activities against EAC cells procreation in in-vivo; Aqueous extract steadily decreases the body weight & tumour. Chorioallantoic membrane assay (CAM) provides evidence towards angiogenic inhibitory activity. Different solvent extracts of *Leucas Aspera* using Chicken Chorioallantoic Membrane (CAM) assay. Methanol leaf extract showed the maximum angiosuppressive activity of 3 (+-) 1 inhibition, concentration dependently displayed a strong inhibition in the CAM angiogenesis.

**SFE/CONV/17/--32**

**Cytotoxic, Antidiarrheal and Analgesic Activity of Methanolic Extracts of *Wrightia coccinea* Roxb. Fruit Rind**

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In present study we conducted both in vitro (Cytotoxic effect) and in vivo (antidiarrheal activity, central analgesic activity, peripheral analgesic activity) experiment to find out the impact of methanolic extract of fruit rind of *Wrightia coccinea* (Family Apocynaceae). Here, the hexane extract shown prominent cytotoxic effect ( $LC_{50} = 0.96 \pm 0.07$ ) although other partitionate show significant cytotoxic efficacy comparing with Vincristine Sulfate as standard ( $LC_{50} = 0.473 \pm 0.023$ ). For *in vivo* study we conducted our study by using mice. Among them, the methanolic extract of the *W. coccinea* exhibit higher antidiarrheal activity for both concentration 200 mg/kg (WC2) and 400 mg/kg (WC4) ( $p < 0.001$ ) compared with standard (Loperamide) and control. Besides, the methanolic extract showed better peripheral analgesic activity compared with the standard ( $p < 0.001$ ) whereas it exhibited no central analgesic activity for first 30 minutes ( $p > 0.05$ ) although it started to show its activity after 60 minutes which was observed upto 90 minutes ( $p > 0.05$ ). From our current study we can be concluded that, the methanolic extract of the fruit rind of *W. coccinea* exhibited cytotoxic, antidiarrheal, central and peripheral analgesic activity.

**SFE/CONV/17/--33**

**Vitexin: A potential flavone glycoside**

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Flavonoid is a group of chemical compounds, occurs in most fruits and vegetables, and can play an important role in human health. Flavonoid glycosides are one of the most vital phytochemicals in diet and are of great general interest due to their diverse bioactivity. Vitexin is an apigenin flavone glycoside (apigenin-8-C-glucoside) isolated from different medicinal plants of the families like Fabaceae, Moraceae, Acanthaceae, Rosaceae, Asteraceae, Sapindaceae. It has anti-diabetic, anticancer, anti-inflammatory, antioxidant, cardioprotective, memory enhancing potential, platelet aggregation inhibition property. Isovitexin (apigenin-6-C-glucoside) is an isomer of vitexin, generally purified together with vitexin. Active research is going on the Pharmacophore modelling and 3D-QSAR studies of vitexin which has explored some of its pharmacologically active derivatives such as vitexin 2"-O-beta-L -rhamnoside, vitexin-2"-O-beta-glucoside, vitexin-2"-O-alpha-L-rhamnoside. However further research is in progress to establish the newer and better derivatives of vitexin as well as their pharmacological activities.

**SFE/CONV/17/--34**

**Flavonoid and alkaloid enriched fractions of *Terminalia bellerica*(Gaertn.) Roxb as Antimicrobial agents against Multi Drug Resistant *Staphylococcus aureus***

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Present work is an attempt to search a herbal remedy in order to inhibit multi drug resistant (MDR) *Staphylococcus aureus* which primarily constitutes enrichment of flavonoids and alkaloids from ethanolic extract of *Terminalia bellerica* using solvent Partition technique. *S aureus* which was found to be resistant to five different antibiotics was tested for antimicrobial activity of ethanolic extract of *T bellerica* outer coat, fruit and seed followed by determination of MIC<sub>90</sub>. Ethanolic extract of *T bellerica* outer coat having lowest MIC<sub>90</sub> was further fractionated to eight fractions F1 to F8 and were tested for antimicrobial activity against isolated MDR. *S aureus* showed highest degree of resistance against Cefixime having MIC<sub>90</sub> 23.66 ± 0.33 µg/ml. Phytochemical tests for all the fractions were done where only F5 and F6 were found to contain flavonoids and F4 contain alkaloid. Fraction F6 gave significant zone of inhibition 2.56±0.05cm with MIC<sub>90</sub> 50±0.33 µg/ml where as Fraction F4 gave highest zone of inhibition 2.76±0.05(cm) with MIC<sub>90</sub> 12.33±0.33(µg/ml). Thus it was concluded that alkaloids of *T bellerica* have a greater antibacterial potential than flavonoids against MDR. *S aureus* and could be used as a potential drug or a resistance modifier in near future.

**SFE/CONV/17/--35**

**BACTERIAL PROTEIN AS ANTICANCER AGENT-A REVIEW**

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Cancer is characterized by uncontrolled and invasive growth of cells. These cells may spread to other parts of the body, and this is called metastasis. Although conventional anticancer therapies, consisting of surgical resection, radiotherapy and chemotherapy, are effective in the management of many patients but for about half of cancer sufferers these are ineffective, so alternative techniques are being developed to target their tumours. Experimental cancer treatments are medical therapies intended or claimed to treat cancer by improving, supplementing or replacing conventional methods. However these therapies can reveal serious and systemic side-effects in patient's health due to its high toxicity and lack of cancerous tissue specificity. One of the new paths considered in the search for new anticancer therapies resides on an unconventional approach using microorganisms, namely live bacteria or their purified products. However not only bacteria may have applications in cancer therapies, since bacterial purified products such as protein, enzymes, immunotoxins, antibiotics or other secondary metabolites have been extensively studied concerning this matter. There are different kinds of bacterial protein like azurin, a well described *P. aeruginosa* protein, *S. flexneri* which have cell-cycle-inhibiting proteins called cyclomodulins etc with antitumor properties. Present review constitutes various bacterial proteins which have anticancer activity.

**SFE/CONV/17/--36**

**ANTIANGIOGENIC EFFECT OF TOMATO SKIN EXTRACT ON ZEBRA FISH EMBRYO – A REVIEW**

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Angiogenesis is the development of new blood vessels from existing vasculature, is essential in normal developmental process of cells specially tumour cells. Uncontrolled angiogenesis is a major contributor to a number of disease states such as inflammatory disorders, obesity, asthma, diabetes, cirrhosis, autoimmune disease etc. It is also considered a key step in tumour growth, invasion and metastasis. Angiogenesis is required for proper nourishment and removal of metabolic waste of tumour sites as well as aids in metastasis and invasiveness. Therefore, modulation of angiogenesis is considered as therapeutic strategies of great importance of human health especially in cancer. Numerous bioactive plant compounds are recently tested for their antiangiogenic potential. Among these naturally occurring compounds, polyphenols are of great importance. Plant polyphenols inhibit angiogenesis and metastasis through regulation of multiple signalling pathways. Two major such polyphenols includes flavonoids and chalcones. Specifically, flavonoids and chalcones regulate expression of VEGF (vascular endothelial growth factor), matrix metalloproteinase, EGFR (epidermal growth factor receptor) and inhibit NFkB, PI3-K (phosphoinositide 3-kinase) signalling pathways, thereby causing strong antiangiogenic effects. This review focuses on the antiangiogenic property of chalcones from tomato skin extract on zebra fish embryo with real-time monitoring of antiangiogenic effect. The major component of tomato peel extract is naringene and naringenin which are essential chalcones possessing antiangiogenic activity. The study is to determine the mechanism by which these chalcones exactly inhibit angiogenesis and to identify the chalcone derivatives possessing other pharmacological and therapeutic activity.

**SFE/CONV/17/--37**

**Therapeutic Bio-Equivalence Study of Aswagandha with Anti-Tubercular Drugs in the Management of Pulmonary Tuberculosis**

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Pulmonary Tuberculosis (PTB) is one of the major challenging disease burden the India. After the discovery of Streptomycin the therapeutic management of PTB received a major breakthrough and the treatment module changed remarkably with the formulation of newer Anti-Tubercular Drugs (ATDs) with appreciable success. Recent resurgence of PTB in developed countries like United States posed a threat to the medical community due to resistant strains. Hence, WHO looked towards traditional medicine and literature reveals that Ayurvedic treatment of PTB was in vogue in India before the introduction of ATD with limited success. In this perspective, the objective of the present study was to evaluate the toxicity reduction and early restoration by adjunct therapy of Ayurvedic drugs by increasing the bio-availability of ATDs. In the present study, treatment response of 99 patients treated with ATD as an adjunct with Aswagandha (*Withania somnifera*) was investigated. Hematological profile, sputum bacterial load count, immunoglobulin IgA and IgM, blood sugar, liver function test, serum creatinine were the assessed parameters besides blood isoniazid and pyrazinamide, repeated after 28 days of treatment. The symptoms abated, body weight showed improvement, ESR values were normal, there was appreciable change in IgA and IgM patterns and significantly increased bioavailability of isoniazid and pyrazinamide were recorded. This innovative clinical study coupled with empowered research may turn out to be promising in finding a solution for the treatment of PTB.

**SFE/CONV/17/--38**

**A Review on A Lead To Antidiabetic Herbal Drugs**

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Diabetes is firmly recognized as global problem with recent estimates of a staggering 410 million people with diabetes mellitus in 2016. Diabetes can be defined as a chronic disorder of carbohydrate, fat and protein metabolism characterized by increased fasting and post prandial blood sugar levels. It is classified mainly into two types namely-TYPE I i.e Insulin Dependent Diabetes Mellitus (IDDM), caused due to destruction of Pancreatic  $\beta$ -cells and TYPE II i.e Non Insulin Dependent Diabetes Mellitus(NIDDM), caused due to reasons including abnormality in glucoreceptor of  $\beta$  cell, reduced sensitivity of peripheral tissues to Insulin or excess of hyperglycemic hormones. Presently there is growing interest in herbal remedies due to side effects associated with oral hypoglycemic agents and relatively lower cost. Some of the traditional herbal plants used in India and other subcontinent since ages include: *Tinospora cordifolia*, *Emblica officinalis*, *Gymnema sylvestre*, *Momordica charantia*, *Trigonella foenum-graecum*, *Panax ginseng*, *Allium sativum*, *Eugenia jambolana*, *Murray koenigii* etc. Isolation and identification of therapeutically active constituents, such as Gymnemic acid, Charantin, Trigonelline, Koenidine, Embelline, Berberine, Magnoflorine etc from these plants, preparation of standardized dose and dosage regime can play a significant role in development of anti diabetic molecules, as well as anti diabetic herbal formulations. The herbal extracts have been found to profoundly enhance insulin secretion from B cells along with hypolipidaemic and antioxidant properties. The review deals with hypoglycemic plants which may prove to researchers in the field of pharmacology and therapeutics to develop evidence based alternatives to cure different kinds of diabetes.

**SFE/CONV/17/--39**

**A Review ON EPILEPSY RELATED HERBAL DRUGS**

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Epilepsy is a neurological disorder characterized by seizures has effect on CNS .In Ayurveda epilepsy is known as “Apasmara” and epileptic attack is known as “Akshepaka”.Common symptoms including convulsion,spasmodic muscle contraction ,teeth biting, dementia etcetera take place for few second or ,minutes.And also after seizures person remain fatigued and asleep for many hours. Most of the synthetic AED have unwanted effect and unpredictable pharmacological action .So examining of further new drugs with a less or no side effect will be benefited for human because duration of treatment i.e. therapy is prolonged . There is little scientific proof that herbal remedies successfully treat epilepsy. Different types of low-priced and effective compounds are derived from different medicinal herbs, act as anti-epileptic agent and most of them are comparable with the basic structure of anticonvulsants. MUGWORT (oil has relaxing and soothing effect on brain and nervous system, can be used for epileptic attack), SECURIDACA (have an anticonvulsant property),BRAHMI( treats mental fatigue and increase circulation through brain),SKULLCAP( treat anxiety and insomnia), VIOLET TREE , VALERIAN(to treat sleep disorder, dementia, epilepsy) CINCHONA(bark of cinchona act as an anticonvulsant and also used to treat painful leg cramps and spasms) ,TREE OF HEAVEN ( Bark and roots of tree of heaven is used to treat spasmodic condition and epilepsy),MAGNOLIA( It seems to have anxiety reducing), MEDICAL CANNABIS( The dried leaves and flowers of cannabis is also known as marijuana .It act as a anticonvulsant and may reduce the cause of seizures).The review is concentrating about the nonconventional methods of epilepsy treatment. Unfortunately lack of evidence and suitable investigation of antiepileptic herbal drugs, usage of them are limited and anecdotal. Another interesting approach is to identify more herbal therapies by isolating compound and also the activity of them in animal epilepsy model.

**SFE/CONV/17/--40**

**Role of Ashwagandha in a Case Of Generalised Anxiety Disorder**

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In the modern era, psychological disorders are rapidly increasing day by day. Anxiety is an abnormal and overwhelming sense of apprehension and fear often marked by physical signs such as tension, sweating and increased pulse rate. Anxiety affects the society in different dimensions. The overall module to arrest the anxiety disorders therapeutically is very difficult and it requires a promising cost effective therapy. Ashwagandha (*Withania somnifera*) is a very useful drug to combat anxiety disorders due to its multi dimensional rasayan effect. The drug Ashwagandha possesses the immune-modulator activity and subsequently acts on serotonin levels in blood. Anxiety disorders have a direct effect on serotonin levels. Therefore considering this, a pilot study was carried out at IPGAE&R at SVSP with the drug Ashwagandha (Tablet) procured from a GMP certified company in one group and Ashwagandha powder supplied from institute in the other group, in a dose of 500mg twice daily with water, morning and evening before food for a period of 1 month on the 10 OPD cases of both the groups with anxiety disorders. The effect of Ashwagandha in a case of anxiety disorder was established on the basis of Hamilton’s Anxiety Rating Scale and blood serotonin levels of those patients was estimated before administration of the drug and at the end of one month after treatment. In this study Ashwagandha tablet was found to be more effective (P<0.001) than the supply powder (p<0.005) when the data was estimated statistically. The complete description of the study will be given in the full paper.

**SFE/CONV/17/--41**

**Determination of Antioxidant Activity from Leaves of Macromutant Plant Types in *Withania somnifera* (L.) Dun.**

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Reactive Oxygen Species (ROS)/ Antioxidants formed in our body due to exogenous and endogenous factors are responsible for many diseases. Use of antioxidants supplementation can reduce the level of oxidative stress and retard or prevent the development of complicated diseases. Many synthetic antioxidants have shown toxic and/or mutagenic effects which have shifted attention towards phytochemical antioxidants as health benefactors. *Withania somnifera* (L.) Dunal (family: Solanaceae) has been widely used in Ayurvedic system of medicine as a rejuvenator and for prevention of various ailments. In view of this, antioxidant activity from leaves of nine viable M3 macromutants (screened and selected following induced mutagenesis experiments) were analysed by adopting FRAP assay (Ferric Reducing Ability of Plasma). Antioxidant power was measured in control and M3 macromutant plant types. In control Antioxidant power was noted to be 75.75 and it was found to be enhanced in bushy (184.52), thick stem II (166.67), ovate leaf (166.67), thick stem I (142.86) and lax branching (101.19) mutants. Present investigation therefore confirms that the desirable plant type mutants could be of great use for the preparation of antioxidant rich nutraceuticals.

**SFE/CONV/17/--42**

**ANTIDIABETIC FLAVONOIDS**

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Type 2 diabetes mellitus (DM) is characterized by impaired insulin secretion and increased insulin resistance, leading to hyperglycaemia. DM is one of the world's fast growing diseases due to aging, high population growth size, increased urbanization, high prevalence of obesity, rise in living standards and the spread of calorie rich foods. Although many anti hyperglycaemic drugs are available in market, many of them are toxic on chronic use. Hence some herbal medicines are used as anti hyperglycaemic agents mostly due to their less toxic effect and ease of availability. Flavonoids play a major role in controlling hyperglycaemia. Generally, Flavonoids occur in plants as glycosides in which one or more of the phenolic hydroxyl groups are combined with sugar residues. These occur in different plant families like, Fabaceae, Meliaceae, Asparagaceae, Rutaceae, Acanthaceae, Malvaceae, Cucurbitaceae and are found to have anti diabetic property. It has been seen that Myricetin, Kaempferol, Quercetin, Diosmin, Fisetin, Apigenin, Morin, Luteolin etc have significant anti diabetic activity. However, future research is in progress to isolate novel Flavonoids having anti diabetic activity from various plant sources and increase their yield and synthesise their derivatives for betterment of diabetic patients.

**SFE/CONV/17/--43**

**Phytochemical characterization and evaluation of antibacterial activity of *Christella acuminata***

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The plant *Christella acuminata* is, usually a medium-sized, terrestrial, widely spread in regions of North India. One of the species of the genus *Christella* namely *Christella dentata* has been found to possess antimicrobial activity. So an attempt was undertaken to characterize the different extracts of the plant *Christella acuminata* and to evaluate the antibacterial potential of the plant. The ethanolic and aqueous extracts of the plant were subjected to various phytochemical tests to find out the nature of phytoconstituents present. Both the extracts were tested against several gram positive bacteria like *Bacillus subtilis* and *Staphylococcus aureus* and gram negative bacteria like *S. paratyphie*, *E. coli* and *Shigella dysenteriae* by disc diffusion technique using Mueller-Hinton agar media. Phytochemical studies revealed the presence of tannins and phenolics in both the extracts. The ethanolic as well as aqueous extract of the plant showed a significant inhibitory effect towards all the tested gram positive and gram negative bacteria in a concentration dependent manner. So it can be concluded that the plant *Christella acuminata* possess good antibacterial activity.

**SFE/CONV/17/--44**

**Data mining on folklore use of *Ashwagandha* in different states of India**

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*Ashwagandha (Withania somnifera)*, a plant of Solanaceae family has been used since long time in many Ayurvedic formulations. In India drugs of herbal origin have been used in traditional systems of medicine such as Unani, Ayurveda, Siddha. Our country is known for its valuable heritage of herbal medicinal knowledge. In Ayurveda, Mainly the dried root powder used as aphrodisiac, rejuvenator (*Rasayana*), and to treat many of nervous disorders. It is not only confined in Ayurvedic texts also its folklore use is famous at various parts of India. A number of tribes, local people of some part and traditional healers are very well known about its therapeutic uses since ages. Recent studies by many of research scholars reveals that *Ashwagandha* possesses antioxidant, anxiolytic, adaptogen, memory enhancing, anti-parkinsonian, anti-inflammatory, antitumour properties. Other effects like immunomodulation, hypolipidemic, anti-bacterial, cardio-protective are also been proved. The indigenous people at various regions have developed their own way of using plants for their health care and the knowledge transfer from generation to generation. Likewise use of *Ashwagandha* is reported in almost all states of India by local tribes, traditional healers etc. Whole plant part is used as many of formulations. For example in Jalaun district, UP, people use it against diphtheria. The Gond, Kol, Majhi tribes use its leaves to treat fever. Villagers of Nanded district, Maharashtra and the Bhilla tribes use the plant powder to treat arthritis. In Gulbarg district, Karnataka use its root and leaf pastes over ulcers and carbuncles. This review article is presented to compile all the update information of the folklore use of *Ashwagandha* in various states of India.

**SFE/CONV/17/--45**

**EFFECTS OF MEDICINAL PLANTS ON ALZHEIMER'S DISEASE AND MEMORY DEFICITS**

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Alzheimer's disease, a neurodegenerative disorder is characterized by intense memory loss enough to interfere with social and occupational execution. It is caused by senile plaques in the grey matter of the brain caused by deposit of amyloid beta. The allopathic medicines which have been used for treatment purpose are Caprylidene, Cereloid, Galamer etc. which have various adverse side effects on human body such as GI track infection, heart burn, sleepiness, affected CNS etc. Due to this kind of adverse effect of allopathic medicine, natural therapy including herbs and medicinal plants are used such as *Embllica officinalis* (as antioxidant and memory enhancer), *Magnolia officinalis* (as acetyl cholinesterase active agent and antioxidant), *Convolvulus pluricaulis* (it formulae as a Ervine tonic for improvement of memory and cognitive function), *Cantella asiatica* (Decrease free radical concentrations and inhibit beta amyloid cell death in vitro), *Ficus carica* (contains quercetin that plays an important role for A.D patient), *Ginkgo biloba* (contains flavonoids prevents neurodegeneration and GABA inhibitory neurotransmission), *Withania somnifera* (A subset of component withanamides has been shown to scavenge free radicals generated during the initiation and progression of AD). Such studies should include identification of the active principle in order to improve the validation of the clinical trial. Further large-scale, multicentre studies are necessary to determine the effectiveness of these substances in the cognitive deterioration of AD.

**SFE/CONV/17/--46**

**A COMPARATIVE CLINICAL STUDY OF UTTARABASTI AND MATRABASTI IN KLAIBYA W.S.R.TO ERECTILE DYSFUNCTION**

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After age of puberty we are bonded for achievement of Kaama (Sexual life). Among the various phases of sexual response, the most essential is the achieving of normal erection with sufficient rigidity for penetrative intercourse, the absence of which ends into failure and dissatisfaction. This condition has been elaborately described as 'Klaibya' in Ayurvedic classics and 'Erectile dysfunction' in modern texts. Sexual gratification is the most essential thing for being happy and satisfied in marital life. The presence of Sexual dysfunction may lead to various psychosomatic disorders in both the partners in due course of time. The disease Klaibya is a multifactorial condition, mainly involving Bahu Doshavastha as a whole and Shukrakshaya in specific, Mano Dosh, and Shukravaha Sroto Dusthi. Ayurveda has realized this problem thousands of years back and maintains a separate branch known as Vajeeekarana, which deals with promotion of sexual health and prevention and cure of disorders of semen resulting due to Shukra Dusthi. Bastikarma has been doing wonders in the treatments of Ayurveda. Though it has been indicated for almost all the diseases, the prime importance of Bastikarma has been specified in the management of Klaibya. The Present study compares Uttarabasti and Matrabasti to evaluate the effect of Aswagandhataila in Klaibya. From the study analyses International index of Erectile function (IIEF) and all other parameters shows highly significant as  $p > 0.05$  in the groups where Uttar Basti was given. Thus it is fair to conclude that Uttarabasti with Aswagandhataila is more effective in Klaibya.

**SFE/CONV/17/--47**

### **EFFECT OF MASHADI BASTI IN PAKSHAGHATA – A PILOT STUDY**

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Pakshaghata is one of the central Nervous system diseases, considered as vatayadhi in Ayurveda occurs mainly due to vitiation of vata. The mode of onset is understood as sudden or gradual with the association of Hypertension or Diabetes. Loss of functions of limbs- with or without involvement of face is observed here. It affects either Left half or Right half or both sides even. Pakshaghata expresses the important signs as the shareera Akarmanyata, chestanivriti, Hasta PadaRuja, Hasta Padasankocha, SiraSnayuShosha, Sandhibandha Vimokshana and Vakstambha either to Right or Left side of the body. The Present pilot study objects are to evaluate the effect of Mashadi Basti in Pakshaghata. Mashadi yoga is mainly related to pacify vata as vata is the main cause. From the pilot study analyses Stroke specific –quality life scale, Modified Barthel Index and Grip test all other parameters shows highly significant as  $p > 0.05$ . The subjective parameter Akarmanyata, chestanivriti, Rujasankocha, Shosha, sandhibandha and vakstambha showed highly significant after in this study. Thus it is fair to conclude that mashadi yoga tailakalabasti is effective in Pakshaghata.

**SFE/CONV/17/--48**

### **A Review on Preclinical Safety Studies of Ashwagandha (*Withania somnifera* (L.) Dunal)**

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Documentation of safety profile of Ashwagandha (*Withania somnifera* Dunal) to ensure its safety for therapeutic use. Ashwagandha (*Withania somnifera* (L.) Dunal), a valued medicinal plant is the unique source of various types of compounds having diverse chemical structure. The plant is used in Ayurveda as a Rasayana (tonic). The medicinal uses of the plant are mentioned in various classical texts of Ayurvedic System of Medicine. The plant is used mainly for its anti-stress, anti-tumor, anti-inflammatory, anti-arthritic, cardio-protective, immune-modulating and antioxidant activities. Oral LD<sub>50</sub> of *Withania somnifera* extract in Wistar rats was greater than 2000mg/kg body weight in acute toxicity studies. In sub-acute toxicity study, administration of extract upto 2000mg/kg body weight for 28 days did not show any significant toxicity (Patel *et al.*, 2016). Oral LD<sub>50</sub> of hydro-alcoholic extract of *Withania somnifera* in female rats was more than 1000mg/kg body weight (Sahni *et al.*, 2014). In another study, LD<sub>50</sub> values in rats and mice were found to be 465mg/kg (332-651mg/kg) and 432mg/kg (299-626mg/kg), respectively in two-percent suspension of ashwagandholine (total alkaloids from the roots of *Withania somnifera* (Singh *et al.*, 1982). Various experimental data reported from the present review confirm Ashwagandha (*Withania somnifera* (L.) Dunal) is safe when administered in high doses. Further, an extensive research and development work should be undertaken to explore *Withania somnifera* for its potential in preventing and treatment of diseases.

**SFE/CONV/17/--49**

**Activity of Ashwagandha against Insomnia**

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Insomnia can be triggered by disruption of normal sleep cycle. Under normal circumstances, our body is able to self-regulate our sleep cycles. Due to different influences, body gradually loses its ability to maintain the levels of sleep regulating substances, like Glutamate, Adenosine and GABA in the brain-giving rise to insomnia. Sedatives offer a temporary fix, by compensating for what the body is having difficulty in producing, but regular use of synthetic sedatives gives rise to drug dependence. So Ashwagandha is one of the best medicinal herb which works as a CNS depressant, causing sensations of tranquillity and relaxation to facilitate sleep induction. Ashwagandha (Latin: *Withania somnifera*), is both a tonic and a sedative due to its adaptogenic properties. Withania refers to the plants primary extract and somnifera literally means "sleep-inducing". According to the medical researchers, Ashwagandha owes its relaxant properties to a group of steroidal alkaloids called, Withanolides, such as Withaferin A, Withanolide D, Withanolide E, 3- $\beta$ -Hydroxy 2,3 dihydrowithanolide F etc. Other constituents – including other alkaloids called Sitoindosides, along with saponins and assorted minerals – may also play a role in producing a state of relaxation. Researches indicate that the extracts of Ashwagandha produces GABA-like activity which decrease neuron activity, inhibit nerve cells from over-firing and help to induce sleep because insomnia and restlessness are mainly caused due to excessive neuronal activity. To conclude, the present study suggests that Ashwagandha extract can be used in the management of sleep loss or to cure insomnia.

**SFE/CONV/17/--49**

**Effect of Ashwagandharista on different hematological parameters at different dose level utilizing Sprague-Dawley rats**

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Ashwagandharista (ASG) is a classical Ayurvedic preparation which is used as an anabolic. The main objective of the study was to analyze its effect on different hematological parameters. The experiment was conducted on 80 male and female Sprague-Dawley rats weighing between 50-70 gm. Both male and female control and three different dose regimen for each sex containing Ashwagandharista (ASG) treated groups were utilized for the experiment. The formulation ASG, was administered chronically to Sprague-Dawley rats of both sexes with (0.625 ml/kg = low dose, 5.0 ml/kg=medium dose and 40.0 ml/kg=high dose body weight) peroral doses of the formulation everyday for a period of 51 days. Blood was collected from the rats and analyzed utilizing hemolyzer. Statistically significant increase in wbc count in the female rat was noted in the lowest dose. Statistically significant increase in hemoglobin content in the female rat was noted in the mid-dose, on the contrary, statistically significant decrease in rbc count, hemoglobin content and hematocrit was noted in the male rat in the highest dose. Statistically significant decrease in the MCHC in the female rat was noted in both the mid and high doses. Statistically significant increase in the ESR in the male rat was noted in both the mid and high doses. Statistically significant increase in the bleeding time was noted in both the male and female rats, whereas statistically significant decrease in the clotting time was noted in the female rats only. This gender specific differentiation is may be due to some steroidal alkaloid which interferes with the gonadotropic activity.

**SFE/CONV/17/--51**

**Phytochemical and Pharmacological Profile of Ashwaganda (*Withania somnifera* L. Dunal): A Review**

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To explore various dimensions including phytochemical and pharmacological studies carried out on this Plant. Moreover the focus on this review is the possible exploitation of the species to treat different diseases and to suggest future investigations. The World Health Organization estimated that 80% of people worldwide rely on herbal medicines for some aspect of their primary healthcare. *Withania somnifera* (L) Dunal is a well known Indian medicinal plant widely used in the treatment of many clinical conditions in India. It is an important drug commonly known as Ashgand which has been used either single or in combination with other drugs in Unani as well as Ayurvedic system of medicine for centuries. It has been described by Dioscorides (78 AD) in his book "Kitab-ul-Hashaish". *Withania somnifera* (L.) Dunal belongs to the family solanaceae found in the drier parts of India, Sri Lanka, Afghanistan, Baluchistan and Sind and is distributed in the Mediterranean regions. It is also found in high altitude ascending to 5,500 feet in the Himalayas. It grows wildly throughout India particularly in hotter parts, on waste places and on road sides. It is also cultivated for medicinal purposes in fields and open grounds throughout India. In Ayurvedic system of medicine, roots of *Withania somnifera* commonly known as Ashgand are used for the medicinal properties. Different pharmacological studies on *Withania somnifera* shows that it possess Anti-inflammatory, Antimicrobial, Immunomodulatory, Anti-stress/Adaptogenic, Antitumour, Anticonvulsant, Anti-hyperglycaemic, Neuropharmacological, Morphine Tolerance and Dependence-Inhibiting Effect, Macrophage-Activating Effect, Musculotropic, Anti-oxidant, Anti-ageing Effect and Hepatoprotective Activity. *Withania somnifera* extract and their active constituents should be subjected to more detail mechanistic studies to fully understand the mode of action of the active constituents.

**SFE/CONV/17/--52**

**Immunomodulation Effect of Ashwagandha in Ayurveda**

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In Ayurveda, Ashwagandha (Botanical name: *Withania somnifera* -- SOLANACEAE) is a popular medicinal plant used as a tonic, alternative, aphrodisiac, nervine-sedative etc. The root is the main useful part of the plant whereas leaves are also used in some cases. There are various Ayurvedic medicinal preparations which are composed with Ashwagandha. It is indicated in the treatment of sexual, neurological, dermatological, cardiovascular, geriatric and other systemic disorders. It possesses properties like *guna* (quality) – *snigdha* (unctuous), *laghu* (light); *rasa* (taste) – *tikta* (bitter), *katu* (pungent), *kasaya* (astringent); *virya* (potency) – *usna* (hot); and *vipak* (effect after digestion) – *katu* (pungent). It consists of cuseohygrine, anahygrine, tropine, anaferine etc. like alkaloids or chemical components. Its root is used as a hypnotic in alcoholism and leaves are used as anthelmintic and are applied locally in curbuncle. It is successfully used in general debility, nervous exhaustion and loss of memory. It also prevents the decaying of the body tissues. In skin diseases, its powder mixed with oil when applied locally, ensures the healing. In deafness, its oil is prescribed as nasal drop. In case of paralysis as well as several rheumatic diseases, its oil is used locally. So, this literature review could emphasize the use & indication of Ashwagandha on different ailments through its pharmacodynamic actions.

**SFE/CONV/17/--53**

**Food Habbit In Skin Cancer Prevention - A Review**

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Cancer is an abnormal cell proliferation. Skin cancer is common and destructive proliferation of skin tissue which originated from the lined up cells of skin tissue. There are 3 major type of skin cancer; basal cell carcinoma; squamous cell carcinoma and melanoma. The main causes of skin cancer are UV radiation, some toxic chemicals. Food habits are important step towards prevention of skin cancer. Healthy people having adequate amounts of nutrients like lycopene, essential fatty acids and vitamins like A, B, C, E and zinc are not prone to diseases caused by harmful radiations. Every living organism on the surface of the earth is exposed to the ultraviolet (UV) fraction of the sunlight. UV radiation can damage DNA and thus mutagenize several genes involved in the development of the skin cancer. A gene often mutated in basal cell cancer is the PTCH1 gene, which is the part of the hedgehog signaling pathway inside cells. PTCH1 is a tumor suppressor gene that normally helps keep cell growth in check, so changes in this gene can allow cells to grow out of control. People who have basal cell nevus syndrome (Gorlin syndrome), which is often inherited from a parent and results in getting many basal cell cancer, have an altered PTCH1 gene in all the cells of the body.

**SFE/CONV/17/--54**

**An Overview of the Clinical Application of A Traditional Plant: Ashwagandha**

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*Withania somnifera*, also commonly known as Ashwagandha, is a small evergreen shrub that grows to roughly four to five feet tall. *Withania somnifera* (ashwagandha) is widely used in Ayurvedic medicine as the traditional medical system of India. Many pharmacological studies have been conducted to investigate the properties of Ashwagandha in an attempt to authenticate its use as a multi-purpose medicinal agent. Research reveals Ashwagandha possesses anti-inflammatory, antitumor, antistress, antioxidant, immunomodulatory, hemopoetic and rejuvenating properties. Ashwagandha also appears to benefit the endocrine, cardiopulmonary and central nervous systems. The chemistry of Ashwagandha has been extensively studied and over 35 chemical constituents have been identified, extracted and isolated. Ashwagandha contains potentially active constituents of alkaloids and steroidal lactones that together are called withanolides. The withanolides are reported to show antioxidant properties, including the prevention of lipid peroxidation in animal studies. The effectiveness of ashwagandha in a variety of rheumatologic conditions may be due in part to its anti-inflammatory properties, which have been studied by several authors. Ashwagandha's traditional use in Ayurvedic medicine includes its use as an optimal aging herb that increases longevity promotes resistance to disease, and improves both mental and physical health. This botanical agent has been used for centuries in ayurvedic medicine as potent antioxidant, anti-inflammatory, immune modulating agent.

**SFE/CONV/17/--55**

**LC-MS based metabolomic analysis of two edible *Momordica* species**

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*Momordica* species are mostly vegetables belonging to the family of Cucurbitaceae consisting of medium sized plants that grow abundantly in tropical parts of the world. They are widely known for the bitter taste due to the presence of phytochemicals (alkaloid) and possesses a wide range of medicinal properties. The *Momordica* species have been used in indigenous medical systems in various countries in Asia and Africa for a very long time. *Momordica dioica* and *Momordica charantia* are universal in distribution over India. In this study, metabolite profiling of fruit extracts of the two *Momordica* species i.e *Momordica dioica* and *Momordica charantia* were performed using ultra-performance Electrospray Ionization Liquid chromatography quadrupole TOF MS (UPLC-ESI-QTOF-MS) analysis. The readings were taken in both positive and negative ionization mode. Several metabolites were identified, with phenolic compounds and hydroxy fatty acids as the dominant substance groups. Principal component analysis (PCA) and hierarchical clustering analysis (HCA) were then applied to statistically interpret the result. Results from this study indicated that the proposed method is reliable for the rapid analysis of a group of metabolites present in *Momordica* species and applicable in the differentiation of between the two *Momordica* species that share similar chemical ingredients. This can lead to an effective method development for identification and discrimination between the two edible *Momordica* species.

**SFE/CONV/17/--56**

**Anti-inflammatory potential of aqueous root extract of *Withania somnifera***

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*Withania somnifera* (Ashwagandha) is an important Rasayana herb and roots of this plant are considered as Indian ginseng in Ayurveda. Traditionally, the roots of this plant are used as a tonic to promote physical and mental health and are actively taken part in the formulations effectively used for stress, cancer and inflammatory disorders. The study was designed to compare the *in vitro* anti-inflammatory efficacy of aqueous root extract of *Withania somnifera* with that of standard diclofenac sodium. For *in vitro* anti-inflammatory activity, heat induced albumin denaturation assay was performed. To establish the possible mechanism of anti-inflammatory actions inhibition of cyclooxygenase (COX) enzyme and pro-inflammatory mediators such as TNF- $\alpha$ , IL-1 $\beta$  and IFN- $\gamma$  were performed by using ELISA commercial kits. *Withania somnifera* root extract effectively inhibited heat induced albumin denaturation. The extract exhibited inhibitory effect for both COX-1 and COX-2 in *in vitro* test systems an IC<sub>50</sub> value of 124 and 32.74  $\mu$ g/mL respectively. Moreover, the extract inhibited the pro-inflammatory mediator activity in the test systems with an IC<sub>50</sub> value of 27.32, 14.71 and 72.46  $\mu$ g/mL for TNF- $\alpha$ , IL-1 $\beta$  and IFN- $\gamma$  respectively. The results obtained were comparative with that of diclofenac sodium. Inhibition of cyclooxygenase activity, as well as pro-inflammatory mediator release by *Withania somnifera*, reflects its anti-inflammatory actions. These observations reaffirm the traditional claims of *Withania somnifera* as an anti-inflammatory agent and its standardized root extract could be an alternative for the treatment of various inflammatory disorders including cancer.

**SFE/CONV/17/--57**

**Various Pharmacological Investigations of Leaf Extracts of *Paederia foetida***

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*Paederia foetida* is an important medicinal herb whose leaf extracts was evaluated in the present study for in-vivo anti-pyretic, neuropharmacological activity and gastrointestinal motility in Swiss albino mice following oral administration. Antipyretic test of methanol, ethanol and chloroform extracts of *Paederia foetida* leaf was performed by brewer's yeast method; neuropharmacological study was carried out by open field test and swimming test; gastrointestinal motility test was done by charcoal induced GI motility test. Methanol 400 mg/kg extract showed significant ( $p < 0.01$ ) result in case of forced swimming test corresponding value of control group. In-vivo gastrointestinal motility test was conducted with 100 mg/kg and 200 mg/kg of methanol, ethanol and chloroform extracts. Both the doses of ethanol extract showed significant ( $p < 0.01$ ) and ( $p < 0.001$ ) increase in GI motility comparing with the control. Significant *in-vivo* anti-pyretic on mice was observed with methanol 200 mg/kg extract.

**SFE/CONV/17/--58**

**Exploration of *in vitro* and *in vivo* biological activities of the leaf extract of *Spondia spinnata***

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*In-vitro* membrane stabilizing activity, *in-vivo* neuropharmacological activity including open field and swimming test, gastrointestinal motility and acute toxicity in Swiss albino mice following oral administration of different leaf extracts of *Spondia spinnata* were done in the present study. Charcoal induced gastrointestinal motility test, acute toxicity study were done by investigating mortality/morbidity status of test animal. Membrane stabilizing activity was done with human RBC in both hypotonic and heat induced method. In case of hypotonic solution induced haemolysis, the ethanol extract inhibited 76.92% hemolysis as compared to 85.42% produced by acetyl salicylic acid (ASA). During heat induced condition different organic soluble materials of *S. pinnata* demonstrated 76.68%, 77.19% and 74.83% inhibition of hemolysis respectively whereas ASA inhibited 78.04%. In-vivo neuropharmacological activity showed significant ( $p < 0.05$ ) and ( $p < 0.001$ ) results when methanol 200 mg/kg, ethanol 200 mg/kg, chloroform 100 & 200 mg/kg extracts which were administered to evaluate the rate of movement with time in dose dependent manner when compared with corresponding value of control group. In case of forced swimming test methanol 200 mg/kg, ethanol 200 mg/kg, chloroform 100 & 200 mg/kg extracts showed significant ( $p < 0.001$ ) and ( $p < 0.05$ ) results corresponding value of control group. Both the doses of methanol and ethanol extracts of 100 mg/kg and 200 mg/kg showed significant ( $p < 0.05$ ) and ( $p < 0.001$ ) results in gastrointestinal motility comparing with standard. None of the extracts showed any *in-vivo* acute toxicity effect on mice.

**SFE/CONV/17/--59**

**Evaluation of *in vitro* anthelmintic activity of leaf extracts of different Calamus species**

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Due to the costly nature of conventional anthelmintic drugs as well as the occurrence of anthelmintic resistance, scientists were eager to utilize medicinal plants as an analogous source of anthelmintics. The present study was aimed for evaluating the effectiveness of methanol, ethanol and chloroform leaf extracts of *Calamus guruba*, *Calamus viminalis*, *Calamus erectus* and *Calamus tenuis* for anthelmintic activity at two concentrations (50 and 100 mg/ml), using adult earth worm, *Pheretima posthuma*. Compared to albendazole, the chloroform extracts of *C. guruba*, *C. viminalis*, *C. erectus* & *C. tenuis* leaf (50 and 100 mg/ml) caused paralysis as well as death of worms in a significant dose dependent manner. Among the four selected plants, methanol extract of *C. tenuis* produced a significant decrease in paralysis time (\*\* $p < 0.01$ ) and death time (\*\* $p < 0.001$ ) as compared to the standard albendazole. When compared with the ethanol extract of *C. guruba*, *C. erectus* & *C. tenuis*, the ethanol extract of *C. viminalis* at 100 mg/ml showed significantly less time to cause death (\*\* $p < 0.001$ ) which is even lower than the standard drug.

**SFE/CONV/17/--60**

**Exploration of *In Vivo* Antioxidant Potential of *Citrus Maxima* Leaves against Paracetamol Induced Hepatotoxicity in Rats.**

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Pomelo or shaddock (*Citrus maxima*) is a widely cultivated and consumed citrus variety in India. In the present study, the methanol extract of *Citrus maxima* (J. Burm.) Merr. leaves (MECM) was evaluated for its *in vivo* antioxidant and hepatoprotective activity against paracetamol induced hepatotoxicity in Wistar albino rats. The results of the present study established the hepatoprotective and antioxidant activity of MECM at the dose levels of 200 and 400 mg kg<sup>-1</sup> body weight and showed dose dependent decrease in the bilirubin, total protein and serum hepatic enzyme levels in comparison to the paracetamol control rats. By MECM treatment, the hepatic TBARS levels were decreased and GSH and catalase levels were increased as comparable to the silymarin treated group (25 mg kg<sup>-1</sup> b.w.) which served as reference. The data were supplemented by histopathological studies of the rat liver sections.

**SFE/CONV/17/--61**

**Pharmaceutical Standardization of Apamargaksharsutra for the treatment of ano-rectal disorder**

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*Ksharsutra* is an ayurvedic medicated thread coated with herbal alkaline drugs mainly used for ano-rectal disorders. *Ksharsutra* preparation and its application were mentioned in *Susruta Samhita* (chikitsasthana 17/26-30). *Ksharsutra* therapy is a safe, and cost effective minimal invasive parasurgical procedure and time-tested ayurvedic technique in the management *arsha* (haemorrhoids), *bhagander* (fistula-in-ano), *nadivrana* (pilonidal sinus) etc. It is a special technique of excision without the use of knife by means of mechanical pressure and chemical action. An anti-septic property of kshar promotes simultaneous cutting and healing. *Ksharsutra* (medicated thread) was standardized through various standard physio-chemical procedures. Medicinal plants for the preparation of *Apamargaksharsutra* were collected from the herbal garden of the IPGAE & R, Kolkata and prepared in the Dravyaguna Dept of IPGAE & R following ayurvedic guidelines, by repeated smearing of alkali of *Achyranthes aspera* Linn. (*Apamarga*), latex of *Euphorbia nerifolia* Linn. (*Snuhi*) and turmeric (*Curcuma longa* Linn) powder on a 20 Barber's surgical linen thread. Prepared *Ksharsutra* was a dark brown coloured thread, with a dry coat of medicament that remains intact on handling and smooth to touch, having the physio-chemical parameters like length (32 cm), weight (0.95 gm), thickness (180 mm), tensile strength (5 kg), loss on drying at 105°C (4%), water-soluble extractive, hexane-soluble extractive, pH (10.2). The thread was kept in the sealed glass tube in a cabinet, labelled and exposed to ultraviolet radiation.

**SFE/CONV/17/--62**

***Nymphaea odorata* Aiton (Nymphaeaceae) root extracts inhibit the growth of the Breast Cancer Cell Line MCF-7 cell by inducing apoptosis**

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*Nymphaea odorata* (Nymphaeaceae), the American water-lily is a perennial aquatic plant native to the USA and Canada. Preparations of the roots and leaves of *N. odorata* have been used orally in traditional medicine for the management of cancer, chronic diarrhea, as well as topically for burns and open wounds. In the early 1900s, Eli G. Jones employed *N. odorata* in his treatment of various cancers and he was an early pioneer of America Eclectic Medicine prior to the advent of pharmaceutical treatments. Breast cancer is highly prevalent worldwide and remedies from the herbal origin are always considered safe as compared to other treatments to cancer. In this work, we assessed the effect of methanol extracts of the roots of *N. odorata* in the estrogen receptor positive human breast adenocarcinoma cell line MCF-7. Coarsely powdered roots of *N. odorata* were extracted with methanol and the extract was air dried. Cytotoxicity and cell viability assay was performed using CellTiter-Glo® 2.0 assay in MCF-7 and IC<sub>50</sub> value was determined. Control cells were treated with vehicle solvent (0.02% DMSO). Mechanism of cell death was determined by employing Alexa Fluor® 488 annexin V/Dead Cell Apoptosis Kit with Alexa® Fluor 488 Annexin V and PI for Flow Cytometry. The methanol extract of *N. odorata* exhibited cytotoxicity activity on MCF-7 with IC<sub>50</sub> of 20.6 µg/mL and the results of flow cytometry has revealed that, it induces apoptosis in MCF-7. The results suggest that, *N. odorata* may be an effective remedy for the treatment of breast cancer. We have isolated the active compounds in this extract that induce apoptosis in cancer cell lines. Further investigations on isolated active phytoconstituents and mechanisms of action are currently underway.

**SFE/CONV/17/--63**

***Nymphaea odorata* suppresses growth of *Helicobacter pylori* and Gastric Cancer Cell Lines AGS and NCI-N87**

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*Nymphaea odorata* Aiton (Nymphaeaceae; American white water-lily) is an aquatic perennial plant root used in First Nation, Ayurvedic and Chinese traditional medicine for the treatment of various ailments. The dried root and rhizome of the white water lily are used orally for the treatment of gastrointestinal, genital, and bronchial diseases. The leaves and roots have also been used externally, as infusions to treat lesions and inflammation associated with mucous membranes. In this work we have investigated the effects of extracts of *N. odorata* on the growth of *Helicobacter pylori*, the etiologic agent for gastritis, peptic ulcer, gastric MALT lymphoma and gastric cancer, as well as the effects of the active extract on gastric cancer cells *in vitro*. In 17 clinical strains of HP and the ATCC strain 43504, a methanol extract of *N. odorata* inhibited the growth of all HP strains at a concentration of 12.5 µg/ml, with an MIC of 9.25 µg/ml. The second part of the study, the effect of the methanol extract of roots of *N. odorata* was investigated in two gastric cell lines namely, AGS and NCI-N87 at concentrations up to 100 µg/mL. Control cells were treated with vehicle solvent (DMSO 0.02%). Cytotoxicity and cell viability was determined using the CellTiter-Glo® 2.0 assay. The IC<sub>50</sub> values of methanol extract of *N. odorata* root was found to be 26.79 µg/mL in AGS and 35.44 µg/mL in NCI-N87. The results of this study indicate that extracts of the roots of *N. odorata* inhibit the growth of HP strains providing a plausible of action in the treatment of GI disorders and may be a potential new candidate for the treatment of gastric cancer. Further investigations on isolated active phytoconstituents and mechanisms of action are currently in progress.

**SFE/CONV/17/--86**

**LC-MS based metabolomic analysis of two edible *Momordica* species**

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*Momordica* species are mostly vegetables belonging to the family of Cucurbitaceae consisting of of medium sized plants that grow abundantly in tropical parts of the world. They are widely known for the bitter taste due to the presence of phytochemicals (alkaloid) and possesses a wide range of medicinal properties. The *Momordica* species have been used in indigenous medical systems in various countries in Asia and Africa for a very long time. *Momordica dioica* and *Momordica charantia* are universal in distribution over India. In this study, metabolite profiling of fruit extracts of the two *Momordica* species i.e *Momordica dioica* and *Momordica charantia* were performed using ultra-performance Electrospray Ionization Liquid chromatography quadrupole TOF MS (UPLC-ESI-QTOF-MS) analysis. The readings were taken in both positive and negative ionization mode. Several metabolites were identified, with phenolic compounds and hydroxy fatty acids as the dominant substance groups. Principal component analysis (PCA) and hierarchical clustering analysis (HCA) were then applied to statistically interpret the result. Results from this study indicated that the proposed method is reliable for the rapid analysis of a group of metabolites present in *Momordica* species and applicable in the differentiation of between the two *Momordica* species that share similar chemical ingredients. This can lead to an effective method development for identification and discrimination between the two edible *Momordica* species.

**SFE/CONV/17/--64**

**Natural Remedy For Hairfall**

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*Xanthium strumanium*, known as **Ghagra** plant in West Bengal is helpful in controlling hairfall and cures baldness. This plants leaf helps in strengthening the roots of hair thus reduces hairfall. Its leaves are very effective in curing hair loss and baldness. Methods of using this plant is:-Apply the paste on scalp and on the areas where the hair has fallen and leave for some time. While taking bath wash with mild shampoo or soap. Those who have bald can have a little irritation or itching. Further research is going on.

**SFE/CONV/17/--87**

**Evaluation of tyrosinase inhibitory potential of standardized extract of Ayurvedic Varnya herb Nagkesar (*Messua ferrea*)**

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The varnya dravya are those herbs which are traditionally used as skin lighting agents. *Messua ferrea* is one of the varnya herb which is mentioned in the traditional ayurvedic literature, used for its skin lightening activity. As tyrosinase is the key enzyme in melanin formation, it is necessary to find the tyrosinase inhibition potential of nagkesar. The standardized extract of Nagkesar (*Messua Ferrea*) was screened to evaluate their in vitro anti-tyrosinase activity and inhibition kinetics. Phytochemical and pharmacological studies were carried out with methanol extract of *Messua Ferrea*. RP-HPLC analysis was used to determine the quercetin content in extract and fractions of *Messua Ferrea*. In tyrosinase inhibition assay, MFME was found to possess highest dose-dependent monophenolase and moderate diphenolase activity. The enzyme kinetic study revealed that MFME possessed mixed type inhibition of monophenolase activity of tyrosinase. These bioactivities indicate that the MFME has antihyperpigmentation potential in human skin.

**SFE/CONV/17/--65**

**Assessment of *In-vivo* antioxidant action of *Sida cordifolia* Linn. On dichromate ( $K_2Cr_2O_7$ ) model using oxidative stress marker**

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Reactive oxygen species (ROS) are produced by living organisms as a result of normal cellular metabolism and environmental factors, such as air pollutants or cigarette smoke. ROS are highly reactive molecules and can damage cell structures such as carbohydrates, nucleic acids, lipids, and proteins and alter their functions. The aim of this *in vivo* research study was to establish the antioxidant action of root part's aqueous extract of traditional Ayurvedic rejuvenator, tonic drug Bala (*Sida cordifolia*) on the oxidative stress induced by Potassium Dichromate on animal model using wister rats. Oxidative stress contributes to many pathological conditions and diseases, including cancer, neurological disorders, atherosclerosis, hypertension, ischemia/perfusion, diabetes, acute respiratory distress syndrome, idiopathic pulmonary fibrosis, chronic obstructive pulmonary disease, semen disorders and asthma.No significant toxic

symptoms or mortality has showed up to 1500 mg/kg dose in Acute toxicity study. Total phenol content using Folin- Ciocalteu showed a value of 27.375 mg. Gallic acid equivalent/gm. Total Antioxidant Capacity by Phosphomolybdate Assay in concentrations of 3, 6 and 9 mg/ml was evaluated to be  $15.40 \pm 9.13$ ,  $19.00 \pm 7.56$  and  $21.02 \pm 8.42$  gram equivalents of ascorbic acid. Oxidative stress markers- derivatives of Reactive Oxygen Metabolites (d-ROMs Test) to evaluate the level of hydroperoxides in terms of U. CARR units flourishing an impression that the effect of agents causing oxidative stress have reduced by research drug administration and Reactive Oxygen Species (ROS), studied using ELISA kit in the form of Optical Density values showed a significant reduction of oxidative stress due to simultaneous administration of research drug.

#### **SFE/CONV/17/--66**

#### **Evaluation of Polyherbal Formulation on potassium dichromate induced Oxidative Stress model by determining ROS (Reactive Oxygen Species) level**

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Several reactive oxygen species (ROS) are continuously produced as byproducts of aerobic metabolism. Depending on the nature of the ROS species, some are highly toxic and rapidly detoxified by various cellular enzymatic and non-enzymatic mechanisms. This study focuses on the *in vivo* antioxidant activity analysis of aqueous extract of the combination of roots of *Sida cordifolia* Linn. and *Glycyrrhiza glabra* Linn. has been evaluated on rat model using potassium Dichromate induced oxidative stress model. *Sida cordifolia* Linn. and *Glycyrrhiza glabra* Linn. are very useful rejuvenator and mentioned in Ayurveda for their medicinal properties. Acute toxicity study showed no significant toxic symptoms or mortality up to 1500 mg/kg dose. Total Antioxidant Capacity by Phosphomolybdate Assay in concentrations of 3, 6 and 9 mg/ml was evaluated to be  $16.48 \pm 80$ ,  $18.97 \pm 8.87$  and  $20.98 \pm 8.93$  ( $\mu\text{g}/\text{mg}$ ) equivalents of ascorbic acid. Total phenol content using Folin-Ciocalteu reagent showed 28.60  $\mu\text{g}$  Gallic acid equivalent/mg. Determination of Reactive Oxygen Metabolites (d-ROMs Test) to evaluate the level of hydroperoxides in terms of U. CARR units indicated that effect of agents causing oxidative stress can be mostly neutralized by polyherbal formulation administration. Reactive Oxygen Species (ROS) was studied using ELISA kit in the form of Optical Density values suggests that effect of oxidative stress is drastically reduced due to simultaneous administration of polyherbal formulation.

#### **SFE/CONV/17/--67**

#### **Anti-leishmanial activity of a 'carbohydrate fraction' isolated from wild mushroom *Astreus hygrometricus*: Searching a sweet solution.**

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Visceral leishmaniasis, also known as kala-azar, has a pathophysiology of irregular bouts of fever, substantial weight loss along with splenomegaly, hepatomegaly and anaemia. *Leishmania donovani*, the causative agent of visceral leishmaniasis is an obligate intracellular parasite that finds abode in macrophages, thereby suppressing the host immune system and shapes for its own survival. Although several formulations are in use widely as anti-leishmanial drugs, severe side effects along with emergence

of resistant strains are a continuous nuisance in treatment efficacy. In this study, we reported a 'carbohydrate fraction', isolated from an edible mushroom *Astraeus hygrometricus*, capable of tweaking the host machinery towards pro-inflammatory pathways of immune responses of the host. It was found capable of promoting the expression of iNOS2 and pro-inflammatory cytokines like TNF- $\alpha$  and IL-12, with subsequent down regulation of the anti-inflammatory cytokines as TGF- $\beta$  and IL-10, *in vitro*. Activation of TLR-2, TLR-7 and TLR-9 were also detected by Real Time PCR, *in vitro*. Interestingly, a dose dependent reduction of parasite burden was observed in spleen and liver, *in vivo*. Flow cytometry experiments showed proliferation of Ly6C<sup>+</sup> cells from bone marrow of Balb/c mice with an increase in inflammatory monocytes and presumably potent pro-inflammatory macrophages, with the fraction administered subcutaneously. Thus, this fraction might be a resourceful impact in the development of new adjuvant as an efficient anti-leishmanial agent with comparatively least toxicity but high promises.

**SFE/CONV/17/--68**

**Evaluation of Sothahara Karma (Anti-inflammatory and Analgesic Actions) of a Polyherbal Ayurvedic Formulation in Rodents**

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Rheumatoid arthritis is a common chronic disease in developing countries. The prevalence of rheumatoid arthritis in adults has been reported to vary from 0.5 to 3.8 percent in women and from 0.15 to 1.37 percent in men, with peak incidence in the fourth decades of life. The disease has been shown to put an enormous economic burden on society. Studies have also shown a higher incidence of arthritis among people with low incomes and less education. In ayurveda the disease may be correlated with *amavata* and there are some formulations to treat this disease condition. One of such formulation was taken as research drug which is comprised of dried leaves of *Vitex nigundo* Linn., *Ricinus communis* Linn. and dried stem bark of *Anthocephalus chinensis* Roxb. Hot plate method was used to evaluate the central analgesic activity and carrageenan-induced rat paw oedema was done to evaluate the anti-inflammatory activity in various animal models. In hot plate method percentage increase in reaction time at 90 mins was 77.88% in test drug treated group at highest doses and in standard group it was 103.81% in comparison to control group. Anti-inflammatory experiment in mice (Carrageenan induced paw oedema) exhibited 45.0% inhibition of paw diameter by research drug at the highest doses in comparison to control which was only 11.6%. Standard drug also showed 54.9% inhibition on paw diameter. Results of the experiments showed significant analgesic ( $p < 0.01$ ) and anti-inflammatory ( $p < 0.01$ ) activity of the test drug in different *in vivo* models. The research drug formulation used in the above experiments mainly contains phenolic compounds which may be responsible for the above pharmacological activities.

**SFE/CONV/17/--69**

**Study of aqueous extract of *Glycyrrhiza glabra* Linn. Roots for antioxidant action using oxidative stress model and its correlation with ROS**

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Reactive oxygen species (ROS) are produced by living organisms as a result of normal cellular metabolism and environmental factors, such as air pollutants or cigarette smoke. ROS are highly reactive molecules and can damage cell structures such as carbohydrates, nucleic acids, lipids, and proteins and alter their functions. The shift in the balance between oxidants and antioxidants in favor of oxidants is termed "oxidative stress." Regulation of reducing and oxidizing (redox) state is critical for cell viability, activation,

proliferation, and organ function. Aerobic organisms have integrated antioxidant systems, which include enzymatic and non-enzymatic antioxidants that are usually effective in blocking harmful effects of ROS. The aim of this *in-vivo* research study was to establish the antioxidant action of root part's aqueous extract of traditional Ayurvedic rejuvenator, Yashtimadhu (*Glycyrrhiza glabra*) on the oxidative stress induced by Potassium Dichromate on animal model using wistar rats. Oxidative stress contribute to many pathological conditions and diseases, including cancer, neurological disorders, atherosclerosis, hypertension, ischemia/perfusion, diabetes, acute respiratory distress syndrome, idiopathic pulmonary fibrosis, chronic obstructive pulmonary disease, semen disorders and asthma. *Glycyrrhiza glabra* Linn. has reported for various medicinal properties and has been specially mentioned in the Ayurvedic literature. The roots part has been reported for pharmacological actions which include hypo-lipidaemic, anti-atherosclerotic, antiviral, hepato-protective, spasmolytic, antidiuretic, antiulcer, antipyretic, antioxidant anti-microbial & anti-inflammatory activities. Total phenol content showed using Folin-Ciocalteu reagent as 23.94 µg Gallic acid equivalent/mg. Acute toxicity study has showed no significant toxic symptoms or mortality up to 1500 mg/kg dose. Total Antioxidant Capacity by Phosphomolybdate Assay in concentrations of 3, 6 and 9 mg/ml was found to be  $11.74 \pm 0.59$ ,  $14.32 \pm 1.25$  and  $16.18 \pm 1.50$  (µg/mg) equivalents of ascorbic acid. Determination of Reactive Oxygen Metabolites (d-ROMs Test) to evaluate the level of hydro-peroxides in terms of U. CARR units depicts that effect of agents causing oxidative stress can be mostly neutralized by the drug administration. Determination of Reactive Oxygen Species was studied using ELISA kit in the form of Optical Density values suggests that the effect of oxidative stress is drastically reduced due to simultaneous administration of the drug.

#### **SFE/CONV/17/--70**

#### **Analgesic, Anti-inflammatory and Anti-diarrheal activities of *Streblus asper***

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*Streblus asper* (Family: Moraceae, Bengali name – Shaora) has been used in folk medicine to treat leprosy, piles, diarrhea, dysentery, elephantiasis, cancer and other disorders. The aim of the present study is screening of *S. asper* leaves methanolic extract and its different fractions for analgesic, anti-inflammatory and anti-diarrheal activities in animal model. The extract and various fractions (200 and 400 mg/kg body weight; p.o.) were tested for peripheral analgesic and anti-inflammatory activity by acetic acid-induced writhing and carrageenan induced paw edema inhibition method, respectively; castor oil-induced diarrheal model was used to evaluate anti-diarrheal activity. All the samples were administered once in a day and the duration of study was approximately 5 h. Methanolic extract (200 and 400 mg/kg) showed significant peripheral analgesic activity having 57.09% and 60.00% ( $P < 0.001$ ) of writhing inhibition respectively. Similar result was found with carbon tetrachloride fraction at (200 and 400 mg/kg), showing 53.82% and 54.53% ( $P < 0.001$ ) of inhibition respectively which is comparable to standard Aceclofenac 62.55% ( $P < 0.001$ ). In evaluation of anti-inflammatory activity, crude methanolic extract and its pet ether and ethyl acetate fractions showed significant inhibition of paw edema having 90.76%, 80.67% and 76.47% ( $P < 0.001$ ) respectively compared to the standard Aceclofenac; 95.80% ( $P < 0.001$ ). In anti-diarrheal activity screening, methanolic extract and its ethyl acetate fractions cause reduction of diarrheal feces by 72.22% and 68.89% ( $P < 0.001$ ) respectively compared to standard Loperamide; 74.44% ( $P < 0.001$ ). The findings of the studies demonstrated analgesic, anti-inflammatory and anti-diarrheal activities of *S. asper* leaves which could be the therapeutic option against pain, inflammation and diarrhea.

**SFE/CONV/17/--71**

**Retrospection of Indian banyan tree with reference to its medicinal values**

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Indian banyan or bot, scientifically known as *Ficus benghalensis* Linn, considered as national tree of the country and playing pivotal role in Indian society from the medieval period of history. The tree has significant role in social, economical, medicinal, spiritual and religious life of Indian. Here, our endeavour is to focus the medicinal values of Indian banyan tree to the scientific society once again. Different parts of banyan tree are used as traditional medicine to get remedies from several ailments. The bark is useful in burning sensation, hemorrhages, diarrhoea, dysentery, diabetes, ulcer, skin diseases. The leaves are good for ulcers, leprosy, skin allergies. The buds are used in diarrhoea & dysentery. The latex is useful in rheumatism, hemorrhoids, inflammation and skin diseases. The aerial root is used for its antiemetic, antidiarrhoeal, anti-inflammatory properties. Major chemicals which have been isolated from stem bark are bengalensin, 3,5,7-trimethyl ether of delphinidin-3-O- $\alpha$ -L-rhamnoside, pelargonidin, 5,7 dimethyl ether of leucopelargonidine-3-O- $\alpha$ -L-rhamnoside, 20-tetratriacontene-2-one, pentatriacontan-5-one, meso-inositol,  $\beta$ -sitosterol- $\alpha$ -D-glucose. The aerial root contains alpha and beta amyryl acetate. The leaves contain rutin, friedelin, taraxosterol, lupeol,  $\beta$ -amyryl,  $\beta$ -sitoerol, quercetin-3-galactoside. The latex contains resin, sugar. Several amino acids and polysaccharides are isolated from the fruits and the seeds. Extracts of different parts of the plant and the isolated compounds has shown wide ranges of different pharmacological activities which signify the traditional uses of different parts of the plant.

**SFE/CONV/17/--73**

**Screening and evaluation of anti-leishmanial and immunomodulatory activity of *Piper nigrum* extract**

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The existing anti-leishmanial drugs for cure and mitigation of Kala-azar are very limited. Most of the available drugs are either toxic or less effective to become cause of disease relapse or conversion of post kala-azar dermal leishmaniasis in some cases even after full treatment of the patients. These problems made the mind towards the herbal medicine for leishmaniasis. Therefore in the present study extracts of *Piper nigrum*, an Indian medicinal plant has been evaluated for immunomodulation for anti-leishmanial activities. Extracts of *Piper nigrum* were prepared by soxhlation process using different solvents such as benzene, chloroform, ethyl acetate and methanol. The *Leishmania* parasites were maintained in the laboratory for the bioassay. Immunomodulatory activities and assessed by FACS calibur. Active fraction of extract was standardised with piperine as a marker compound through reverse phase high performance liquid chromatography (RP-HPLC) method. In the present study benzene fraction of *Piper nigrum* showed significant antileishmanial activities against both promastigote and amastigote forms of *Leishmania donovani* in our laboratory. The dose regimen of benzene fraction was found to be ~25-200  $\mu$ g/ml culture with non-significant haemolytic activities against the host cells. The extract showed strong anti leishmanial activity for IC<sub>50</sub> with ~ 25  $\mu$ g/ml and complete elimination of amastigote and promastigote with ~100  $\mu$ g/ml for IC<sub>90</sub> value. Piperine was found to be 4.24% (w/w) in the most active fraction of *Piper nigrum*. Anti-leishmanial activities of *Piper nigrum* extract indicates a new safe therapeutic for the treatment of visceral leishmaniasis.

**SFE/CONV/17/--75**

**Investigation of Phytochemical and Biological activities of Methanol extracts of *Withania somnifera***

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*Withania somnifera* (Ashwagandha) is much admired herb of the Indian Ayurvedic system of medicine. *W. somnifera* belongs to Solanaceae. It is used for various kinds of disease processes and especially as a nervine tonic. The biologically active chemical constituents include alkaloids (isopelletierine, anaferine, cuseohygrine, anahygrine), steroidal lactones (withanolides, withaferins) and saponins. Saponins and acylsterylglucosides in Ashwagandha are anti-stress agents. In the present study we have investigated the methanol extracts of tubers of *W. somnifera*. Primary and secondary metabolites were analysed and carried out the biological studies such as biocompatibility study with human blood cells, antimicrobial activities, anti biofilm activity against chronic infecting human pathogens and in vitro DPPH radical scavenging activity. TLC profiles of methanol extracts of alkaloids, phenols, flavonoids, saponins, phytosteroids were analyzed with the specific solvent system. The present study would be explained minor compounds present in the methanol extracts.

**SFE/CONV/17/--76**

**Analytical methods development for Quinones - I: Sensitive fluorimetric and spectroscopic methods for the assay of cosmetic and medicinal natural product lawsone**

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Naphthoquinone, lawsone, present in *Lawsonia inermis* is known for commercial and medicinal utility. A novel FRET method based on quenching of high fluorescent intensity of riboflavin by lawsone was developed. The decrease in the fluorescence intensity of riboflavin at pH 5.5 is proportional to the concentration of lawsone. The solution containing vit.B 2 and lawsone exhibits excitation and emission wavelength at 440 and 520 nm respectively. The observed linear range is 0.5-7.0 µg/ml. The spectrophotometric method was based on absorption maxima at 475 nm of the oxidative coupling product of lawsone with 3-methyl 2-benzothiazoline hydrazone (MBTH), in the presence of ferric chloride. The linearity is obeyed between 1.0-6.0 µg/ml. The methods were found to be precise and cost-effective for the estimation of contents in crude leaf extracts and commercial henna formulations. Recovery studies clearly indicate that the lawsone extracted and quantified and free from interferences in both the methods.

**SFE/CONV/17/--77**

**Pharmacognostic evaluation of *Hyssopus officinalis* L.**

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Medicinal plants form the backbone of several traditional systems of medicine. *Hyssopus officinalis* is a perennial plant of multidirectional medicinal activity. The objective of this study was to evaluate the pharmacognostical parameters in aerial parts including physico-chemical and phytochemical analysis along with in vitro antioxidant assay. Total phenol and flavonoid content was estimated and antioxidant potential is estimated by DPPH free radical scavenging assay, total antioxidant capacity and reducing power assay. Physicochemical studies revealed water soluble extractive 15%, alcohol soluble extractive 1%, hexane soluble extractive 2.65%, water insoluble ash 10.98%, and acid insoluble ash 12.4%. The percent value of

phytomolecules in crude drug was estimated to be like alkaloid (0.99%), tannin (1.75%), sugar (1.96%) and starch (0.68%). The IC<sub>50</sub> value for the in vitro DPPH radical scavenging assay was 0.50 µg/ml. Therefore, the study suggests presence of considerable amount of phenolic acids and antioxidant activity in the plant which supports its use in the traditional systems of medicine and promotes its utilization to enhance the socio-economic impact on society.

#### **SFE/CONV/17/--78**

### **Simultaneous HPTLC quantification of four bioactive metabolites in *Centella asiatica* (L.) from Western Himalayas (India)**

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A rapid, sensitive and reproducible method for simultaneous HPTLC quantification of four bioactive triterpenoids of *Centella asiatica* was developed. The study was performed on 23 accessions of collected from different locations of Uttarakhand, Himachal Pradesh and Jammu & Kashmir states. The HPTLC was performed on silica gel 60 F254 using chloroform:acetic acid:methanol:water (5.8:2.9:1.4:0.8) as mobile phase for madecassoside and asiaticoside and toluene:ethylacetate:formic acid (5:5:1) for madecassic acid and asiatic acid. The bioactive markers were quantified at the absorption maxima of 600 nm. In all the samples madecassoside concentration ranges from (0.01%-1.5%), asiaticoside (0.1-2.2%), while the madecassic acid from 0.02-1.44% and asiatic acid 0.05-1.2% respectively. Maximum content of all the four bioactive metabolites are madecassoside(CA-91, palampur), asiaticoside(CA-69, bhimtal), madecassic acid(CA-126, jhatingiri) and Asiatic acid(CA-94, sunderbani). This study will aid in identification of the elite chemotypes of *C. asiatica* and will also helps in the quality control of the species in pharmaceutical industries.

#### **SFE/CONV/17/--79**

### **Expected Adverse Drug Reactions of Ashwagandha**

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Ashwagandha (*Withania somnifera* Linn. Dunal) is an inevitable constituent in all the muscle-building and weight promoting formulations in Herbal medicines. Though its primary action is adaptogen and it is proven superior to Chinese ginseng. It is known so because of its distinct 'horsey smell' from fresh roots and leaves. Ashwagandha have been in use since 4000 years back without any serious noxious effect but now a day some of the adverse reactions are noticed. Besides this, at some places, it has shown a synergistic effect with other drugs. Ashwagandha reverses the weight loss in patient suffering from cancer, undergone to chemotherapy, acting as adjuvant. In Ayurveda it is denoted as 'baladaa'. Sometime it may cause G.I. problems like nausea, vomiting, diarrhoea and worsen peptic ulcers due to irritation. It significantly reduces cortisol concentration similar to alcohol and act as anxiolytic. It has been found to reduce immunosuppressive effect of some drugs like azathioprine, fluticasone, prednisolone etc. It interferes with actions of acetaminophen, fentanyl, zolpidem etc. through drug- herb interaction.

**SFE/CONV/17/--80**

**Near Infrared Spectroscopy for rapid in-situ measurement of andrographolides in *Andrographis paniculata***

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*Andrographis paniculata* (Burm. F) Nees, generally known as “king of bitters,” is an herbaceous plant in the family Acanthaceae. In China, India, Thailand, and Malaysia, this plant has been widely used for treating sore throat, flu, and upper respiratory tract infections. In recent years, pharmaceutical chemists have synthesized numerous derivatives, which exhibit essential pharmacological activities such as those that are anti-inflammatory, antibacterial, antitumor, antidiabetic, anti-HIV, antifeedant, and antiviral. In this presentation, we describe the experiments conducted aiming to estimate in-situ the andrographolide concentration in *Andrographis paniculata* leaves. We used the Near Infrared reflectance spectra from the leaves, which are calibrated and validated with the concentration of andrographolide under lab conditions. The region in the spectra was considered as 910-980nm. It is thus envisaged that this technique can be used for assessing the quality of the leaves in the fields in a non-invasive way. While the users will be benefitted by getting quality products, the industries can use the sensing system for maintaining quality of their products.

**SFE/CONV/17/--81**

**Evaluation of Different In-Vivo Biological Activities of the Leaf Extracts of *Calamus viminalis* (L.)**

**Mohammad Shahriar, Sumana Khandaker, Sajan Das and Rumana Akhter**

Department of Pharmacy, University of Asia Pacific, Dhaka, Bangladesh

This research was aimed to evaluate in vivo anti-pyretic, gastrointestinal motility, anti-nociceptive, neuropharmacological and acute toxicity effects in Swiss albino mice following oral administration of different leaf extracts of *Calamus viminalis*. According to the in vivo gastrointestinal motility test, both the doses of ethanol extracts (100 and 200 mg/kg body weight) and the dose of 200 mg/kg body weight of methanol extract showed maximum charcoal defecation time when compared with the effect produced by standard drug. In case of in vivo anti-nociceptive activity test, statistically significant ( $p < 0.01$ ,  $p < 0.001$ ) results were found for the 100 and 200 mg/kg methanol extracts when compared to standard Diclofenac sodium. Significant in vivo anti-pyretic effect on mice was found for both methanol (100 and 200 mg/kg) and chloroform (200 mg/kg) extracts. Ethanol extracts at 200 mg/kg body weight showed highest time of immobility of 191.5 seconds in case of neuro-pharmacological activity with statistically significant ( $p < 0.001$ ) result. In vivo acute toxicity test was performed and none of the extracts showed any significant effect on mice.

**SFE/CONV/17/--82**

**Pharmacognostical Standardization of Ashwagandha**

Deboleena Paria\*, Rajesh Bolleddu, Sreya Dutta, Jayram Hazra

National Research Institute of Ayurvedic Drug Development, 4 CN Block, Sector- V, Bidhannagar, Kolkata 700 091, India.

Pharmacognostical study is the preliminary step in the standardization of crude drug. The detailed pharmacognostical evaluation gives valuable information regarding the morphology, microscopical and physical characteristics of the crude drugs. Pharmacognostic studies have been done on many important drugs and the resulting observation been incorporated in various pharmacopoeias. There are a number of crude drugs where the plant source has not yet been scientifically identified. Hence pharmacognostic study gives the scientific information regarding the purity and quality of the plant drugs. Pharmacognostical standardization of dried, matured roots of *Withania somnifera* Dunal (Solonaceae) has been explained in the present study. The study includes macroscopical and microscopical evaluation. Microscopical evaluation consists of transverse section and powder microscopy of Aswagandha root. The present study reveals standardization profile for drug like *Withania somnifera* Dunal., which would be of immense value in botanical identification and authentication of plant drug and may help us in preventing its adulteration.

**SFE/CONV/17/--83**

**Cardiovascular Activities of an Ayurvedic Preparation Amalaki Rasayan in Rat Model**

Md. Taimuzzaman Sharif<sup>1</sup>, Shahana Jahan<sup>2</sup>, Kamrun Nahar<sup>2</sup>, Most. Shammi Rahman<sup>2</sup>, Md. Musfequr Rahman Shajjad<sup>1</sup>, Abu Asad Chowdhury<sup>1</sup>, Mohammad A. Rashid<sup>1</sup> and Mohammad Shah Amran<sup>1\*</sup>

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The importance of traditional or alternative medicines including Ayurvedic drugs are increasing day by day because of their necessary pharmacological actions and fewer side effects. Previous investigators showed hypolipidemic and cardioprotective effects of Amla which is the active ingredient of Amalaki Rasayan. It is an ayurvedic formulation that contains extracts of *Phyllanthus emblica* plant. Therefore, this study has been conducted to investigate the scientific evidence of its cardioprotective effects in rats by recording electrocardiographic tracings. Rats, of either sex, were treated with preparation containing extracts of *Phyllanthus emblica* in doses 800µg/kg bodyweight, 1600µg/kg bodyweight and 3200µg/kg bodyweight through intraperitoneal route. Electrocardiogram along with heart rate and other parameters were measured in rat model before and after administration of Amalaki Rasayan. It was evident that Amalaki Rasayan, at a dose of 800µg/kg, was safe but 1600 µg/kg and 3200 µg/kg produced abnormal activities in the heart. It can be inferred from the study that, the ayurvedic preparation Amalaki Rasayan possesses significant cardioprotective effect.

**SFE/CONV/17/--84**

**Pharmacological studies of three edible fruits (*Heritiera fomes*, *Sonaratia casiolaris*, and *Sonaritia apetala*) derived from the mangrove region of West Bengal**

Samir K. Samanta, Ria Halder, Soumoyajit Sil, Sainee Roy, Siddhartha Bhowmik, Soumali Dey Roy, Arindam Das, Shymal Biswas and S M Firdous

Calcutta Institute of Pharmaceutical Technology & Allied Health Sciences, Banitabla, Uluberia, Howrah, West Bengal 711316

Mangrove areas are rich in medicinal and edible plants. Biological screening of the plants in this study may lead to drug and health product development. Fruits of *Heritiera fomes*, *Sonaratia casiolaris*, and *Sonaritia apetala* are widely used as food as well as in the preparation of pickle in the tropical coastal areas. Therefore, the fruit of these species could be of great use in preparation of functional foods and dietary supplements. Accordingly, the activity of hydro-methanolic extracts of these fruits has been under taken in

order to determine the suitability for human use as food material. Oral administration of hydro-methanolic extracts (400 mg/kg) of fruits of *Heritiera fomes*, *Sonaratia casiolaris*, and *Sonaritia apetala* for 28 days increased the food and water consumption in rats. The extracts (400 mg/kg) of fruits of all the three mangrove plants increased the hemoglobin level and leukocyte count and improved the lipid profile. Treatment with the extracts (400 mg/kg) for 28 days did not alter the blood glucose level; but increased the serum creatinine level. The extracts (400 mg/kg) elevated ALP and SGOT level but no significant changes in SGPT level was observed. Moreover, significant decrease in the blood urea level in rats treated with extract of *Sonaratia apetala* and significant increase in  $\gamma$ -glutamyl transferase level in rats treated with extracts of *Heritiera fomes* and *Sonaratia casiolaris* fruits was observed.

#### SFE/CONV/17/--85

##### Antiinflammatory and antioxidant activity of Garlic bulb and leaves

Samir K. Samanta, Swarvanu Sarkar, Soumyabrata Midya, Rangan Roy, Ankita Manna, Shymal K. Biswas and S. M. Firdous

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Garlic (*Allium sativum* L., Liliaceae) is a common spicy flavouring agent used since ancient times. Garlic has been cultivated throughout the country for its characteristic flavour and medicinal properties. Although garlic has been used for centuries, and even nowadays is part of popular in many cultures, but until recently there has been little scientific support of its therapeutics and pharmacological properties. In the present study, an attempt was made to evaluate the antiinflammatory activity of garlic bulb and garlic leaves in rats. The aqueous extract of garlic bulb and garlic leaves produced significant inhibition of rat paw oedema, both prior to and after carrageenan administration as compared to control group. The extract also decreased protein exudation and leukocyte migration in the peritoneal fluid, thereby indicating its effectiveness towards inhibiting peritoneal inflammation. The aqueous extract of garlic bulb and garlic leaves was also found to possess significant free radical (DPPH, and hydroxyl radical) scavenging activity.

#### SFE/CONV/17/--86

##### Safety assessment of *Cyperus rotundus* extracts through drug metabolizing inhibition studies

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This study deals with the inhibition potential of the standardized extract of *Cyperus rotundus* (Family-Cyperaceae) against drug CYP2D6 & CYP3A4 for the assessment of its safety profile. The methanolic extract of *Cyperus rotundus* (CR) was standardized through RP-HPLC, (Shimadzu Prominence, Kyoto, Japan, C18 column) using (+) Nootkatone (NK) as marker. Acetonitrile: 1% o-phosphoric acid in Milli-Q water (70:30) was optimized as mobile phase and elute was detected at 245nm. Safety assessment of the AS extract was carried out through CYP450-CO and Fluorometric assay. The method was found to be linear with 20-100  $\mu$ g/ml of standard allicin. The coefficient of determinants was ( $R^2$ ) > 0.998 and  $2.7 \pm 1.03$  % (w/w) of marker present in the extract. CYP450-CO assay result stated that the interaction potential between the extract and pooled liver microsomes was found to be less than the standard inhibitor ketoconazole. In the fluorimetric assay, CR extract showed higher  $IC_{50}$  values than their positive inhibitors, ketoconazole and quinidine for CYP3A4 and CYP2D6, respectively. The findings suggested that the CR extract and its active phyto-constituent showed negligible interaction potential with CYP450 isozymes and may not produce any harmful effect upon their therapeutic benefits.

**Evaluation of Anti-diabetic poly herbal formulation**

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Diabetes mellitus, a metabolic disease with manifestation of hyperglycemia and dyslipidemia, is still one of the most leading causes of death and disability. The study focuses on polyherbal antidiabetic formulations of different plants used in the treatment of diabetes mixed in different concentrations. In the present study three medicinal plants with proven antidiabetic and related beneficial effects were selected for the preparation anti-diabetic polyherbal mixture. The efficacy of prepared mixtures has been tested on alloxan induced diabetic rats. The animals were randomized into three groups: (1) Group a: Control Group, (2) Group b: Diabetic group, (3) Group c: Drug given after diabetic was induced, (4) Group d: Drug given before diabetic was induced. Diabetes was induced by intra peritoneal injection of alloxan. A total number of 25 rats were studied among them 10 rats were alloxan given group and the polyherbal mixture was given to them. After observed for 5 weeks their hyperglycemia was significantly. Another 5 rats were tested for the prophylactic activity, they were given the polyherbal mixture before the alloxan was given. After observed for 5 weeks no significant amount of hyperglycemia was seen in them. The results of the mixtures on treated group were found to restore the glycemic level to the near normal level thereby indicating antihyperglycemic activity of the formulated mixtures.

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