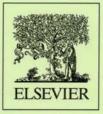
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Official Journal of the International Society for Ethnopharmacology

An Interdisciplinary Journal Devoted to Indigenous Drugs

A Special issue on Ayurveda *Guest Editors:* Pulok K. Mukherjee, Katiyar C. K. and Bhushan Patwardhan *An initiative of* Society for Ethnopharmacology, India 23/3 Saktigarh, Jadavpur, Kolkata 700032, India **www.ethnopharmacology.in**

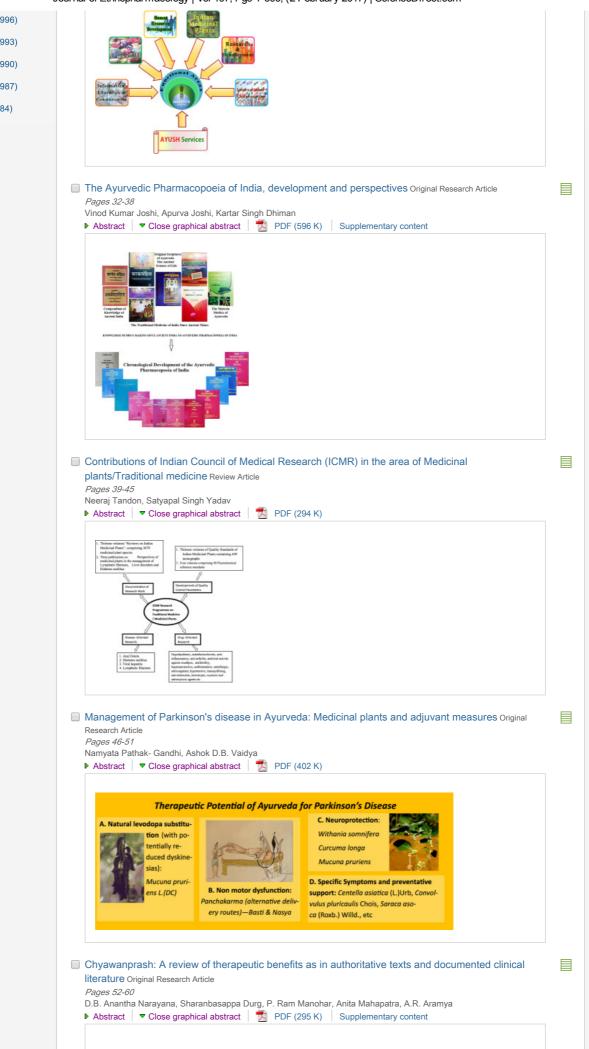
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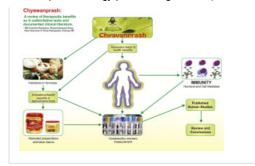
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| Previous vol/iss Next vol/iss > | Journal of Ethnopharmacology Volume 197, Pages 1-306 (2 February 2017) Special issue on Ayurveda Edited by Pulok K. Mukherjee, Katiyar C. K. and Bhushan Patwardhan Articles | s 1 - 3 | |
| rticles in Press | | oes ▼ | |
| pen Access articles | IFC (Journal of Ethnopharmacology) | E | |
| rtual Special Issues | Page IFC | E | |
| Volumes 201 - 203 (2017) | DF (46 K) | | |
| Volumes 191 - 200 (2016 - 2017) Volume 200 pp. 1-236 (22 March 2017) | New times for traditional medicine research Page 1 Dr. Rob Verpoorte PDF (160 K) | E | |
| Volume 199 pp. 1-334 (6 March 2017) | Editorial Special incurs on Annunada | F | |
| Volume 198 | Editorial: Special issue on Ayurveda Page 2 | E | |
| pp. 1-610 (23 February 2017) Volume 197 | Pulok K. Mukherjee, C.K. Katiyar, Bhushan Patwardhan | | |
| pp. 1-306 (2 February 2017) Special issue on Ayurveda | Some excerpts from Charaka Samhita – An ancient treatise on Ayurveda & healthy living | E | |
| Volume 196 pp. 1-292 (20 January 2017) | Pages 3-9 C.K. Katiyar, Pulok K. Mukherjee PDF (1675 K) | | |
| Volume 195 pp. 1-342 (4 January 2017) | | E | |
| Volume 194 pp. 1-1152 (24 December 2016) | Pages 10-24 | | |
| Volume 193 pp. 1-728 (4 December 2016) | Pulok K. Mukherjee, Ranjit K. Harwansh, Shiv Bahadur, Subhadip Banerjee, Amit Kar, Joydeb Chanda, Sayan Biswas, Sk. Milan Ahmmed, C.K. Katiyar ► Abstract ▼ Close graphical abstract ➡ PDF (4265 K) | | |
| Volume 192 pp. 1-534 (4 November 2016) | | | |
| Volume 191 pp. 1-408 (15 September 2016) | A series of the | | |
| Volumes 181 - 190 (2016) | Annale Restar | | |
| Volumes 171 - 180 (2015 - 2016) | | | |
| Volumes 161 - 170 (2015) | Transmission and the second seco | | |
| Volumes 151 - 160 (2014 - 2015) | Kan-bing just in Europe and Conference and the second sec | | |
| Volumes 141 - 150 (2012 - 2013) | The second | | |
| Volumes 131 - 140 (2010 - 2012) | | - - | |
| Volumes 121 - 130 (2009 - 2010) | Government policies and initiatives for development of Ayurveda Original Research Article Pages 25-31 | | |
| Volumes 111 - 120 (2007 - 2008) | Dinesh Katoch, Jitendra S. Sharma, Subhadip Banerjee, Rajarshi Biswas, Bhaskar Das, Debayan Goswami, Ranjit K. Harwansh, C.K. Katiyar, Pulok K. Mukherjee ► Abstract V Close graphical abstract DPF (681 K) | | |
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- ± Volumes 11 20 (1984 1987)
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Journal of Ethnopharmacology | Vol 197, Pgs 1-306, (2 February 2017) | ScienceDirect.com





Understanding the mode-of-action of Cassia auriculata via in silico and in vivo studies towards validating it as a long term therapy for type II diabetes Original Research Article Pages 61-72

Fazlin Mohd Fauzi, Cini Mathew John, Arunkumar Karunanidhi, Hamse Y. Mussa, Rajesh Ramasamy, Aishah Adam, Andreas Bender

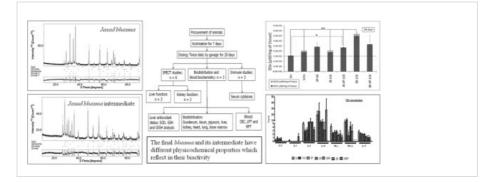




Safety and bioactivity studies of *Jasad Bhasma* and its in-process intermediate in Swiss mice Original Research Article

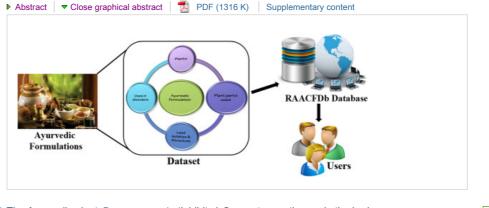
Pages 73-86

Aparna Chavare, Praneeth Chowdari, Sandipto Ghosh, Priyanka Pawar, Meena Patkar, Suresh Dakave, Vikram Gota, Pradip Chaudhari, S.V. Chiplunkar, Shantaram Kane, A.K. Suresh, Jayesh Bellare ► Abstract V Close graphical abstract DPF (2172 K)



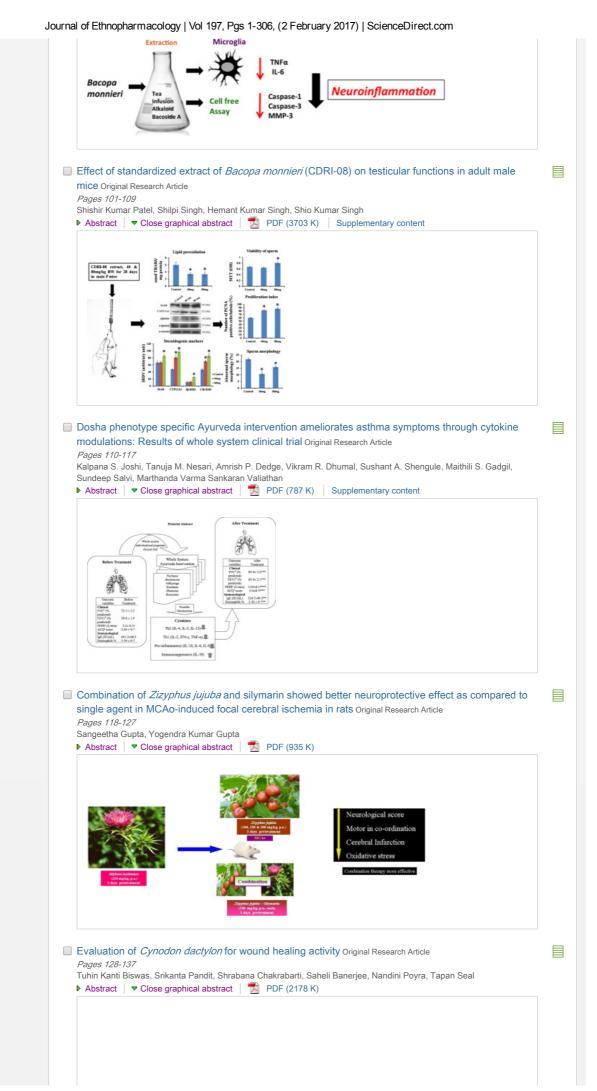
RAACFDb: Rheumatoid arthritis ayurvedic classical formulations database Original Research Article Pages 87-91

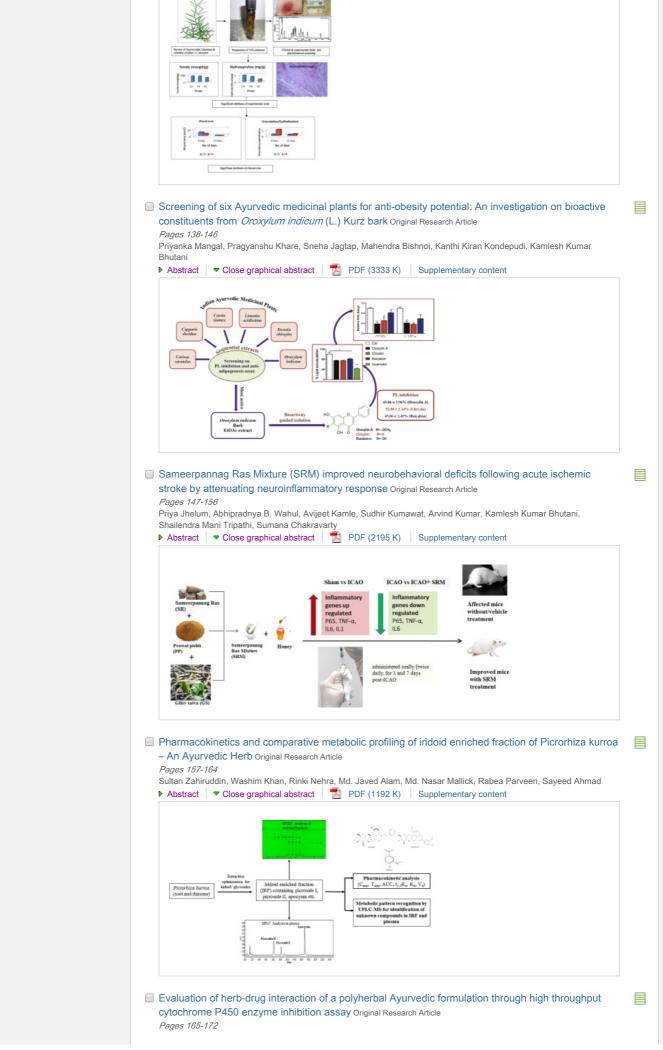
A.M. Mohamed Thoufic Ali, Aakash Agrawal, S. Sajitha Lulu, A. Mohana Priya, S. Vino



The Ayurvedic plant Bacopa monnieri inhibits inflammatory pathways in the brain Original Research Article
 Pages 92-100
 Michelle D. Nemetchek, Andrea A. Stierle, Donald B. Stierle, Diana I. Lurie

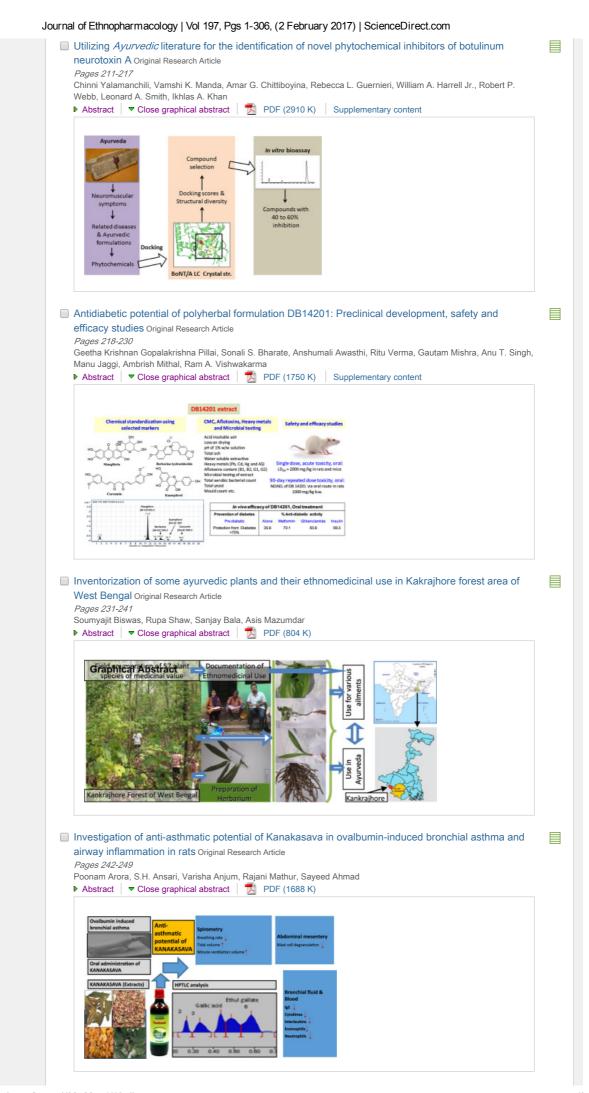
▶ Abstract | ▼ Close graphical abstract | 📩 PDF (1210 K) | Supplementary content

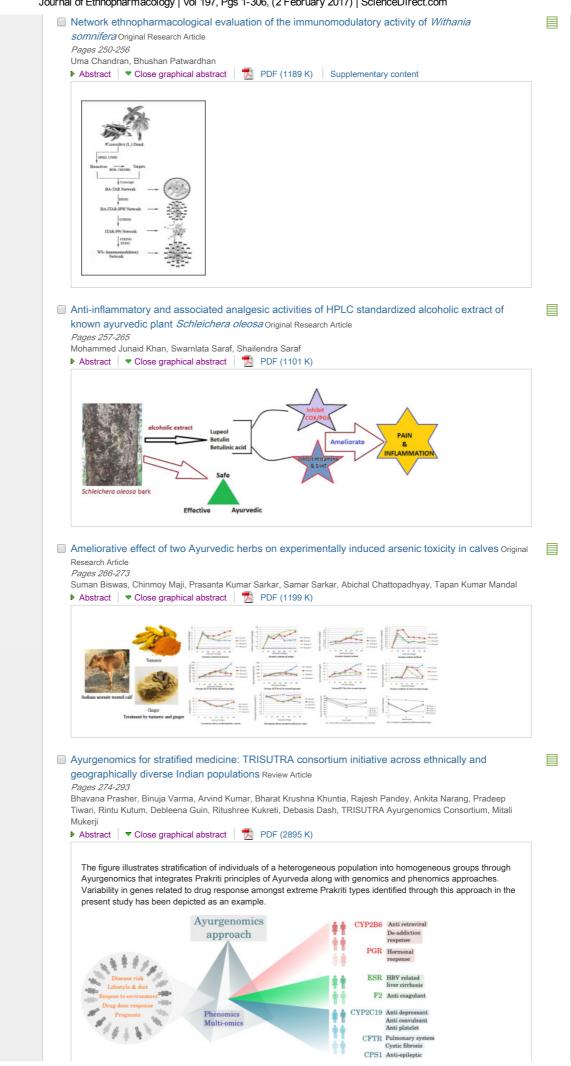


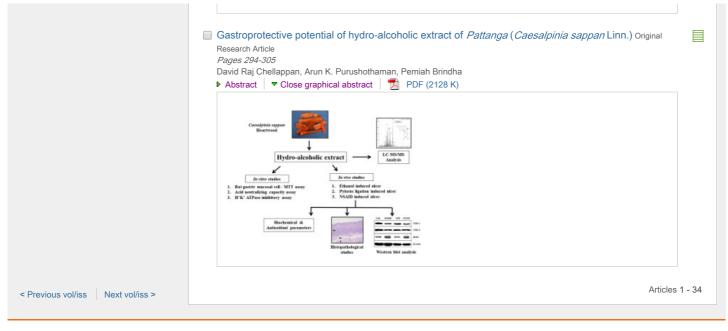


Subrata Pandit, Satyajyoti Kanjilal, Anshumali Awasthi, Anika Chaudhary, Dipankar Banerjee, B.N. Bhatt, Avinash Narwaria, Rahul Singh, Kakoli Dutta, Manu Jaggi, Anu T. Singh, Neena Sharma, Chandra Kant Katiyar









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JOURNAL OF ETHNOPHARMACOLOGY

An interdisciplinary journal devoted to indigenous drugs

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The Journal of Ethnopharmacology is dedicated to the exchange of information and understandings about people's use of plants, fungi, animals, microorganisms and minerals and their biological and pharmacological effects based on the principles established through international conventions. Early people confronted with illness and disease, discovered a wealth of useful therapeutic agents in the plant and animal kingdoms. The empirical knowledge of these medicinal substances and their toxic potential was passed on by oral tradition and sometimes recorded in herbals and other texts on materia medica. Many valuable drugs of today (e.g., atropine, ephedrine, tubocurarine, digoxin, reserpine) came into use through the study of indigenous remedies. Chemists continue to use plant-derived drugs (e.g., morphine, taxol, physostigmine, quinidine, emetine) as prototypes in their attempts to develop more effective and less toxic medicinals.

In recent years the preservation of local knowledge, the promotion of indigenous medical systems in primary health care, and the conservation of biodiversity have become even more of a concern to all scientists working at the interface of social and natural sciences but especially to ethnopharmacologists. Recognizing the sovereign rights of States over their natural resources, ethnopharmacologists are particularly concerned with local people's rights to further use and develop their autochthonous resources.

Accordingly, today's ethnopharmacological research embraces the multidisciplinary effort in the:

- · documentation of indigenous medical knowledge,
- scientific study of indigenous medicines in order to contribute in the long-run to improved health care in the regions of study, as well as search for pharmacologically unique principles from existing indigenous remedies.

The Journal of Ethnopharmacology publishes original articles concerned with the observation and experimental investigation of the biological activities of plant and animal substances used in the traditional medicine of past and present cultures. The journal will particularly welcome interdisciplinary papers with an ethnopharmacological, an ethnobotanical or an ethnochemical approach to the study of indigenous drugs. Reports of anthropological and ethnobotanical field studies fall within the journal's scope. Studies involving pharmacological and toxicological mechanisms of action are especially welcome. Clinical studies on efficacy will be considered if contributing to the understanding of specific ethnopharmacological problems. The journal also welcomes review articles in the above mentioned fields especially on novel methodologies relevant to disease states.

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New times for traditional medicine research



It is my pleasure to make some introductory remarks for this special issue on Ayurvedic medicine. First of all my congratulations to the guest editors Dr. Mukherjee, Dr. Katiyar, and Dr. Patwardhan, they did an excellent job in covering the whole field from regulations to cutting edge research in the exciting field of traditional medicine and their use.

In the past years a remarkable change occurred in the perception of traditional medicine. For many years western medicine did not take traditional medicine serious. For many it was even considered as quackery. For different reasons there is now a clear change in thinking about traditional medicines. First of all progress in developing novel medicines in western medicine is stalling, among others, because the most important diseases are multifactorial and it is unlikely that a single medicine could cure or at least suppress a disease. The final breakthrough for treatment of HIV, was combining several medicines. The idea of using mixtures of compounds became accepted, and a major argument against traditional medicines lost most of its validity. Traditional medicines are mixtures of compounds, and often traditionally certain plant materials are mixed by purpose. Losing the battle against microorganisms because of their resistance against the single compound antibiotics also has attributed to a change in thinking. Finally the year 2015 Nobel Prize for Medicine and Physiology was the recognition of top medical scientists that nature is a very interesting source for novel medicines. The excellent work in many laboratories all over the world in unraveling the mechanisms of action involved in traditional medicine, and in bioprospecting thus should feel honored with this recognition.

As clear from this special issue, to achieve evidence-based use of traditional medicine a multidisciplinary approach is needed. It requires state-of-the-art infrastructures and equipment. Specialists from different disciplines, including the "omics" tools and bioinformatics should collaborate in a systemic approach to questions related to evidence-based use of traditional medicines. That means systems biology rather than the reductionist approach of "single target – single compound" as applied in drug development during the past decades. Synergy and prodrugs will be important aspects in such studies, aspects which require in-vivo models and metabolomics approaches.

Understanding the knowledge of our ancestors: "knowledge of our ancestors and learning from nature" should be the paradigm for the coming years. Our ancestors were able to find artemisinin, morphine, salicylic acid, reserpine, atropine and tubocurarine, just to name a few, by observing nature with their own senses, without any of the tools we have nowadays. So we should be able to find new medicines and treatments, just like our ancestors did, by observation instead of hypotheses and synthesis. The back-up of governments will be important to create the basis for an efficient use of traditional practices and medicines in integrated health care systems. This special issue about Ayurveda, one of the major medical systems in the world, gives us many excellent examples of the ongoing research in this exciting field of research. The political, and regulatory aspects are also dealt with, it should thus be important reading for both scientists and administrators.

The support from the medical field should stimulate all researchers in the field to start new collaborations and further improve our efforts in building cases for evidence-based use of traditional medicines. This could build a platform on which in the coming years a further Nobel Prize might be awarded to our field.

Prof. emeritus Dr. Rob Verpoorte Natural Products Laboratory, IBL, Leiden University, Leiden, the Netherlands E-mail address: Verpoort@chem.leidenuniv.nl Contents lists available at ScienceDirect



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Editorial: Special issue on Ayurveda



"प्रयोजनं चास्य स्वस्थस्य स्वास्थ्यरक्षणमातुरस्यवकिारप्रशमनं चा"

||Prayojanam chasya swasthasya swasthyarakshanam aturasya vikararprasamanam cha ||

Ch. Su. - 30/26

(The aim of Ayurveda is to preserve health of the healthy

and treatment of the diseased).

The term *Ayurveda* originated from the two words '*Ayu*' meaning life and '*Veda*' meaning science or knowledge. Ayurveda defines life as the combination of *Shareera* (body), *Indriya* (sense organs), *Satwa* (mind) and *Atma* (soul). It deals with health in all aspects; physical health, mental balance, spiritual well-being, so-cial welfare, environmental considerations, dietary life style habits, daily living trends and seasonal variations in lifestyle, as well as treating and managing specific diseases. Ayurveda represents a holistic approach in respect of appreciation of life and the means to empower the individual for sustainable living.

Ayurveda is getting global acceptance primarily due to its age-old therapeutic practice, profound conceptual basis and survival of its medicines for thousands of year. It is great to see that the concepts, drugs, formulations developed in ancient times finds their relevance today albeit changes in environment, lifestyle & culture and disease patterns. The philosophy of treating a system or body as a whole is gaining relevance during transition from reductionist approach to "systems" approach in the post genomic era. Chemical standardization like biomarker and metabolite profiling has unfolded a diverse chemical space of safe and therapeutically relevant molecules. On-going research on Ayurgenomics is adding evidence regarding the genomic correlates of Vata, Pitta and Kapha the three dynamic principle bio factors termed as Tridosha. Exploring molecular and network pharmacology of intelligent traditional formulations to elucidate and validate safety, toxicity, pharmacokinetics, metabolic stability, drug-herb interactions etc. are gaining importance. Focus on the validation of clinical traditions and practices like Panchakarma, Marmachikitsa, Agnikarma, Parpatichikitsa, Sarpavishachikitsa, Rasayana needs in depth scientific exploration. Ayurveda pharmaceutics needs special exploration as it presents rational multi-component formulations, safer drugs from herbs, metals and minerals, marine sources with novel pharmaceutical processes detailed in 'Bhaisajyakalpana and Rasasashtra'.

This special issue on "*Ayurveda*" presents different scientific facets of a tradition in motion; alive and progressing. This will provide a forum for *Ayurveda* interest groups to exchange ideas, learn about developments and salute initiatives that hold promise for evidence based research regarding health and well-being.

This special issue contains 30 articles emphasizing on several crucial aspects on Ayurveda, traditional Indian system of medicine

and Ethnopharmacology.

This special issue is developed through the initiatives of the Society for Ethnopharmacology, India, (SFE-India) (www.ethno pharmacology.in), affiliated to the International Society for Ethnopharmacology. The SFE-India provides networking opportunity for development and promotion of medicinal plants and Ethnopharmacology. The Society works on dissemination of knowledge in this area with the major highlights on "Globalizing local knowledge and localizing global technologies."

We express our special gratitude to all the authors for their valuable contribution and to the reviewers for their esteemed support for this issue. It would have not been possible to complete this work without the active help rendered from the research group of Prof. Pulok K. Mukherjee at the School of Natural Product Studies, Jadavpur University, Kolkata. We are thankful to Mr. Ranjit K Harwansh, Mr. Rajarshi Biswas, Mr. Subhadip Banerjee, Mr. Bhaskar Das, Mr. Amit Kar, Mr. Debayan Goswami, Mr. Shiv Bahadur, Mr. Sayan Biswas, Mr. Joydeb Chanda and others for their support and help.

We express our special gratitude to Prof. Rob Verpoorte (Editorin-Chief), Prof. A. M. Viljoen (Deputy Editor-in-Chief) for their guidance and support to make this issue. We would like to thank Marianne Verberne, I. Vermaak, M. Sandasi, L. J. McGaw, B. Pomahacova (Handling Editor), Monica Mary Saravanan, Reny Pio, Meenakkshi VS (Journal Manager), Selvam Balasubramaniam (Publishing content specialist, Elsevier) for their support for this Special Issue.

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Some excerpts from Charaka Samhita – An ancient treatise on Ayurveda & healthy living

Charaka is the name of the great sage, Maharishi Charaka and Samhita means lexicon or encyclopedia. Charaka Samhita is almost 3000 years old written in original Sanskrit language. It contains information about lifestyle guidelines, foods and drugs to ensure longevity and includes health promotion, disease prevention measures besides behavioral aspects. It has provided equal emphasis on food, lifestyle, drug and disease management. Charaka Samhita comprises eight sthana (parts) containing 120 chapters. Sutra Sthana (General principles) is having 30 chapters which deal with general principles, philosophy, definitions, and prevention through healthy living. Nidana Sthana (Pathology) contains 8 chapters on causes of diseases. Vimana Sthana comprises 8 chapters containing training of a physician, ethics of medical practice, pathology, diet and nourishment, taste of medicines. Sharira Sthana (Anatomy) is having 8 chapters which describe embryology & anatomy of a human body. Indriya Sthana contains description on diagnosis & prognosis based on sensory response of the patient covered in 12 chapters. Chikitsa Sthana (Therapeutics) is having 30 chapters dealing with medicines and treatment of diseases. Kalpa Sthana (Pharmaceutics and toxicology) comprises 12 chapters describing pharmacy, the preparation and dosage of medicine, signs of their abuse, and dealing with poisons. Siddhi Sthana described in 12 chapters describes the signs of cure, hygiene and healthier living.

Given below are some selected excerpts from Charaka Samhita on Ayurveda, healthy lifestyle, dietary principles and attribute of drugs. For the convenience of readers Sanskrit *shlokas* have been reproduced with their near English translations (Sharma, 2000).

The efforts of Dr. C.K. Katiyar, CEO (Technical), Emami Ltd., Kolkata, India, for compiling these verses from the ancient text is greatly appreciated.

1. Ayurveda

आयुर्वेदस्य लक्षणम् हिताहितं सुखं दुःखमायुस्तस्य हिताहितम्∣ मानं च तच्च यत्रोक्तमायुर्वेदः स उच्यते∥

(च .सू. १/४१) [Devanagari Script]

Hitahitam sukham dukham-ayustsya hitahitam | Maanam cha tachcha yatroktam-ayurvedah sa uchchayte || +(Charaka Samhita, Sutrasthana 1/41)

[Diacritical Script]

"Ayurveda deals with happy and unhappy life. It explains what is appropriate (the promoters of the health) and what is inappropriate (the non promoters of the health) in relation to the life, as well as it measures the life expectancy and the nature (quality) of the life"

http://dx.doi.org/10.1016/j.jep.2016.10.067

1.1. Causes of disease

कालबुद्धीन्द्रियार्थानां योगो मिथ्या न चाति च

द्वयाश्रयाणां व्याधीनां त्रिविधो हेतुसङ्ग्रहः||

(च .सू – १/ ५४) [Devanagari Script]

Kalabuddhindriyarthanam yogo mithya n cati ch | Dwayashryanam vyadhinam trividho hetusangraha|| (Charaka Samhita Sutrasthana-1/54) [Diacritical Script] "Improper use i.e. Erroneous, Non-use and excessive conjunction of time, action of intelligence and sense objects causes of both psychic and

1.2. Eight branches of Ayurveda

somatic disorders"

तस्यायुर्वेदस्याङ्गान्यष्टौ; तद्यथा- कायचिकित्सा शालाक्यं, शल्यापहर्तृकं, विषगरवैरोधिकप्रशमनं, भूतविद्या, कौमारभृत्यकं, रसायनं, वाजीकरणमिति|| (च.सू – ३०/ २८) [Devanagari Script]

Tasya ayurvedsyanganyasthyo; tadyatha – kayachikitsha shalakyam, shalyaphartrikam, vishagarvairodhikprashamanam, bhutavidya, kaumarbhrityakam, rasayanam, vajikaranamiti || (Charaka Samhita Sutrasthana-30/28)

[Diacritical Script]

"Ayurveda has eight branches such as – Kayacikitsa (Internal medicine), Salakya Tantra (Eye and ENT), Salya (Surgery and Para-surgical methods), Agad tantra (Toxicology and Jurisprudence), Bhuta vidya (Psychiatry), Kaumarabhrtya (Pediatrics and Gynaecology), Rasayana (Geriatrics) and Vajikarana (Reproductive Health)"

1.3. Four components of treatment

भिषग्द्रव्याण्युपस्थाता रोगी पादचतुष्टयम्| गुणवत् कारणं ज्ञेयं विकारव्युपशान्तये||

> (च .सू – ९/३) [Devanagari Script]

Bhishagdravyanyupasthata rogi padachatusthayam | Gunavat karanam geyam vikarvyupshantaye || (Charaka Samhita Sutrasthana-9/3) [Diacritical Script] "The supdambes in Physician days, attendent (number atoff) and nations endowed with qualities, leads to allowiption of disordered

"The quadruple i.e. Physician, drug, attendant (nursing staff) and patient endowed with qualities, leads to alleviation of disorders"

1.4. Avoidance of incapable physicians

पाणिचाराद्यथाऽचक्षुरज्ञानाद्भीतभीतवत्| नौर्मारुतवशेवाज्ञो भिषक् चरति कर्मसु||

> (च .सू – ९/१६) [Devanagari Script]

Sati padatraye gyagyo bhishajavatra karanam |

Varatma hutoagyena na chikitsa pravartita || (Charaka Samhita Sutrasthana–9/16) [Diacritical Script] "It is better to self-immolate than to be treated by an incapable physician"

2. Healthy lifestyle

For a healthy state, Ayurveda emphasizes on the systematic daily routine, seasonal regimens and various guidelines.

2.1. Urges which should always be suppressed

लोभशोकभयक्रोधमानवेगान् विधारयेत्|

नैर्लज्ज्येर्ष्यातिरागाणामभिध्यायाश्च बुद्धिमान्||

च .सू – ७/ २७ [Devanagari Script]

Bhshokabhayakrodhamanvegan Vidharayet | Naylarjjayershyaatiragaanambhidyayasch bhuddiman || (*Charaka Samhita Sutrasthana-7/27*) [Diacritical Script]

"The urges of greed, grief, fear, anger, vanity and also of Shamelessness, envy, excessive attachment and desire of taking another's property should always be suppressed which will help to reduce mental disorders"

2.2. Thirteen urges which should never be suppressed

न वेगान् धारयेद्धीमाञ्जातान् मूत्रपुरीषयोः| न रेतसो न वातस्य न छर्द्याः क्षवथोर्न च|| च .सू – ७/३ नोद्गारस्य न जृम्भाया न वेगान् क्षुत्पिपासयोः| न बाष्पस्य न निद्राया निःश्वासस्य श्रमेण च|| च .सू. - ७/ **४** [Devanagari Script]

Na Vegan dharayedwimanjatan mutrapurishayo | Na retaso na vatasya na chardya kshabthonrna ch || (*Charaka Samhita Sutrasthana-7/3*) No dwarasya na jrimbhya na vegan shutpipasyayo | Na vashpsy na nidraya nishwasasya shramena ch || (*Charaka Samhita Sutrasthana-7/4*) [Diacritical Script]

"There are 13 types on non-suppressible urges which if suppressed causes pathological state; these are urges of urine, faces, semen, flatus, vomiting, sneezing, eructation, yawning, hunger, thirst, tears, sleep and breathing after exertion"

2.3. Benefits of physical exercise

लाघवं कर्मसामर्थ्यं स्थैर्यं दुःखसहिष्णुता | दोषक्षयोऽग्निवृद्धिश्च व्यायामादुपजायते||

> च .सू – ७/३२ [Devanagari Script]

Laghavam Karmasamarthay stharyam dukhasahinsnuta | Doshokshayo agnivriddhisha vyayamadupjayate || (*Charaka Samhita Sutrasthana-7/32*) [Diacritical Script] "By doing physical exercise the following can be achieved such as lightness, increased capacity to work, firmness, tolerance of difficulties, balances the bodily humours, improve digestive capacity and metabolism"

2.4. Symptoms of appropriate exercise

स्वेदागमः श्वासवृद्धिर्गात्राणां लाघवं तथा| हृदयाद्युपरोधश्च इति व्यायामलक्षणम्||

> (च .सू – ७/३३-१) [Devanagari Script]

Swedagama Swasabriddhigatranam laghava tatha | || Hridyadyuprodhascha eti vyayayamlakshanam || (Charaka Samhita Sutrasthana-7/33-1) [Diacritical Script] "Appearances of perspiration, increased respiration, lightness of the body, increased heart beat are the signs of proper physical exercise"

2.5. Adverse effects of excessive exercise

श्रमः क्लमः क्षयस्तूष्णा रक्तपित्तं प्रतामकः|

अतिव्यायामतः कासो ज्वरश्छर्दिश्च जायते||

(च .सू – ७/३३)

[Devanagari Script]

 Shrama Klama Kshayatrishna raktapittam pratamaka |

 Ativyayamata kaso jwaraschardisha jayate ||

 (Samhita Sutrasthana-7/33)

 [Diacritical Script]

 "Excessive physical exercise results in fatigue, exhaustion, emaciation, thirst, internal bleeding, breathlessness with feeling of darkness, cough, fever and nausea"

3. Food

Food (Diet) is the most important part of life. To stay in good health physically, mentally and spiritually one should follow few good codes of conducts related to diet and Life style. Proper diet and lifestyle, which are congenial to an individual helps to maintain normal body functions and prevents the diseases.

3.1. Eight factors of diet and dietetics

तत्र खल्विमान्यष्टावाहारविधिविशेषायतनानि भवन्ति; तद्यथा-प्रकृतिकरणसंयोगराशिदेशकालोपयोगसंस्थोपयोक्त्रष्टमानि (भवन्ति)||

> (च .वि). – १/२१) [Devanagari Script]

Tatra khalvimanyaashtavaharvidhivisheshayatanani bhabanti; tadyatha – prakritikaransamyograshideshkalopyogsamstha-pyoktraashtamani (bhavanti) ||

(CharkaCharaka Samhita Vimanasthana-1/21)

[Diacritical Script]

"To determine the maximum benefit of food there are eight factors required which are complementary to each other; these are Food attribute (nature), processing method, Combination, quantity, habitat/climate, time, food intake rules and consumer/user"

3.2. How to take food

तत्रेदमाहारविधिविधानमरोगाणामातुराणां चापि केषाञ्चित् काले प्रकृत्यैव हिततमं भुञ्जानानां भवति-उष्णं, स्निग्धं, मात्रावत्, जीर्णे वीर्याविरुद्धम्, इष्टे देशे, इष्टसर्वोपकरणं, नातिद्रुतं, नातिविलम्वितम्, अजल्पन्, अहसन्, तन्मना भुञ्जीत, आत्मानमभिसमीक्ष्य सम्यक्|| (च.वि.. – १/२४)

(U.iu . - (/ २०) [Devanagari Script]

Tatredamaharvidhividhanamroganamaturanam chapi keshanchit kale prakrityaiva hitatambhunjananam bhavati – ushnam, snigdham, matravat, jirne viryavirudham, esthe deshe, eshtasarbopkaranam, natidrutam, natibilambam, ajalpan, ahasan, tanmana bhunjit, atmanambhisamikshyasamyak || (Charaka Samhita Vimanasthana-1/24)

[Diacritical Script]

"The following are the various method of dieting for the healthy and the sick – one should eat warm, unctuous, in proper quantity, after the previous food is digested, non-antagonistic, in favorable place, with all the favorable accessories, not too fast, not too slow, not while talking or laughing and with full concentration after due consideration to the self"

3.3. How to know that appropriate quantity of food has been taken

तत्र मात्रावत्त्वं पूर्वमुद्दिष्टं कुक्ष्यंशविभागेन, तद्भूयो विस्तरेणानुव्याख्यास्यामः| तद्यथा- कुक्षेरप्रणीडनमाहारेण, हृदयस्यानवरोधः, पार्श्वयोरविपाटनम्, अनतिगौरवमुदरस्य, प्रीणनमिन्द्रियाणां, क्षुत्पिपासोपरमः, स्थानासनशयनगमनोच्छ्वासप्रश्वासहास्यसङ्कथासु सुखानुवृत्तिः, सायं प्रातश्च सुखेन परिणमनं बलवर्णोपचयकरत्वं च; इति मात्रावतो लक्षणमाहारस्य भवति|| (च.वि. – २/६)

Tatra matravatwam purvamuddishtam kukshyamshvibhagen, tadbhuyo vistarenanuvyakhyashyama | Tadyatha – Kuksherapranidanmaharena, hridaysyanavarodha; parsvayorvipatanam, anatigauravamudarasya, prinananmindiyanam, kshutpipasopram, sthanasansayangamanochwasapraswasahasysankathasu sukhanivritti, sayam pratashcha sukhena parinamanam bala varnopchayakaratwa ch; eti matrabato lakshanamaharasya bhabati || (Charaka Samhita Vimanasthana-2/6)

[Diacritical Script]

"The appropriate intake quantity of food is judged by various symptoms; these are no undue pressure generated on heart, no pain in sides, no excessive heaviness in abdomen, sense of saturation, cessation of hunger and thirst, ease in standing, sitting, lying down, movement, inspiration, expiration, laughing and gossiping, easy digestion (of food) in evening and morning, promotion of strength, complexion and development"

3.4. Factors responsible for improper digestion even though food is appropriate

मात्रयाऽप्यभ्यवहृतं पथ्यं चान्नं न जीर्यति|

चिन्ताशोकभयक्रोधदुःखशय्याप्रजागरैः||

(च .वि . – २/९) [Devanagari Script]

Matrayapyabhyavahritam pathyam channam na jiryati | Chintasokabhayakrodhadukhasaiyyaprajagaraii || (Charaka Samhita Vimanasthana-2/9) [Diacritical Script]

"Even the compatible food taken in proper quantity, does not get digested due to anxiety, grief, fear, anger, uncomfortable bed and Sleeplessness"

4. Drug

Use of drugs has been recommended in Ayurveda for both preventive as well as curative purposes. Attributes of drugs have been mentioned in

detail in this ancient text of Ayurveda, Charak Samhita.

4.1. Importance of proper use of drug

| योगादपि विषं तीक्ष्णमुत्तमं भेषजं भवेत् | |
|--|---------------------|
| भेषजं चापि दुर्युक्तं तीक्ष्णं सम्पद्यते विषम् | |
| | (च.सू – १/१२७) |
| तस्मान्न भिषजा युक्तं युक्तिबाह्येन भेषजम् | |
| धीमता किञ्चिदादेयं जीवितारोग्यकाङ्क्षिणा | |
| | (च .सू – १/१२८) |
| | [Devanagari Script] |

Yogadapi Visham tikshnamuttamam bheshajam bhabet | Bheshajam chapi duryuktam tikshnam sampadyate visham || (*Charaka Samhita Sutrasthana*-1/127) Tasmanna Vishaja yuktam yuktivhayhena bheshajam | Dhimita kinchidadyeyam jivitarogyakandikshana || (*Charaka Samhita Sutrasthana*-1/128) [Diacritical Script]

"Even if the most dangerous poison is used in proper way will become a medicine. Similarly, the drugs if used in improper manner will turn out to be poison. So, if a person who wants health and Life should avoid receiving medicines from such physician who is ignorant about the proper use of drugs"

4.2. Results of known and unknown usage of drugs

| यथा विषं यथा शस्त्रं यथाऽग्निरशनिर्यथा | |
|--|---------------------|
| तथौषधमविज्ञातं विज्ञातममृतं यथा | |
| | (च .सू – १/१२५) |
| औषधं ह्यनभिज्ञातं नामरूपगुणैस्त्रिभिः | |
| विज्ञातं चापि दुर्युक्तमनर्थायोपपद्यते | |
| | (च .सू – १/१२६) |
| | [Devanagari Script] |

Yatha Visham yatha shastram yatha agnirshinyartha | Tathayoshadhamvigyatam vigyatmmritam yatha || (*Charaka Samhita Sutrasthana*-1/125) Aushadham hyanbhigyatam namarupagunastribhi | Vigyatam chapi duryuktamnathrayopapadyate || (*Charaka Samhita Sutrasthana*-1/126)

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[Diacritical Script]
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"If the drug is unknown, it is fatal like poison, weapon, fire and thunderbolt; While the known drugs help to protect life as elixir. If the name, form and properties of drug are unknown or even if known but is misused – both are responsible for development of complications"

4.3. Parts of plants used as drug

मूलत्वक्सारनिर्यासनाल(ड)स्वरसपल्लवाः| क्षाराः क्षीरं फलं पुष्पं भस्म तैलानि कण्टकाः|| पत्राणि शुङ्गाः कन्दाश्च प्ररोहाश्चौद्भिदो गणः|

> (च .सू – १/७४) [Devanagari Script]

Mool twak saar niryasa nala swarasapallaba | Kshara kshiram phalam pushpam bhasma tailani kantaka || Patrani shunga kandascha praroha audhvidho guna | (Charaka Samhita Sutrasthana-1/74) [Diacritical Script]

"The 18 useful parts of plants used as drugs are root, bark, heartwood, Secretions (gum), stalk, expressed juice, tender leaves, alkali, latex, fruit, flower, ash, oil, thorn, leaves, leaf-buds, tubers and sprouts"

4.4. Four qualities of drug

बहुता तत्रयोग्यत्वमनेकविधकल्पना| सम्पच्चेति चतुष्कोऽयं द्रव्याणां गुण उच्यते|| (च .सू – ९/७) [Devanagari Script]

Bahuta tatrayogyatwamanekvidh kalpana | Sampaaccheti chatushkoayam dravyanam guna uchhyate || (*Charaka Samhita Sutrasthana-9/7*) [Diacritical Script]

"Available in abundance, effectivity, various pharmaceuticals forms and having appropriate properties are the four qualities of drugs"

4.5. Mode of action of drugs

न तु केवलं गुणप्रभावादेव द्रव्याणि कार्मुकाणि भवन्ति; द्रव्याणि हि द्रव्यप्रभावाद्र्गुणप्रभावाद्रव्यगुणप्रभावाच्च तस्मिस्तस्मिन् काले तत्तदधिकरणमासाद्य तां तां च युक्तिमर्थं च तं तमभिप्रेत्य यत् कुर्वन्ति, तत् कर्म; येन कुर्विन्ति, तद्वीर्यं; यत्र कुर्वन्ति, तदधिकरणं; यदा कुर्वन्ति, स

कालः; यथा कुर्वन्ति, स उपायः; यत् साधयन्ति, तत् फलम्]| (च.सू – २६/१३) [Devanagari Script]

Na tu kevalam gunapravadeva dravyani karmukani bhabanti; dravyani hi dravyapravabadrunapravavaddravyagunaprabhabaccha tasminstasmin kale tatadhikaranamasadya tam tam ch yuktimartham ch tam tambhipretya yat kurbanti, tat karma; yen kurbanti, tadirya; yatra kurbanti, tadhikaranam; yada kurbanti, sa kala; yatha kurbanti, sa upaya; yat sadhayanti, tat phalam ||

(Charaka Samhita Sutrasthana-26/13)

[Diacritical Script]

"The drugs are effective not only due to their properties but also due to their intrinsic potential, properties and both combined together in particular time, on reaching a particular location, with a particular mechanism and objective. What they perform is karma (action), by means of which they act is virya (potency), where they act is adhikarana (locus of action), when they act is kala (time), how they act is upaya (mechanism) and what they achieve is result"

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