2nd MCCCON-2019

2nd Annual National Conference of Midnapore City College

on

"Academia-Industry meets on opportunity and challenges on foodomics in functional food preparation based industrial process"

5th to 6th February, 2019

Sponsored by

Science and Engineering Research Board
Department of Science & Technology, Govt. of India

सत्यमेव जयते
Department of Biotechnology
Ministry of Science & Technology, Govt. of India

SOUVENIR

Organised by

MIDNAPORE CITY COLLEGE

(Recognised by Higher Education Department, Govt. of West Bengal & Affiliated to Vidyasagar University)

Midnapore, Paschim Medinipur, Pin- 721129, West Bengal, India

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ममता व्यानार्জ্জী
ममता बैनर्जी
ممتا بنرجی
Mamata Banerjee

मुख्यमंत्री, पश्चिमबंग
मुख्यमंत्री, पश्चिम बंगाल
وزیراعلیٰ مغربی بنگال
CHIEF MINISTER, WEST BENGAL

28th January, 2019

MESSAGE

I am happy to know that **Midnapore City College** will organize its **2nd Annual National Conference** on "**Academia-Industry Meets on Opportunity and Challenges on Foodomics in Functional Food Preparation Based Industrial Process**" on 5th & 6th February, 2019 at the premises of the college at Midnapore, Dist - Paschim Medinipur.

On this occasion, I convey my heartiest greetings and best wishes to the organizers and participants of the conference and wish the initiative all success.

(Mamata Banerjee)

Dr. Pradip Ghosh
Director, Midnapore City College
Kuturiya, Bhadutala, Midnapore
Paschim Medinipur – 721 129

Nabanna, West Bengal Secretariat, Howrah - 711 102
West Bengal, India
Tel : +91-33-22145555, +91-33-22143101
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Dr. Partha Chatterjee

Minister-in-charge
Departments Higher Education,
School Education, Parliamentary Affairs
Government of West Bengal

No. –60/MIC/HED, SED&PA/WB/19

MESSAGE

I am delighted to know that "Midnapore City College" is going to organize DBT & DST-SERB, Govt. of India sponsored 2nd Annual National Conference "MCCCON 2019" on 'Academia-Industry Meets on Opportunity and Challenges on Foodomics in Functional Food Preparation Based Industrial Process" on 5th & 6th February, 2019. I would like to congratulate the organizers for taking such pedagogic initiative and expect a grand success of the conference.

(Dr. Partha Chatterjee)

Dr. Pradip Ghosh
Director
Midnapore City College

Bikash Bhavan, Salt Lake, Kolkata- 700 091, Tel: 2334 6181/2256, 2337 6172, Fax: 2337 6783/2358 8858
Nabanna: 325, Sarat Chatterjee Road, Howrah -711 102, Room No. 101, Telefax: 2250 1157

ব্রাত্য বসু
Bratya Basu

মন্ত্রী
বিজ্ঞান ও প্রযুক্তি ও জৈবপ্রযুক্তি বিভাগ
পশ্চিমবঙ্গ সরকার
বিজ্ঞান চেতনা ভবন (৭ম তল)
ডিডি - ২৬বি, সেক্টর - ১
সল্টলেক, কলকাতা - ৭০০ ০৬৪
ফোন : ২৩৩৪-১৪৪৩, ২৩৩৪-৮০৭৪ ফ্যাক্স : ২৩৫৯-৬৭১৩
ইমেল : micstbt@gmail.com

Minister-in-Charge
Science and Technology and
Biotechnology Department
Government of West Bengal
Vigyan Chetana Bhavan (6th Floor)
DD-26B , Sector - I
Salt Lake, Kolkata - 700 064
Tel : 2334-1443, 2334-8074, Fax : 2359-6713
e-mail : micstbt@gmail.com

No. 50-MIC/ST & Bt

18th January, 2019

Message

It gives me immense pleasure to learn that Midnapore City College is going to organize **2nd Annual National Conference "MCCCON 2019"** on "**Academia-Industry Meets on Opportunity and Challenges on Foodomics in Functional Food Preparation Based Industrial Process**" at Midnapore City College on and from 5th to 6th February, 2019.

I convey my best wishes to the organizers and wish the Conference a grand success.

The Director,
Midnapore City College,
Midnapore, Paschim Medinipur
West Bengal

Bratya Basu
(Bratya Basu)

VIDYASAGAR UNIVERSITY

Professor Ranjan Chakrabarti
Vice-Chancellor

Date: 01.02.2019

MESSAGE

I am happy to learn that the Midnapore City College is going to organize a DBT & DST SERB sponsored 2nd Annual National Conference on *Academia-Industry Meets on Opportunity and Challenges on Foodomics in Functional Food Preparation Based Industrial Process* to be held on February 5 & 6, 2019.

I commend the endeavour of the organizers and hope that the deliberations in the Conference will really be enriching to all the participants.

I convey my best wishes for the success of the same.

(Professor Ranjan Chakrabarti)

Dr. Pradip Ghosh,
Director,
Midnapore City College,
Kuturiya, Bhadutala,
Paschim Medinipur – 721 129

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Dr. (Mrs.) Rita Banerjee
Consultant , Programme Coordinator &
Advisor – Life Sciences

Science and Engineering Research Board

(A statutory body of Department of Science & Technology, Govt. of India)

MESSAGE

It gives me immense pleasure to congratulate the team of Second Annual National Conference of Midnapore City College team-MCCCON 2019 consisting of faculty, scientists, administrative and other support staff for their overall contribution in organising this conference of "Academia Industry meets on opportunity and challenges on foodomics in functional food preparation based industrial process". The conference will highlight and address an array of research activities, challenges and opportunities facing food industries using emerging and cutting-edge technologies for product development adopting sustainable innovations.

It is a matter of pride Midnapur City College located in educationally backward and rural area in the district of Paschim Midnapore has taken lead in organising a National level conference of a priority area "Foodomics" which is not much explored in today's genomic era. The highlights of the conference will be a beacon for many emerging and eminent scientist in our country working in the field of Nutrition to understand the importance of basic research through the application and integration of advanced – omics technologies such as genomics, transcriptomics, proteomics and metabolomics, epigenomics etc.

On behalf of DST-SERB I sincerely wish to thank the organizer relentless effort in organising this program.

Rita Banerjee

(RITA BANERJEE)

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Pocket-5, Vasant Kunj, New Delhi – 110070 INDIA

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Organising Committee

Chief Patron	Mr. Pravas Ghosh, Founder Chairman
Patron	Dr. Pradip Ghosh, Founder Director
Convenor	Dr. Shrabani Pradhan, Assistant Professor of Nutrition Dept. of Biological Sciences
Joint Convenor	Dr. Sudipta Chakrabarti, Principal & Associate Professor of Botany Dept. of Biological Sciences
Organizing Secretary	Dr. Suchismita Roy, Assistant Professor of Nutrition Dept. of Biological Sciences
Seminar Co-ordinator	Dr. Koushik Das, Assistant Professor of Physiology Raja N.L. Khan Women's College
Conveners for Invitation	Dr. Sabyasachi Pal, Associate Professor of Physics Dept. of Pure & Applied Science
Conveners for Printing & Publication	Dr. Arpita Raj, Assistant Professor of English Dept. of Humanities
	Dr. Anulina Manna, Assistant Professor of Botany Dept. of Biological Sciences
	Mr. Suman Mallick, Graphic Designer in the Administrative Dept.
Conveners for Refreshment	Mr. Abhishek Das, Office In-Charge in the Administrative Dept.
Conveners for Transport & Accommodation	Mr. Nayan Hazra, Assistant Professor of Geography Dept. of Pure & Applied Science
Conveners for Cultural Programmee	Dr. Sangita Maiti Dutta, Assistant Professor of Zoology in the Dept. of Biological Science
	Ms. Titli Panchali, Technical Assistant of Nutrition Dept. of Biological Science

Programme Schedule

2nd Annual National Conference of Midnapore City College "MCCCON 2019"

on

"Academia-Industry meets on opportunity and challenges on foodomics in functional food preparation based industrial process"

Date: 5th & 6th February, 2019.
Venue: Midnapore City College

Technical Program with session wise details and name of session chair/co chair,

PROGRAMME SCHEDULE

5th February, 2019

9.00 A.M. -10.00 A.M. — Registration & Breakfast

10.00 A.M.- 11.00 A.M. — Inauguration and Key note address

Inauguration (Lighting the lamp) by
Chief Guest

Welcome Address by the
Principal & Joint Convenor
Dr. Sudipta Chakrabarti, Principal & Associate Professor of Botany at Midnapore City College.

Key Note Address by
Dr. Koushik Das
Head, Dept. of Nutrition, Raja N. L. Khan Women's College

Vote of thanks by Organizing Secretary
Dr. Suchismita Roy

11-00A.M. -1.00 P.M. — Technical Session – I

(The Role of Foodomics in Food Innovation and Functional Food Preparations)

Chairperson
Prof. B. D. Banerjee
Professor, Department of Biochemistry, University of Delhi

Invited Lecture – 1 (40 min)
Dr. Rita Banerjee
Advisor & Consultant, Science & Engineering Research Board (SERB),
Department of Science and Technology (DST), Govt. of India.

Invited Lecture – 2 (40 min)
Dr. Sukumar Debnath
Principal Scientist, Department Of Technology Scale-up, CFTRI, Mysuru.

Invited Lecture – 3 (40 min)
J. Sreenivasa Rao
Scientist D, Food Chemistry Division, National Institute of Nutrition, Hyderabad.

1.00 P.M. - 2.00 P.M. — **LUNCH**

2.00 P.M. – 3.20 P.M. — Technical Session – II

(The Foodomics Description of the Destiny of Food)

Chairperson
J. Sreenivasa Rao
Scientist & Asst. Director, Dept. of Food Chemistry,
National Institute of Nutrition (NIN), Hyderabad.

Invited Lecture – 4 (40 min)
Prof. B. D. Banerjee
Professor, Department of Biochemistry, University of Delhi.

Invited Lecture – 5 (40 min)
Dr. Keshab Chandra Mondal
Professor, Department of Microbiology, Vidyasagar University.

3.20 P.M. - 4.00 P.M. — Panel Discussion on

'Nutritional Counseling and Therapeutic Diet'

Moderator
Dr. Sudip Chatterjee
MD, Park Clinic, Kolkata.

Panelist

Dr. Pulak Roy Chowdhury

Chief Dietitian, Park Clinic, Kolkata.

Kalpana Roy

RD & Chief Dietitian, Park Clinic, Kolkata.

Arpita Ghosh Deb

RD & Chief Dietitian, Bellevue Clinic, Kolkata.

4.00 P.M. - 5.00 P.M. — Poster presentation by
PG and UG students

Oral Presentation First Phase
Oral presentation for **Senior Scientist Award**
Oral presentation for **Young Scientist Award**

5.00 P.M. - 5.15 P.M. — **Tea Break**

5.00 P.M. - 7.00 P.M. — Cultural Program by Students

7.00P.M. - 8.00 P.M. — **Dinner**

Date: 06.02.2019

10.00 A.M. -11.00 A.M. — **Breakfast**

11-00 A.M. -12.20 P.M. — Technical Session – III

(How Foodomics Contributes to the Selection of Biomarkers)

Chairperson

Dr. Rita Banerjee

Adviser & Consultant, Science & Engineering Research Board, DST, Govt. of India.

Invited Lectures – 6 (40 mins)

Professor Debidas Ghosh

Professor, Dept. of Bio Medical Lab Science & Management, Vidyasagar University.

Invited Lectures – 7 (40 mins)

Dr. Dipankar Halder

Associate Professor, Department of Food Technology & Bio-Chemical Engineering, Jadavpur University.

12.20 P.M. - 2.20 P.M. — Technical Session – IV
(The Foodomics Approach to Food and Health)

Chairperson
Prof. Debidas Ghosh
Sr. Professor, Department of Biomedical Lab Science & Management, Vidyasagar University.

Invited Lecture – 8 (20 mins)
Dr. Dilip Kumar Nandi
Associate Professor, Department of Physiology, Raja N.L. Khan Women's College, Midnapore.

Invited Lecture – 9 (20 mins)
Dr. Aditi Roy Chowdhuryi
Assistant Professor, Department of Food Technology, Techno India.

Invited Lecture – 10 (20 mins)
Kamalendu Ghosh
General Manager (Operations), SOBISCO

Invited Lecture – 11 (20 mins)
Dr. Prithviraj Karak
Assistant Professor, Department of Physiology, Bankura Christian College.

Invited Lecture – 12 (20 mins)
Dr. Tapanendu Kamilya
Assistant Professor, Department of Physics, Narajole Raj College.

2.20 P.M. -3.00 P.M. — **Lunch**

3.00 P.M. – 3.30 P.M. — **Oral Presentation Second Phase**
Oral presentation for **Senior Scientist Award**
Oral presentation for **Young Scientist Award**

3.30 P.M. – 5.00 P.M. — Valedictory Session

ABOUT THE COLLEGE

MIDNAPORE CITY COLLEGE, the first self-financing general degree college in the South Bengal region within the state of West Bengal, was established by MORAINE HUMAN RESOURCE DEVELOPMENT ORGANISATION, a registered society bearing registration S/1L/31682 on dated 02.09.2005 having its office at Aparnapalli, Satbankura, Paschim Medinipur with the sole aim to survive the people as per notification of Higher Education Department, Govt. of West Bengal bearing No: W.B (Part-I)/2015/SAR-458 dated 23rd day of September, 2015 published in Kolkata Gazette and subsequent No Objection was issued to this college through its order No.197-ILC/OM-58L/2017 on dated 18.07.2017 on the basis of which Vidyasagar University also extended the affiliation by its memo No: VU/R/ Circular /8EC-10 / C0383/ 2017 dated 05.09.2017. The college is also recognized under section 2(f) by UGC, Govt. of India bearing File No: 8-1/2018(CPP-I/C) dated 18.01.2018 for conducting different Under Graduate and Post Graduate programmes in the faculty of Arts and Science and Allied Health Science from the academic session 2017-18. The college is located in educationally backward and rural area in the district of Paschim Medinipur within the state of West Bengal and most of our students belong to socially and economically backward sections of society. The sole aim of MORAINE HUMAN RESOURCE DEVELOPMENT ORGANISATION is to serve people by imparting quality education and research the society had received recognition from Department of Scientific Industrial Research (DSIR) Govt. of India as Scientific and Industrial Research Organisation (SIRO) bearing F. No.11/762/2018-TU-V on dated 26th November,2018. The institute believes that excellent teaching can produce better students and thereby helping the institute to emerge as a centre of excellence.

Message from the PRESIDENT
MIDNAPORE CITY COLLEGE

She is the founder president of Moraine Human Resource Development Organisation. The idea of opening the first self-financing general degree college in south Bengal first came to her mind. The college is an epitome of her noble thoughts. "Midnapore City College is more than just a college; we are a COMMUNITY. From your first day at Midnapore City College, you will meet people who will support, inspire, and challenge you to be the best person. Because of our uniqueness, we can promise that when you will leave, you will experience tremendous growth. You will be developed into a new, more advanced and self-assured version of yourself.

At MCC, we feel proud of ourselves of our reputation for being a "caring college". Our faculty and staff are dedicated to help students to achieve their goals. They will work with you daily to ensure a successful educational experience. Our student body is equally as welcoming and warm-hearted. They offer an environment of support, encouragement and friendship like no other.

As an accredited institution, uniquely aligned with business and industry, we also feel proud of ourselves for being a center for academic excellence. Once you begin at Great Bay, you will be exposed to a rigorous learning experience both in and out of the classroom. We will make you face challenge like never before, but the award will be a presentation of better you. Get inspired and control your destiny.

Midnapore City College is uniquely capable of answering this call, of speaking to this world. As an institution of higher education, Midnapore City College is committed to the discovery and transmission of knowledge. It also seeks to integrate excellence and distinctive commitment among the students.

As a President of Midnapore City College, I am conveying the message to all of my delegates, students and all the academic personalities. I am assuring you that by this conference entitled 'Academia-Industry meets on opportunity and challenges on foodomics in functional food preparation based industrial process' sponsored by DST SERB and DBT, Govt of India, will provide you to have the opportunity to strengthen your views on academic and industrial research on nutritional science. These ideas will benefit our society. The nutrition and food related research is one of the most important related thing to health sciences. By these discussions people can develop their knowledge in this research connected to human health.

Thank you. All the best.

Smt. Sukrita Ghosh
President
Midnapore City College

Message from the PATRON

MIDNAPORE CITY COLLEGE

The starting of college life from school life is a very big step in life. Students have put in so much hard work in public exams, spent sleepless nights, earned a rewarding score, and with the blessings of parent/guardian, students have joined the chosen stream of education to realize life-ambition and set the foundation for future. By choosing to create a future for thereselves from our institution means that we, the teachers and management at Midnapore City College are also responsible for their successful graduation and growth.

It is their career path that have now embarked upon, which will be a remarkable journey in itself that will prepare them for a life beyond college. We hope to make students journey with us, engaging, encouraging and enlivening as ever, for them to grow as a thorough individual, ready to take on life as an adult. We pray and will work with all the students to see them become one with the society where their contribution will make a definitive difference to our world. As I mentioned earlier, the learned staff and the ever accessible management is there to guide them through and help for nurture their dreams and fulfill them - by empowering to realize true potential.

This is a great occasion to show our care for the conference 'MCCCON-2019' 'entitled 'Academia-Industry meets on opportunity and challenges on foodomics in functional food preparation based industrial process' on dated 5th and 6th February, 2019. This National conference is an extraordinary gathering of students, researchers, scientists and professors. By this conference the students will benefitted by the scientists and academicians from their source of knowledge's.

Best wishes.

Mrs. Anindita Ghosh
Patron
Midnapore City College

Message from the CHAIRMAN

MIDNAPORE CITY COLLEGE

Mr. Pravas Ghosh is the founder Secretary of Gopsai Avinandan Sangha. For last fifteen years he is in the education field and is behind the establishment and expansion of 9 different Educational Institutions in the field of Engineering, Management, Teachers' Training & Pharmaceutical Science Colleges. He is active and his vision is to develop modern Educational Institution with Teacher Education, Engineering and technology in the field of Computer Science, Electronics and Communication, Electrical, Information Technology, Management Studies, Biological Sciences, Health Sciences and Paramedical Sciences, Research Center with job oriented courses for students coming from various parts of India and abroad. He proposes to add a few more courses to the existing ones.

In a world that is ruled by technology, every aspect of life is determined by the innovation, up gradation and application of technology that is relevant and manageable. The development and use of technology is again rested on the individuals who are exposed to such technology, have firsthand experience in handling it. I extremely realize the deficiency of General Degree College in this area. I find the "Midnapore City College" with the sole aim to serve the people for such kind of education."

As a Chairman of this College, I assure you that college will provide and assist all the stuedents to achieve goal. In Midnapore City College (MCC) students will have a quality of life that's very high and different, both in academic pursuits for seeking professional excellence that will enrich and make efficient, confident and successful person in life. It will be more glorified by this national conference.

It is my anticipation that the conference will stimulate new thoughts. We will all be benefitted by the healthy exchange of ideas from this conference. I am confident that we are going to gather a lot of knowledge from it. And I hope that these discussions will strengthen our society with the development of knowledge by application of foodomics and overall health benefits.

Wish you all the best. Again thank you.

Mr. Pravas Ghosh
Founder Chairman
Midnapore City College

Message from the DIRECTOR

MIDNAPORE CITY COLLEGE

As the Founder Director of Midnapore City College & Secretary of Moraine Human Resource Development Organization I am welcoming all the delegates to this conference. I wish to develop Midnapore City College as a model Institution with the development of Pure and Applied Sciences, Biological Sciences, Humanities, Social Science and Education in this college. From this developmental and progressive mind we have arranged 2nd annual national conference entitled 'Academia-Industry meets on opportunity and challenges on foodomics in functional food preparation based industrial process' sponsored by DST-SERB and DBT, Govt. of India. This conference will be focuses on the benefit of human health as well as research collaborations with different academic institutions and industrial bodies. In the competitive world of today, survival is not just a matter of qualifications but we have to develop the knowledge equivalent to this qualification. For this reason we have to do more study and more discussions. Mainly from that point of view, the college has arranged the discussion hub by this tow day national conference. A better survivor is one with better competency and qualifications. The Midnapore City College (MCC) has been initiated with the vision of enabling the youth of this country to have a purposeful vision, mission and goal. I always think the betterment of the Institution and to shape the Institute as a Centre of Excellence for higher studies in science, Humanities, Social Science and Education, particularly in emerging areas.

Our present discussion is directly applied to the society. The conference is relevant to any person working in science related to health research. This conference focus on developing functional foods to improve public health requires contributions from ongoing basic and applied research and modifications to the current regulatory framework to facilitate the review of new functional components and their health claims. A good communication must establish meaningful connections between the attributes of functional foods and the health-related consequences of consuming those foods.

Thank you. I wish all the very best.

Dr. Pradip Ghosh
Director
Midnapore City College

Message from the PRINCIPAL

MIDNAPORE CITY COLLEGE

Good morning and welcome to the National conference of Midnapore City College. The college has been functioning with a noble vision and mission clearly reflecting its social responsibility and commitment to nation building. The institution provides effective and efficient support and facilities to academic mission and maintains a supportive environment for all students and staff by this symposium held in the rural area of Midnapore (Jungalmahal).

This is a marvellous opportunity for me to show my support for this conference. This national Seminar is an unprecedented gathering of students, researchers and scientists. It is a chance for us to discuss the "Academia-Industry meets on opportunity and challenges on foodomics in functional food preparation based industrial process". This conference aims to bring together leading academic personalities including students and research scholars to exchange and share their experiences and researches about the scientific research work done in different disciplines related to health and nutritional science. It also provides the premier interdisciplinary forum for researchers and educators to present and discuss the most recent innovations and trends in foodomics research and practical challenges and the solutions adopted in the field of Biological sciences specially in health science.

It is my hope that the Conference will stimulate a thoughtful dialogue. We will all be benefitted with the healthy exchange of ideas. I hope these discussions will reinforce our strong commitment.

Thank you. Best wishes.

Dr. Sudipta Chakrabarti
Principal
Midnapore City College

Message from Organizing Secretary

She is Assistant Professor of Nutrition, Department of Biological Sciences, Midnapore City College, obtained her Doctorate degree in Microbiology, from Vidyasagar University. She is young and dynamic lady with enthusiastic and dedicated to her job, also play active role towards the academic and administrative development of Midnapore City College.

At first I convey my deep sense of gratitude to all the delegated for lustrous presence and participation in the DST-SERB and DBT sponsored Two Day National Conference 'MCCCON-2019" on 5th and 6th February, 2019 entitled "Academia-Industry meets on Opportunity and Challenges on Foodomics in Functional Food Preparation Based Industrial Process". We are very much fortunate to have the eminent persons from different Research Institution and higher educational Institutes working in the area of Food and Nutritional sciences. I am sure that the participants must have benefitted by attending this National level conference. I am very much thankful to all the sponsors of this conference, without their generous financial support, it would not have been possible to organize this conference. I am very much thankful to Dr. Pradip Ghosh, Founder Director of Midnapore City College for continuous support and advices which have greatly helped towards the successful organization of this conference. My thanks to Dr. Sudipta Chakraborti, Principal, Midnapore City College for his support and co-operation. I sincerely thanks to all the members of the advisory committee for their valuable suggestions. I am also thankful to Prof. Pravas Ghosh, Founder Chairman of Midnapore City College for his encouragement, guidance & providing a stimulating environment for such educational developments. I thank all plenary speakers and the delegates for their enthusiastic participation in this conference. I acknowledge the unwavering support received from all the faculty and staff members of Midnapore City College. My thanks also go to all the people who have given their precious time in organizing this conference. In particular, I would like to acknowledge and thanks to Prof Debidas Ghosh, Professor & HOD, Dept. of Biomedical Lab Science & Management, Vidyasagar University, Dr. Dilip Kumar Nandi, Associate Professor& HOD, Dept. of Physiology, Raja N. L. Khan Women's College and Dr. Koushik Das, In-charge, Dept. of Nutrition, Raja N. L. Khan Women's College for their constant encouragement and guidance for organizing this conference. I am extremely grateful to Science and Engineering Research Board (SERB), Department of Science & Technology, Department of Biotechnology, Government of India for their financial support for organizing this National Conference.

Dr. Suchismita Roy
Organizing Secretary and Assistant Professor in Nutrition,
Department of Biological Sciences, Midnapore City College

Message from Convenor

I welcome the participants of 2nd Annual National Conference "MCCCON2019" entitled of "Academia-Industry meets on opportunity and challenges on foodomics in functional food preparation based industrial process" sponsored by Department of Biotechnology, Science and Engineering Research Board (SERB), Department of Science & Technology(DST), Govt. of India, . The main goal of organizing this conference is to share and enhance the knowledge of each and every individual in this Nutrition world. We have given a good opportunity for those who have a thirst in knowing the present research and developments and also share their ideas. Furthermore, this conference will also facilitate the participants to expose and share various novel ideas. The conference aims to bridge the researchers working in academia and other professionals through research presentations and keynote addresses in current research trends in functional food development. It reflects the growing importance of foodomics as a field of research and practice. You will get ample opportunities to widen your knowledge and network. Outside of the conference, I hope that you would/will enjoy some of the many attractions found in and around our beautiful campus Midnapore City College. Such a large conference event is the culmination of many individuals. I thank the conference committee for extending their valuable time in organizing the program and all the authors, reviewers, and other contributors for their sparkling efforts and their belief in the excellence of MCCCON 2019.

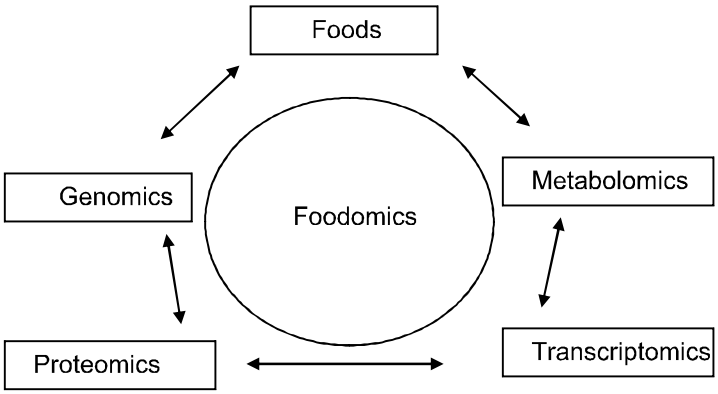
Dr. Shrabani Pradhan
Convenor and Assistant Professor in Nutrition,
Department of Biological Sciences, Midnapore City College

Foodomics: a new inventive approach to food and nutrition

Dr Koushik Das
Head, Dept. of Nutrition, Raja N L Khan Womens College, Midnapore-721102, Paschim Medinipur, West Bengal, India

Key note address

Foodomics 'a disclipine that studies the food and nutrition domains through the application and integration of advanced omics technologies to improve consumers well being, health and knowledge. Foodomics requires the combination of food and chemistry, biological sciences, and data analysis. Starting from the four major types of omics measurements (genomics, transcriptomics, proteomics and metabolomics), a variety of omics subdisciplines (epigenomics, lipidomics, interactomics, metallomics, diseasomics, etc). The complex relationships connecting food, nutrition and human health will be discussed, with emphasis on the relapses for the development of functional foods and nutraceuticals, personalized nutrition approaches, and the study of the interplay among gut microbiota, diet and health/ disease.



Functional foods lie at the low cost, high consumer participation end of the delivery options continuum for health-enhancing bioactive substances and thus may be especially advantageous in lieu of a drug regimen. Many consumers are averse to drugs and may accidentally or purposely avoid taking their prescriptions. Consumption of food does not carry such an aversion and is looked upon much more favorably. Functional foods are an effective way to deliver beneficial agents and should become an integral part of public health programs aimed at reducing disease risk.

This chapter addresses the challenges and opportunities facing food industries during application of innovations. Strategies and long term R&D issues (eg, networks development, open innovation, the role of innovation policies, etc.), technical innovation aspects (eg, product development, emerging technologies, sustainable innovation, etc.) as well as cutting-edge areas (eg, biobased packaging materials, functional foods, food waste recovery, adoption of information and communications technologies, foodomics, etc.) are critically discussed with a final purpose of identifying the main needs and resistance of the food industry. The

chapter discusses all the critical outcomes from previous chapters, suggests solutions to overcome difficulties during implementation, and ultimately presents a perspective on where we go now, following the current consumer acceptance tendencies.

This chapter presents a brief account of the various categories of food chemistry and technology along with the different parameters associated with them. Included in the discussion of food chemistry and technology are such issues as food security, nanotechnology in food applications, fro-zen food and technology, chemical and functional properties of food components, the production, properties and quality of food, safety of enzyme preparations used in food, trace element speciation in food, bionanocomposites for natural food packing, etc.

ENVIRONMENTAL FOOD CONTAMINANTS AND ETIOLOGY OF DISEASES: AN ARTIFACT OR REALITY?

Prof. B. D. Banerjee
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India has one of the leading positions among the largest producers of food in the world, partly due to the use of pesticides to control the insects, weeds, and other organisms that attack crops. However, their unregulated and indiscriminate applications have raised serious concerns about the entire environment in general and the health of humans. Pesticides cause serious health hazards to living systems because of their rapid fat solubility and bioaccumulation in non-target organisms. Even at low concentration, pesticides may exert several adverse effects, which could be monitored at biochemical, molecular or behavioral levels (1). Due to long residence time of these substances, there is a great interest in examining their presence in the environment. Endocrine disruption, altered immune surveillance, inflammation and subsequent oxidative stress are few among the mode of action of these pesticides (2). Although environmental chemical exposures are important, genetics clearly plays a role in the etiology of adverse health outcomes. Identification of genetic susceptibility variants will lead to better understanding of the role of variable factors in adverse health outcomes (3). It can be hypothesized that genetic polymorphism requires the presence of certain environmental stimuli to have consequences of clinical significance. The recent abundance of epidemiologic research examining associations between polymorphic genes that code for enzymes involved in chemical biotransformation like CYP450/GST family and disease has on occasion generated interesting findings. Recent studies from our laboratory clearly showed the importance to assess the role of variations in the human genome (polymorphisms) in modifying the effect of exposures to environmental chemicals to define "Gene–Environment Interaction", which render some individuals or groups in the population more or less likely to develop adverse health effect (4,5). Current and future efforts to identify new polymorphisms in genes involved in environmental response with larger sample size will broaden the scope of potential genetic effect modifiers. Currently, our laboratory is involved in studying the role of "Gene-Environment Interaction" with reference to environmental chemical metabolism and oxidative stress related genes in various diseases such as cancer, neurodegenerative diseases, chronic kidney disease, hypospadias, etc. Our laboratory has reported the association of organochlorine pesticides (OCPs) like α-HCH, β-HCH, γ-HCH and p,p-DDT (range 1.02–11.0, 1.34–32.0, 1.21–21.56 and 0.99–7.18 ppb

respectively) with many of adverse health outcomes such as prostate cancer, urinary bladder cancer, ovarian cancer, birth defects, preterm birth, intrauterine growth retardation, recurrent miscarriage etc (6,7). Our effort in this area may also lead to the development of possible biomarker(s) to screen individuals, exposed to environmental chemicals and preventive measures for safe health outcomes and generating various preventive measures to minimize the pathogenesis by taking necessary steps based on genetic counseling to such families. In conclusion, determining the effect of genetic variants of xenobiotic metabolizing enzymes along with OCPs burden will be of paramount importance in an early diagnostic strategy and preventive measures for adverse health outcomes with reference to environmental chemicals.

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OMICS APPROACH OF CROSSTALK BETWEEN FOOD SCIENCE AND NUTRITION SCIENCE: A NEW APPROACH OF SCIENCE – FOODOMICS

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Food has a great impact on health/nutrition which was first indicated by Hippocrates, the father of medicine, before 400 B.C i.e. 2500 years ago by the statement "Let food be thy medicine and medicine be thy food". Different facts also supported the statement of Hippocrates where Royal jelly in bee in critical period for differentiation of queen and worker. Similarly in Eskimos, the specific food habit of sea fish consumption reduces the chance of cardiovascular diseases. After that, the importance of food on nutrition/health was not focussed deeply but from mid 20th century specially four major omics i.e. genomics, transcriptomics, proteomics, and metabolomics have highlighted the importance of food ingredients on nutritional status modification with special reference to disease prevention, disease recovery and health improvement. Nutriepigenetics also enlighted the role of food ingredients on gene imprintation at critical period which is also associated with disease controlling process. Due to foodomics – the new branches of nutrigenomics, nutriproteomics, nutritranscriptomics etc. have been emerged for optimization of human health and well being. For disease prevention, microbial mitigation strategies have been developed by ready to eat food products. Metabolomics which is fingerprint of specific cellular processes is rapidly becoming a fundamental approach in food science and nutrition science. Foodomics also has a great contribution in the domain of nutraceuticals that focus the mode of action of specific and isolated food ingredient which acts as drug/medicine by manipulation of gene expression and its downstream processes. Lycopene, catechine etc., all such food ingredients which influence disease prevention by unfolding the cellular events through crosstalk approach between gene and nutrient, most promising branch of nutrition research.

ADVANCED FOOD PROCESSING APPROACHES FOR THE OPTIMUM RETENTION OF BIOACTIVE NUTRIENTS DURING FUNCTIONAL FOOD PREPARATIONS

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A new terminology has been emerged in food processing in 2009, known as '*Foodomics*' that deals with '*food science*' and '*nutrition*' to improve the consumers' well-being and heath. It is the exploitation of food science for the improvement of optimum human nutrition. The functional foods/nutraceuticals are necessary to have in today's life in order to combat the various metabolic syndrome/diseases acquired by people through their modern lifestyles, such as, inflammation, insulin resistance, hypertension, platelet hyperactivity, dyslipidemia, CVD etc. There is a high potential of nutraceuticals/functional foods in Indian market. The global nutraceuticals market was reported at around US$175 billion in 2016. The Indian nutraceuticals market is growing at a CAGR of 17.1 % and is expected to reach $4 billion by 2020. However, food processing effects the bioactive properties of food by modifying their various micro- and macro-nutrients, such as lipid oxidation, denaturation of proteins, non-enzymatic browning of amino acids and sugar during heating, loss of vitamins, minerals, enzymatic oxidation etc. Therefore, in this regard, *foodomics* plays an important role to indicate the appropriate food processing techniques, control, assessment of food safety and for the maximum retention of the bioactive compounds and optimum benefit of the consumers' health. This new methods of assessment has a great challenge in a food processing sector and global food market as well. However, the presentation will highlight on some of the advanced approaches of food processing techniques such as microencapsulation, superheated steam drying, high pressure processing, vacuum frying, membrane processing etc. for the optimum retention of bioactive nutrients during the development of functional foods.

Nutritional challenges and food security in India

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Micronutrient mal nutrition is one of the severe problems in developing world including India. Approximately 7.5 billion people are occupying the earth, at present. In order to feed every one adequately we need 2800 million tonnes of cereals would be required, against which global production is only 2100 million tonnes. This deficit in production has left over 868 million people undernourished worldwide, out of which 850 million are living in developing countries and India is one of such countries which has a major proportion of undernourished children. India ranks poorly in terms of both hunger and malnutrition. On the contrary the demand for protein of animal is increasing day by day due to rapid urbanization. By 2050, consumption of meat and dairy products is projected to increase by 173% and 158%, respectively, as that of 2013. To meet the growing demand and to cope up with 9 billion world population by 2050, agricultural production needs to increase by 60% (compared to 2005/2007 production) including of increase in animal production and animal products. In addition cropland per capita is one of the biggest challenges for feeding Indian people who are on the track of rapid urbanization. Availability of food grains is a necessary condition for food security. The Indian people are more or less self sufficient in cereals, however, to achieve self sufficiency in pulses and oilseeds have become a major challenge for it. Due to changes in consumption patterns, the demand for fruits, vegetables, dairy, meat, poultry, and fisheries has been increasing. Crop diversification is very much required for better production. It may be noted that the slowdown in agriculture growth could be attributed to structural factors on the supply side, such as public investment, credit, technology, land and water management, etc., rather than globalization and trade reforms as such.

In the sixties of the last century the acute or chronic food inadequacy at national, regional or household level was widespread among the poor segments of population. Taking this into account food security was defined as the ability of a country or region to assure adequate food supply for its current and projected population. Over the next three decades many countries became self sufficient in food production but calamity associated acute food scarcity and wasting persisted in some pockets. Poverty and inability to purchase adequate food leading to under nutrition and micronutrient deficiencies persist even today among the poor segments of population. The nineties witnessed the emergence of dual nutrition burden in all the countries with persistent inadequate dietary intake and under nutrition on one side and low physical activity/food intake above

requirements and over nutrition on the other side. Body size and physical activity levels are two major determinants of human nutrient requirements. The revised ICMR RDAs for Indians take cognizance of the current body weight and physical activity of Indians while computing the energy and nutrient requirements. The revised RDA has been used to assess gap in food intake in women and children and providing food supplements to bridge the gap and prevent under nutrition. Nutrition scientists have suggested that in India underweight in under five children may not be a good indicator for assessment of food insecurity because third of Indian infants are born with low birth weight and birth weight is a major determinant of growth in infancy and childhood. The steep rise in underweight rates occurs between 3-23 months of age and is related to poor infant and young child feeding practices which are not directly linked to household food insecurity. In India and South Asia stunting rates in preschool children are high. Stunted children with appropriate weight for their height get misclassified as underweight. Available data from India indicate that only about 1/6th Indian preschool children have low BMI for age. If normal BMI issued as the criterion for nutrition security, India fares well with over 80 per cent of preschool children and 60 per cent adults in India being normally nourished. As both under-and over nutrition are associated with health hazards, perhaps time has come for use of normal BMI as the nutrition indicator for food security.

FOODOMICS APPROACH TO ESTABLISH LINK BETWEEN PROBIOTICS AND THE ABILITY TO CURE NEPHROTOXICITY

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Probiotics are constituents of functional foods, which when administered in appropriate amounts confer a benefit to the host. Probiotic use in chronic kidney disease (CKD) patients continues to be an area of interest among renal health care professionals. Foodomics is a discipline that studies the Food and Nutrition domains through the application and integration of advanced omics technologies to improve consumer's well being, health and knowledge. Foodomics requires the combination of food chemistry, biological sciences and data analysis. In this study, acetaminophen induced uremia in male albino rats was tried to prevent using isolated probiotic strain from fermented food dahi. . Namely AD1 and AD3 two designated strains out of 7 initial isolate LAB were found to have strong urease enzyme activity, and identified as *Weissella confusa* AD1 (Genebank Acession no KX583657.1) and *Lactobacillus plantarum* AD3 (Genbank Accession no. KY472790.1).Another study was undertaken to examine effect of some nonpathogenicbacteria, such as *Sporosarcina pasteurii*MTCC No. 1761 and chicken isolated strain *Lactobacillus ingluviei* ADK10 on kidney disease. *S.pasteurii*, and *L. ingluviei* ADK10 were tested for their probiotic characteristic. They tolerated the very low pH conditions (pH 2.0) and were able to survive for 240 min. All probiotics were able to survive 4 h exposure to 0.3% Oxgall bile at pH 8.0. The relative ranking of probiotic adherence to Ht-29 cells was determined as adherence index with 258/100 cells along with good hydrophobicity (67% using toluene) in case of *L. ingluviei* ADK10. *S.pasteurii* also showed good surface hydrophobicity (33%) using toluene as organic compound. Cell free culture supernatant of *S.pasteuri* and *L. ingluviei* ADK10 effectively inhibit growth of *Escherichia coli*, *Bacillus subtilis,Staphylococcus aureus*, *Shigella dysentery, Pseudomonas aeruginosa*, *Klebsiella pneumonia* (average diameter of 10 mm in case of *L. ingluviei* ADK10 and 6 mm in case of *S.pasteurii*). In case of group treated with *S. pasteurii* at a dose of 1×10^9 cfu/ml/kg and duration of 3 weeks showed significant reduction of uremic profiles. In case of group treated with *L. ingluviei* ADK10at a dose of 1×10^9 cfu ml/kg and duration of 2 weeks showed significant reduction of uremic profiles.

Thus, the present work complies a summary of the useful approach of foodomics applications that greatly helps in an area of food science and nutrition to gain a better access to data, which is analyse the effects of food on human health. Moreover, these established probiotics will be effective, harmless, cost effective management for the protection of renal diseases and also pharmaceutical industries will be benefited.

Keywords: Probiotics, Foodomics, Acetaminophen, Uremia.

FOOD: FUNCTIONALITY, OPERATIONS AND THE UNDERLYING CHEMICAL PRINCIPLES

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Food Science and Technology is basically an interdisciplinary area of study which requires contribution by different Scientific, Engineering and Technology disciplines for its growth and development . Thus the fields of food science and technology like food analytical chemistry, food process engineering/food processing, food and bioprocess technology, food extrusion, food quality control, food packaging, food biotechnology and food microbiology have been emerged through interactions with other areas of science and technology . As Chemistry is the Science of Matter, it is, indeed, the major contributor to this area of study.

The knowledge gained through the study of Chemistry and Chemical Technology opens various methodologies for transforming materials around us in edible form with desired physicochemical and sensory properties. To understand food ,understanding of the properties of food constituents, and the interactions between these constituents during food processing, storage as well as understanding of the relationship between form and functionality of constituents and the concept of fitness-for-purpose (i.e., quality) in converting agricultural products into foods is very much required. The relationship between chemical composition and properties of macroconstituents (carbohydrates, proteins, lipids) and microconstituents (vitamins, minerals, antioxidants, flavour and anti-nutritional chemicals) and their functions in plant- and animal-based foods has to be explored for comprehensive understanding of food operations.

Optimization and adoption of feasible food processing and packaging operations are practiced in industries only through the comprehensive use of principles of chemistry. We need to ask help from the science of chemistry to develop new generation food products like functional foods, innovative analytical methods to assess 'quality' of those products, technology to reduce formation of hazardous & toxic substances within the food matrix during processing & preservation i.e. to maintain safety, security and sustainability with respect to the end use by the consumers. It also helps guide you go for the right way to consume as well as the right form of an edible material towards availing the fullest extent of its beneficial properties be it nutritional or functional.

If we know the basic chemical process principles underlying the formation of simple food gels then only we can order the right choice of chemicals like 'stabilizer', 'thickener' etc. and subsequently may arrive at a quality product. Else, we may arrive at a 'weeping gel'.

Gut flora and their metabolic end products for health perspective of individual

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The interaction in between the gut microbiota and human health is become the high priority of research in world-wide. It is now well established that good health of an individual is largely depends upon a healthy and balanced gut flora. The gut (entire length of 9 mt and surface area of around 400 sq mt) is populated with ten trillions of microbial cells from all the three domains of life (Archaea, Bacteria and Eukarya). The entire population of microorganisms including bacteria, fungi, archaea, viruses, and protozoans is referred as microbiota and their collective genome is called as microbiome. The human is a superorganism that functions in harmony with trillions of symbiotic bacteria and eukaryotic cells. The host and its symbionts together are called a "holobiont," and their collective genome is known as "hologenome". It has estimated that 95% of microbiota are bacteria and they have about 50 phyla and 50-100 species. An adult American containing Firmicutes (79.4%), Bacteroides (16.9%), Actinobacteria (1%), Proteobacteria (0.1%) and Verrucomicrobia (0.1%), whereas, an adult Indian have Firmicutes (62%), Bacteriodetes (24%), Actinobacteria (5.2%) and Proteobacteria (4.2%), other groups like Errucomicrobia, Tenericutes and Fusobacteria are very low (0.03% to 0.05%).

The abundancy of bacterial population depends upon many factors like geographic location, regional diet, host genetics, age, health, mode of delivery, feeding type, exposure of antibiotics, etc. The compositional dysbiosis leads to different types of intestinal and extra-intestinal disorders. Inflammatory bowel disease (IBD), irritable bowel syndrome, coeliac disease and even colorectal cancer are the manifestation of altered microbial composition. Many metabolic diseases like obesity, diabetes, allergy, asthma, lupus erythematosus, psychological disorders, etc., are also linked with the gut flora composition. Several potential mediators have been hypothesized to link the activity and composition of gut bacteria and metabolic diseases, including lipopolysaccharide, angiopoietin-like protein 4, bile acids and short-chain fatty acids. In the presentation of the seminar, I will focus the current evidence related to the direct role of gut bacteria in obesity-related metabolic perturbations.

CARBOHYDRATES AND THEIR USES IN FUNCTIONAL FOOD PRODUCT DEVELOPMENT

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Carbohydrates occur in plant and animal tissues as well as in micro-organisms in many different forms and at variable levels. In plants a wide variety of monosaccharides, oligosachharides and polysachharides are present. The storage carbohydrate in plant is starch with which we are very much familiar. The structural polysachharide in plant is cellulose whereas gums are a varied group of polysachharide found in plant, sea weeds and micro-organisms. Because of their useful physical and functional properties they have found widespread application in food processing and functional food product development as well .

Functional foods deliver additional or enhanced benefits over and above their basic nutritional value. Some functional foods are generated around a particular functional ingredient, for example foods containing dietary fibre, prebiotics, gums and mucilage or fructo oligosachharide etc. Other functional foods can be foods fortified with a nutrient that would not usually be present to any great extent (e.g. folic acid fortified bread or iron fortified breakfast cereals). Functional foods may provide benefits in health terms, but should not be seen as an alternative to a varied and balanced diet and a healthy lifestyle.

Dietary fibre is that part of plant material in the diet which is resistant to enzymatic digestion which includes cellulose, noncellulosic polysaccharides such as hemicellulose, pectic substances, gums, mucilages and a non-carbohydrate component, lignin. The diets rich in fibre such as cereals, nuts, fruits and vegetables have a positive effect on health since their consumption has been related to decrease incidence of several diseases. Dietary fibre can be used in various functional foods like bakery, drinks, beverages and meat products. Influence of different processing treatments (like extrusion-cooking, canning, grinding, boiling, frying) alters the physico- chemical properties of dietary fibre and improves their functionality.

Prebiotics are short chain carbohydrates that are resistant to the digestion process in the upper part of the digestive system, are not absorbed in any segment of the gastrointestinal system, and finally are selectively fermented by specific colonic bacteria. The mechanisms of the beneficial impacts of prebiotics on human health are very difficult to specify directly, because their health-promoting functions are related to fermentation by intestinal microflora. The impact of prebiotics on diet-related diseases in many ways also depends on the products of their fermentation. Prebiotics as functional food ingredients also have an impact on the quality of food products, due to their textural and gelling properties. Prebiotics as food additives can be very valuable in the creation of functional food items.

Resistant starch refers to the portion of starch and starch products that resist digestion as they pass through the gastrointestinal tract. RS is an extremely broad and diverse range of materials and a number of different types exist (RS1–4). The four distinct classes of RS in foods are: (1) RS1 – physically inaccessible starch, which is entrapped within whole or partly milled grains or seeds; (2) RS2 – some types of raw starch granules

(such as banana and potato) and high-amylose (high-amylose corn) starches; (3) RS3 – retrograded starch (either processed from unmodified starch or resulting from food processing applications); (4) RS4 – starches that are chemically modified to obtain resistance to enzymatic digestion (such as some starch ethers, starch esters, and cross-linked starches). At present, these are mostly defined according to physical and chemical characteristics. Resistant starch is the fraction of starch which is not hydrolyzed to D-glucose in the small intestine within 120 min of being consumed, but which is fermented in the colon. This will be treated as a potential functional component which can show less glycemic index value.

The increase in consumer demand for high quality food products has led to a growth in the use of new technologies and ingredients. Several factors influence changes in consumer demand

including health concerns like cholesterol, cancer, obesity, diabetes etc. As a result of this change, interest in new product development, particularly convenience functional food products with new technologies have dramatically increased in recent years. The food industry offers functional and nutritional quality and convenience to a wide spectrum with respect to taste, appearance, healthiness, nutritional and safety. Carbohydrates can serve a solution in such developmental aspect with various process technologies for making functional foods.

SPICY FOOD OR POISONOUS FOOD? BIOCHEMICAL DETECTION OF ADULTERANTS IN POWDERED SPICE SAMPLES COLLECTED FROM DIFFERENT MARKETS OF KOLKATA AND ITS SUBURB

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ABSTRACT

A major goal of nutrition biologists is to formulate food items or food ingredients that will be beneficial to human health, but some unscrupulous traders add harmful adulterants to food material to be consumed by humans. In the present study, 64 samples of turmeric powder, 66 samples of red chilli powder and 56 samples of cumin powder were collected from 3 markets of Kolkata and 4 markets of the suburbs (Barrackpore, Titagarh, Khardah and Agarpara); these samples included 3 branded products for each spice item while all others were unbranded products. Moreover, 10 control samples, each of pure powder of turmeric, red chilli and cumin were collected from Saha Bani Milling, Suri, Birbhum. All the samples were subjected to different biochemical tests for detection of the presence of adulterants. The branded products and the control samples did not reveal the presence of any adulterant. Adulterants detected in turmeric powders could be arranged as: Metanil Yellow dye (known to be carcinogenic) > starchy material > chalk powder; those detected in red chilli powder could be arranged as: red coal-tar dye (known to be carcinogenic) > brick powder; those detected in cumin powder could be arranged as: husk dust > starchy material. It was concluded that nowadays, people generally use ready-made, powdered spices in order to save their time and labour in pounding the intact stuff while unscrupulous traders take advantage of this situation. Further, the findings of the present study warrant the necessity of (i) some easy tests to be carried out at home by the consumers before they use any unbranded spice powder, in one hand and (ii) public awareness programmes to be organized frequently by the nutrition biologists, on the other.

Key words: Adulterant, Turmeric powder, Red chilli powder, Cumin powder.

DEITETIC INTERVENTION IN ORAL CANCER PATIENTS- A PROSPECTIVE STUDY

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Aim: The aim of the study is to establish the importance of proper nutritional intervention in oral cancer patients.

Method: One subject was selected among 20 oral cancer subjects for this study with co-morbidities like hypertension and fatty liver. The subject was started with low calorie diets and gradually increased to optimum calorie diet. It was seen that the patients vital parameters along with all other patho-physiological parameters are improved with time.

Conclusion: Proper dietary intervention is indeed essential for oral cancer patients for overall positive outcome.

HIGH PROTEIN DIET IS BENEFICIAL FOR PATIENTS SUFFERING FROM ACUTE KIDNEY INJURY

Aim: To prove that a high protein balanced diet is beneficial for patients suffering from acute kidney injury.

Method: Two subjects were studied over a period of time who were suffering from AKI along with other disease conditions like sepsis, fever, etc. Both of them were administered with a high protein diet based on the dietary guidelines of AKI, which was increased gradually according to their requirements. It was observed that the biochemical parameters improved, Infection markers decreased, Patient's fluid balance was corrected, Patient's appetite improved, overall health status became better.

Conclusion: A high protein balanced diet is indeed beneficial for patients suffering from Acute Kidney Injury.

NUTRITIONAL COUNSELING AND THERAPEUTIC DIET

Aim: The importance of nutrition in both health and disease, can't be over stated. Changing socio-economic and environmental conditions along with increasing public awareness towards health, giving rise to ever increasing new challenges to health care professionals, especially professionals related to clinical nutrition. Today the emphasis is growing towards primordial prevention through proper diet and nutrition.

The purpose of this study is to emphasis the above points with their logical goals.

Conclusion: Proper and scientific methods of nutritional counseling along with therapeutic diet is imperative for the optimum health.

FISH OIL AND HUMAN HEALTH

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ABSTRACT

Fish are very rich and varied either in marine or freshwater are favourite food and people love to eat. Natural marine fish are excellent sources of Omega-3 fatty acids that are extremely beneficial for our health. The recent decline in certain fisheries together with preference of some sections of the populations to the foods of vegetable origin initiated search on alternate sources of these fatty acids, such as transgenic plants and micro-algae. The algae and Echium sources offer vegetarians a product that can significantly increase blood levels of EPA and DHA, something that is not possible with traditional flax seed oil. It is said that the food processors are locked in a "fish oil arms race"; many entrepreneurs are interested in development of genetically modified crops that could challenge the supremacy of fish as the best source of ω-3 fatty acids. Nevertheless, the supremacy of marine fish as sources of PUFA is difficult to challenge at least in the near future. However, some clinical data have produced conflicting results and areas of potential use include schizophrenia, respiratory diseases, and promotion of postnatal growth, development, memory and even mood require further more research. Omega-3 fatty acids, which are found abundantly in fish oil, exert cardiometabolic effects with a diverse range of actions. The results of previous studies raised a lot of interest in the role of fish oil and omega-3 fatty acids in primary and secondary prevention of cardiovascular diseases. The present review will focus on the current clinical uses of omega-3 fatty acids and provide an update on their effects.

BIOTECHNOLOGY AND CONSERVATION OF TUBER CROPS FOR FOOD SECURITY

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ABSTRACT

Conservation of biodiversity of major tropical tuber crops viz. cassava (*Manihot esculenta* crantz), sweet potato (*Ipomoea batatus* (L.) Lam.), Taro [*Colocasia esculenta* (L.) Schott], Elephant foot yam [*Amorphophallus paeoniifolius* (Dennst) Nicolson] and yams (*Dioscorea alata* L.) are most important in the context of food insecurity, climate change and organic farming. *In vitro* tissue culture technology is an upcoming ecofriendly biotechnological tool for conservation and propagation of vegetatively propagated crops. Tuber crops research in India was initially on improving yields. Recently a paradigm shift has taken place for climate proof crops with valued traits. Conservation, progressive screening and evaluation of tuber crops germplasm at CTCRI resulted in identifying sweet potato genotypes tolerant to biotic (weevil), abiotic salt stress(6- 8dSm-1) packed with high yield (>15tha–1), starch(18-20%), beta carotene(6-10mg/100g) and anthocyanin (85mg/100g). Some of the local land races of taro are found to be tolerant to biotic leaf blight, abiotic submergence, drought and salt stresses So it is necessary to conserve many crop species including important land races. Present paper deals for conserving some tuber crops through *in vitro*. A number of studies covering developed and developing countries have shown greater concerns about the loss of genetic diversity of such climatic resilient value added tuber crops genotypes.

Key words: Biotechnology, Conservation, tuber crops, cassava, sweet potato, taro, elephant foot yam, yams.

NUTRACEUTICALS AS THERAPEUTIC TOOL FOR THE TREATMENT OF DIET-RELATED DISEASES

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ABSTRACT

Background: Globally, incidence of diet-related diseases is increasing progressively due to greater availability of hypercaloric food and a sedentary lifestyle. This causes obesity, diabetes, hypertension, atherosclerosis, various cancers and vascular diseases are more common. As we approach towards the 21st century, advancement in the field of medical sciences, pharmaceutical technology and nutritional sciences natural products and health-promoting foods have received great importance. Nutraceuticals and functional foods represent a novel therapeutic approach to prevent or attenuate diet-related disease. Nutraceuticals have attracted considerable interest because of its potential health benefits beyond their nutritional value.

Aims and objectives: This article attempts to highlights that application of nutraceuticals as therapeutic tools for the treatment of various diseases and ailments.

Discussion and conclusion: On the basis of natural source, chemical grouping nutraceutical are categories as nutrients, herbals, dietary supplements, dietary fiber, prebiotics, probiotics, polyunsaturated fatty acids and antioxidants etc. In whole, 'nutraceutical' has led to the new era of medicine and health as a powerful tool in maintaining good health and to fight against nutritionally induced acute and chronic diseases, thereby promoting optimal health, longevity and quality of life.

Key words: Nutraceutical, functional foods, obesity, Probiotics, Prebiotics.

MUSHROOM: NUTRITIONAL VALUE AND HEALTH CARE

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ABSTRACT

Nutrients are the substances found in food which drive biological activity and are essential for the human body. They are categorized as proteins, fats and carbohydrates (sugars and dietary fibre), vitamins and minerals and perform the vital functions like building all parts of body such as muscle, bone, teeth and blood, producing energy (power and heat) and it also keep the body in good working order. Edible mushrooms are consumed for their nutritional value and occasionally for their medicinal value. One cup of chopped raw white mushrooms contain-15 calories, 2.2 grams of protein, 2.3 grams of carbohydrate but no fat. Besides mushrooms are rich in B vitamins such as riboflavin (B2), folate (B9), thiamine (B1), pantothenic acid (B5) and niacin (B3). The B vitamins help the body to get energy from food and to form red blood cells. Pregnant women are advised to take folate during pregnancy to boost fetel health. Mushrooms are the only vegan which is a source of vitamin D and several other minerals like selenium, potassium, copper iron and phosphorous. It also contains Beta-glucans in the cell wall. These help in preventing cancer, decrease high blood pressure, cholesterol and cardiovascular diseases, increase nerve impulse and immunity and manage body weight.

Key words: Mushrooms, vitamins, minerals, cardiovascular disease, immunity.

WILDLIFE HUNTING FOR FOOD: A CASE STUDY FROM SUSUNIA HILLS, WEST BENGAL, INDIA

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ABSTRACT

The present study was aimed to throw a light on hunting practices, indigenous tools and technique, species harvested and the socio-economic factors affecting the exploitation of wildlife surrounding the Susunia hills, Bankura. All the tribal groups under the study area killed various wild animals surrounding the natural habitat of Susunia hills. A total of 36 species of wild animals was recorded to be killed from their natural habitat. Occasionally few reptiles and amphibian was also killed for meat. The villagers practiced to harvest a wide range of animals from the forest to be used as food. The rest (bone, skull, skin, and hoof) was used for aesthetic purposes. It was found that new generation tribal people are not interested in hunting because of their socioeconomic status change and new job opportunities created by MGNERGA 100 day work. Now they can easily collect poultry bird meat, digestive part and skin by spending only little amount of money. This poultry bird gave them easy availability of meat. So uncertainty of hunting practices decreased. Lastly number of wildlife has decreased, strong implementation of wildlife protection laws, increase of educational level and awareness which is preventing new generation from hunting. The easy availability of alternate protein food sources from domestic meat (chicken and pigs) have also decreased the hunting event. In this region hunting was once considered to be more important as a cultural practice than as a livelihood. But now they prefer commercial meat over wild meat. Susunia hill is an ideal ecotourism destination where local people could be employed. Expressing the natural beauties of this hill to the world not only bring a new area for West Bengal tourism but also it may open a new path for socio- economic development for the tribal people of surrounding areas leaving behind the illegal hunting activity.

Key words: Hunting; Wildlife; Poultry; Protein; Food; Ecotourism

DIETARY PROTEIN: ONE OF THE KEY REGULATORY FACTORS OF CHRONIC PAIN

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ABSTRACT

Dietary proteins had a direct regulatory effect on chronic pains. Different proteins had a different grade of effects on various hormonal and metabolic pathways. Protein also builds and repair muscles, cartilage & bone and increases muscle mass and strength.Intake of proteins increases the plasma insulin level which in turn induced the glycolysis pathway. Protein also had a negative feedback on neoglucogenic pathway. All these pathways lead to a controlled blood glucose level. Which in turn regulate the chronic inflammation, arthritis pain etc. Proteins, particularly amino-acids regulate the thyroid hormone level, which controls normal metabolism of cardiac tissue, fat tissue, skeletal muscle and nearly all tissues, thus controls chronic pain. A low protein diet influences the Hypothalamus-Pituitary-Thyroid (HPT) axis and results in altered production of T3 and T4 hormones. This altered thyroid production and function causes abdominal adiposity, high blood cholesterol level, reproductive abnormalities, and weight loss etc. Fibromyalgia like chronic pain condition is highly influenced by a healthy protein diet. Low protein diet also influences the hyper activity of stress hormones like adrenalin & neurotransmitter dopamine, serotonin, Ɣ-amino butyric acid (GABA). These chemicals have a great positive effect on pain enhancement. This paper focus on the relation of dietary proteins and chronic pain by studying various hormonal and metabolic pathways.

Keywords: Dietary proteins, insulin, HPT, thyroid, stress hormones, chronic pain, fibromyalgia, GABA.

MONOSODIUM GLUTAMATE: TOXIC EFFECTS AND THEIR IMPLICATIONS FOR HUMAN INTAKE

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ABSTRACT

Monosodium glutamate (MSG) is made up of nutritionally indispensable amino acids and used as flavour enhancer worldwide. It is believed to be associated with different health problems. It is present in heterogeneous group of foods as a flavour enhancer and used either as food additive (E621) in the form of hydrolysed protein or as purified monosodium salt. For the first time (1908), MSG was discovered in Japan from seaweed as a flavour enhancer and in pesticide/fertilizer as Metabolic Primer. At earlier times, MSG and glutamic acid was produced by extraction, which was a slow and costly method. It was first introduced in the US in the late 1940s. Later on (1956), large-scale production of MSG and glutamic acid was successfully achieved by fermentation. Since 1957, in the US MSG, was produced by bacterial fermentation involving genetically modified bacteria which secrete glutamic acid through their cell walls.

Various studies revealed that MSG has toxic effect on fetal development/fetus, children's, adolescent, and adults. Physiological complication associated with MSG toxicity is hypertension, obesity, gastrointestinal tract troubles, and impairment of brain, neural and reproductive function. Public awareness may play a major role in controlling the food adulteration by working in collaboration with National testing facilities to scrutinize each commercial food article from time to time.

Key-words: Monosodium glutamate, toxicity, neurotoxicity, obesity, diabetes.

BROCCOLI: A FUNCTIONAL FOOD IN MANAGEMENT OF NON-COMMUNICABLE DISEASES

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ABSTRACT

Broccoli (*Brassica oleracea*) is a vegetable belongs to cabbage family. It is considered as a functional food due to its health-promoting properties which has linked to the presence of natural antioxidants *i.e.*, phenolic compounds and vitamins and chemo-preventive compounds *i.e.*, glucosinolates and their degradation products, isothiocyanates. These antioxidants present in broccoli may decrease the risk of certain diseases; like diabetes, cardiovascular diseases, hypertension, cancers, neurological conditions and rheumatoid arthritis. Broccoli sprouts are a rich source of several isothiocyanates that are well known class of cancer chemopreventive agents. They have shown to mediate antitumor activities by inhibiting the growth of cancer cells, including prostate, breast, lung, liver, cervical, and colorectal cancers. Broccoli possesses antidiabetic potency due to presence of sulforaphane. Sulforaphane has the potential to induce some peroxisome proliferators-activated receptors that contributes to glucose homeostasis in hyperglycaemic and oxidative conditions. Consumption of antioxidants existing in broccoli leaves contributes to decrease damages to cells and, specially, accelerates restoration of pancreatic cells and subsequently increases insulin and decreases blood glucose. Sulforphane of broccoli improves blood pressure as well as decreases inflammation. It can reduce LDL, total cholesterol and increase in HDL cholesterol. So, broccoli was strongly associated with reduced risk of coronary heart disease. Moreover, sulforaphane prevents neuro-degeneration and thereby has its effect on Alzheimer's disease and Parkinson's disease.

Keywords: Functional food, antioxidants, chemo-preventive, glucosinolates, Sulforaphane

ICHTHYOFAUNAL DIVERSITY OF KRISHNABUNDH SUPPLEMENTS FISH FOOD NUTRITION TO THE PEOPLE OF BISHNUPUR, BANKURA WEST BENGAL

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ABSTRACT

Fishes are most important natural resources of the country .They not only solve the food problem of a nation by providing enriched animal protein but also important for their ornamental and recreational value . The present study aims at making a record of the diversity of the fishes of Krishnabundh, Bishnupur Bankura. During the study 31 finfish species was observed in the bundh . Fishes belonged to six orders. 12 species of order Cypriniformes, 1 belonged to order Osteoglossiformes, 6 to order Siluriformes, 10 to order Perciformes, 1 to order Synbranchiformes, 1 to order Clupeiformes. The biodiversity status has been catagorised according to the IUCN Red list category (guideline version 11, February 2014) . Out of 31 species 27 belonged to least concerned, 1 not assessed by IUCN, 2 were nearly threatened, 1 was data deficient. The yield of small fingerlings of IMC was specially during monsoon to post monsoon season. The yield of large fingerlings of IMC was maximum specially during post monsoon to winter. The yield of mature IMC was maximum during winter to summer. In addition the Small indigenous fish varieties (SIF) was found throughout the year. Thus rich source of fish protein is available throughout the year to the people surrounding the bundh. But due to the anthropogenic pressure from the adjacent agricultural fields, frequent changes are observed in the physical and chemical properties of water. So the finfishes within the reservoir face severe threatening. Therefore suitable management strategies are urgently needed to prevent the loss of biodiversity, as well as financial and nutritional security.

Keywords : Ichthyofaunal , fishfood,Krishnabundh, anthropogenic.

FOODOMICS: A LINK BETWEEN PROPER NUTRITION AND GOOD HEALTH

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ABSTRACT

Considering the word 'health' as a multidimensional one, we have the possibility to understand the complex relationship link between nutrition and health, and of reaching healthier conditions by personalized balanced diets in a vision of foodomics. Foodomics is the science of studying, through the evaluation of different biomarkers, the entity and the direction of the movements across the healthy or unhealthy space, developing models that are able to explain how food components, food, diet and lifestyle can influence our trajectory toward the healthy condition. To understand how the principles of foodomics could improve the nutritional status of human beings we needs to acquire knowledge about the metabolic pathways that may be altered in individuals with genetic variants in the presence of certain dietary exposures offers great potential for personalized nutrition advice, and epigenetics and nutrigenetics have been used to assess the need and status of specific nutrients. In this sense, recent works have demonstrated, for instance, how -omics approaches may help to understand the mode of action of bioactive compounds in biological model systems, as well as new relationships between food components nutrition and health quality. Developments in the evolving field of good health, foodomics applied to different fields of Food Science, including food quality and food safety, as well as food components ,good nutrition and good health.

Keywords: Foodomics , Nutrigenetics .

EFFECT OF LYCOPENE ON CYPROTERONE ACETATE INDUCED MALE REPRODUCTIVE HYPO-FUNCTION IN MALE ALBINO RAT: A MOLECULAR APPROACH

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ABSTRACT

Lycopene rectifies the stress induced spermatological abnormalities. In this context, the aim of the study was to find out the molecular mechanism of the rectification of cyproterone acetate (CPA) induced male reproductive hypo-function by lycopene. Vehicle treated control, CPA treated and CPA+ lycopene treated groups were considered. Spermatogenic profile, androgenic enzyme activity, anti-oxidant profile, gene and protein expression of apoptotic markers, flow cytometric analysis of sperm mitochondria and sperm viability, testicular ISEL study and mating study were performed. Results revealed a significant ($p< 0.05$, $p< 0.001$) degradation in all the sensors after CPA treatment. Lycopene administration for 30 days along with CPA treatment exhibited a significant recovery ($p< 0.05$, $p< 0.001$) in sperm motility, count, activities in testicular Δ^5, 3β-hydroxysteroid dehydrogenase (HSD) and 17, β-HSD, testicular cholesterol, serum testosterone level, testicular superoxide dismutase, catalase activities, malondialdehyde level than CPA treated group. Gene expression of Bax, Bcl-2, caspase-3, caspase-8, caspase-9, cytochrome-c, protein expression of Bax, Bcl-2, caspase-3 and seminiferous tubular diameter were recovered towards the vehicle treated control. Flow cytometric analysis focused remarkable recovery in sperm viability and sperm mitochondrial integrity. Immuno-histochemistry also showed the recovery in testicular apoptosis. Finally successful results in mating study confirmed that lycopene may have the capability to rectify the infertile status. So, it can be concluded that apart from oxidative stress management, lycopene may also has the potentiality to rectify the male reproductive hypo-function either by modulating stress induced apoptosis or by altering androgen synthesis via gene expression focusing nutrient-gene interaction.

Key word: Lycopene, cyproterone acetate, apoptosis, spermatogenesis, oxidative stress.

FOOD CONTAMINATION OF MULTIDRUG-RESISTANT BACTERIA MAY JEOPERDIZE FOOD INDUSTRY AND MAY CAUSE FATAL ILLNESS AMONG NEONATAL AND ELDERLY

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ABSTRACT

Bacterial pathogenesis claimed life since ancient time where plant extracts were used to cure illness as described in Charaka Samhita and Atharva Veda. Since the discovery antibiotics, microbial diseases like cholera, typhoid, dysentery, malaria, gonorrhoea, TB were all cured increasing the life expectancy. However, scientist noticed that drugs MICs were increased gradually since 1960. Mdr proteins inactivate the drugs in vivo by drug cleavage, drug modification and drug efflux. The genesis of mdr genes was happened to save the intestinal bacteria which synthesised vitamins. Bacteria combined F' plasmid with R-plasmids to make big plasmids carrying multiple mdr genes. We have studied the superbugs of Ganga River water and also have developed a cost effective plant-derived therapeutics (MDR-Cure) against superbugs. In this communication high rate contamination of multi-drug resistant bacteria was demonstrated in chicken meat obtained from five meat shops at Midnapore. The ampicillin resistant species were 960cfu/g chicken (60% R) in LB-Agar media as compared to only 20cfu/g in goat meat and 5cfu/g from human hair of local saloon (<1% R). Azthromycin, tetracycline and streptomycin resistant species were also detected but chloramphenicol resistant species were infrequent. Drug sensitivity tests using Hi-Media antibiotic paper disk (CSLA standard) and plasmid detection in 1% agarose gel electrophoresis confirmed MDR plasmids with mdr genes. Cooking did not clear the MDR bugs completely suggesting MDR bacteria were also thermophilic. Local cow milk also was highly contaminated with common drug resistant bacteria but not in Pasteurised commercial curd and milk. Pubmed search indicated that food contamination of enteric and non-enteric bacteria were overwhelming. Food industry was warned for MDR thermophillic bacteria contamination.

Keywords: MDR bacteria, chicken meat contamination, thermophillic superbugs

Evaluation of antidiabetic and antioxidative effect of hydro-methanol extract of rhizomes of *Curcuma amada* Roxb. (Zingiberaceae) in Streptozotocin induced diabetic male albino rat: Biochemical and genomic approaches

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ABSTRACT

Rhizome of *Curcuma amada* Roxb. (Zingiberaceae) is widely used as traditional medicine against various illnesses including diabetes. The aim of the study is to find out the anti-diabetic and anti-oxidative efficacy of the hydro-methanolic extract of rhizomes of *Curcuma amada* to recover the diabetes related complications in experimental diabetic rats. The hydro-methanol (60:40) extract of rhizomes of *Curcuma amada* were prepared. Diabetic rats were treated with said extract at the dose of 20mg/100g body weight/day for 28 days. The antidiabetic and antioxidative efficacy of this extract on glycaemic, enzymatic, genomic and histological sensors along with toxicity study if any were investigated.

The result showed a significant ($p<0.05$) recovery in fasting blood glucose, serum insulin, glycated hemoglobin levels, hexokinase and glucose-6-phosphatase activities in liver and skeletal muscle along with activity of antioxidant enzymes like catalase, superoxide dismutase in liver and renal tissue were observed in diabetic rat after hydro-methanol extract treatment. Levels of glutamate oxaloacetate transaminase, glutamate pyruvate transaminase in hepatic tissue and bax, bcl-2 and hex-I gene expression of hepatic tissue were also recovered towards the control after extract treatment to diabetic rat. Degeneration of pancreatic islets cell was noted in untreated diabetic group, but after hydro-methanol extract treatment it was recovered towards the control animals. The findings provide information about the effective recovery in most of the sensors by hydro-methanolic extract of *Curcuma amada* without producing any toxicity.

Key words: *Curcuma amada,* oxidative stress, diabetes, gene expression

Effect of *Musa balbisiana* flower on antidiabetic and antioxidative status in diabetic rat: A genomic approach

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ABSTRACT

A plenty of medicinal plants have been used in traditional medicine to treat diabetes mellitus. Diabetes is a group of metabolic abnormalities in which the body does not produce or use the enough insulin or resistance to insulin. The current study was performed to execute the anti-diabetic and anti-oxidative effects of hydro-methanol::3:2 extract of *Musa balbisiana* flower (colla) at the dose of 10 mg/100 g body weight/day for 28 days in streptozoptocin induced diabetic Wistar strain male albino rat. Fasting blood glucose level, serum insulin and glycated hemoglobin levels were measured. Hepatic Hexokinase, glucose-6-phosphatase, catalase, superoxide dismutase activities; hepatic malondialdehyde and conjugated diene levels; glutamate oxaloacetate transaminase and glutamate pyruvate transaminase activities in serum were assessed. A Foodomics strategy, involving genomic study was also applied in this study. Genomic study of pro-appoptotic gene Bax and anti-appoptotic gene Bcl-2; glycemic genes like Hex-I and GLUT-4 in hepatic tissue along with histological study were performed. Flow cytometry analysis of pancreatic β-cells was also studied. Twenty eight days treatment of above mentioned extract exhibited a significant recovery in all the concerned sensors in diabetic rat. From the results it may be concluded that the *Musa balbisiana* flower can be used as a value-added medicine for managing the diabetes and diabetes induced oxidative stress.

Key words: Diabetes, antioxidant, Bax, bcl-2, Hex-I, GLUT-4.

THERAPEUTIC EFFECT OF NOVEL HERBAL NANOFORMULATION ON HEPATORENAL DYSFUNCTIONS

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ABSTRACT

Nowadays, there has been a change in global trend from synthetic to natural medicine, which we can say "back to nature."Plants have been used for medicinal purposes long before prehistoric period. Evidence exist that Unani Hakims, Indian Vaids, European and Mediterranean cultures were using herbs for over 400years as medicine. Herbal medicine aims to maintain the natural balance of the body. Herbal medicine has been used in the protection as well as reduction of the risks of various diseases and also stimulate the immune system for fighting against infections. Herbal medicines can be administered through various routes such astopical administration route, parenteral routes and oral administration which is most frequently used route and can also be consumed as food. Traditional medicine continue to be practised for healing the body system, but the effective cost of treatments, several side effect and resistance development of currently used drugs in the treatment of hepatorenal dysfunctions have led to increase emphasis on the use of herbal plant materials as a non-conventional alternative management for the prevention of patients.In the study "green chemistry" has been emphasised for the synthesis of gold nanoparticles (AuNPs)using bark extract of *Terminalia arjuna* due to its relative ease, controlled size, shape and biocompatibility. This method for green synthesis of herbal nanoparticles have received much attention due to its no toxicity, ecofriendliness, rapidness and less bio hazardous. The characterization was done by different technique such as UV-SPECTROSCOPY, FESEM, TEM, EDX, XRD, FTIR, DLS. The shape of AuNPs were spherical and well dispersed having size within 40 nm. The molecular arrangement of different functional group was assessed by FTIR analysis.Then the therapeutic effect was observed on acetaminophen induced hepatorenal dysfunctions in male albino rats. Haematological, histological, biochemical, DNA degradation, cell free radical scavenging studies was assessed. Hematological parameters like total count of RBC and hemoglobin (Hb) were reduced during acetaminophen treatment but co administration of AuNPs with acetaminophen treatment could elevate total count of RBC and hemoglobin (Hb). Inhistological study acetaminophentreated rats showed massive cellular disruptions of liver and kidney tissue. But Co administration of AuNPs with acetaminophen treatment rats showed normal cellular architecture of liver and kidney tissue similar as untreated control group rats. In rats, acetaminophen induced significant elevation in nephrotoxic(Urea, Creatinine, CRP), hepatotoxic(AST, ALP,ALT) markers and significant decrease in the antioxidant enzymes such as SOD, CAT.Co-administration of AuNPs along with acetaminophen could not only prevent increased level of hepatoxic and nephrotoxic markers by significantly decreasing the elevated level but also protects inactivation of the antioxidant enzymes in liver and kidney tissue.Green synthesised gold nanoparticles would be effective in protection of hepatorenal dysfunctions due to its improve drug efficiency, effective drug delivery and non-toxicity.

Keywords: Herbalmedicine, Goldnanoparticles, Hepatorenal, Dysfunction, acetaminophen

Formulation of a rice fermented food with *Ruellia macrantha* (root) as an herbal starter: study of its potentialities as anti-obesity medicinal food

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ABSTRACT

Now-a-days anti-obesity potential of fermented food are of growing interest in all around the world. The rhizomes of *Ruellia macrantha* is commonly used for different food and beverage preparation by the native people of the Jangal Mahal area of West Bengal. This study explored the role of the root of *R. macrantha* in rice fermentation and examined the therapeutic potentialities of fermented product against obesity like metabolic disorders. Fermentation of boiled rice with the powder of this root leads to colonization of bacteria like aerobe (4.32±0.31), anaerobe (5.8±0.25), yeast (4.7±0.12), mould (4.52±0.26), Bifidobacterium *sp*. (6.89±0.27), Lactobacillus (6.78±0.33) at the unit of $\log_{10}$ cfu/g of fermented product after 4th day. The fermented product was fortified with fatty acids (mg/kg) like linoleic acid (121.5±3.12), palmitic acid (55.4±2.34), oleic acid (114.8±2.12), stearic acid (28.9±0.92) and phenolics (mg/kg) like protocatechuic acid (42.17±2.43), p-hydroxy benzoic acid (11.62±3.18), p-coumaric acid (0.67±0.12), ferulic acid (2.43±0.15), sinapic acid (6.23±0.74). After 8 weeks of supplementation of fermented product along with the food (20%, w/w) of diet-induced obese mice leads to a significant lowering of body and organ's weight. Significant improvements of serum level glucose, lipid profile, insulin, leptin, adiponectin, histoarchitecture of liver, and modulation of gut microbes particularly enrichment of the quantity of *bifidobacteria sp.* and *lactic acid bacteria*, were also observed by the treatment of fermented product. The antiobesity potentiality of the fermented product was also evident by the up-regulation of mRNA expression of fatty acid breakdown related genes, and their regulated gene products in fatty acid oxidation and glucose uptake. Concomitantly, both adipocytogenesis and fatty acid synthesis were arrested as reflected by the down-regulation of fatty acid synthesis related genes and their transcription factors. These data suggested that the microbial succession in fermented food from herbal starter leads to bioenrichment with a group of reactive metabolites which are affected the target tissues of the host, modified gene expression and alleviates obesity like metabolic disorders.

Keywords: Fermented foods, gene expression and anti-obesity.

Anti-fertility activity of *Terminalia chebula* (Retz.) in Wistar strain adult albino rat

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ABSTRACT

This experiment was done to search out the anti-fertility activity of different solvent fractions of hydro-methanolic (3:2) extract among n-hexane fraction (NH-Fr), chloroform fraction (CH-Fr) and ethyl acetate fraction (EA-Fr) of *Terminalia chebula*: A comparative efficacy study for induction of infertility in male albino rat for 28 days. The experiment was conducted to find out the hypo-testicular activity of effective fraction on different sensors using genomic and flow eytometric cell analysis, at the dose of 5 mg / 100 g body weight of each fractions for this purpose. Treatment with above fractions of *Terminalia chebula* showed a significant diminution in spermatogenesis, activities of androgenic key enzymes, inhibition in serum testosterone, diminution in oxidative stress parameter, Significant up regulation of testicular Bax gene and down regulation of Bcl-2 gene indicated the anti-fertility activity of these fractions. Flow-cytometric study focused a significant diminution in sperm viability and sperm mitochondrial status after the treatment with different fractions. Considering the above parameters, the most efficient results towards anti-fertility was noted in ethyl acetate fraction without impairing any toxicity in general which highlighted that the fraction may contains anti-testicular agent(s).

Keywords: *Terminalia chebula*, Flow-cytometry, Anti-fertility, Ethyl acetate, spermatogenesis

Remedial effects of different fraction solvents of hydro-methanolic extract of the *Holarrhena antidysenterica* seeds in streptozotocin induced male albino rat: an approach through biochemical and genomic study

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ABSTRACT

Background: A medicinal plant is *Holarrhena antidysenterica* has a reputation as folklore medicine for the treatment of diabetes, found in India.

Objectives: The present study was designed to remedial efficacy of different fractions of hydro-methanolic (40:60) extract of the *Holarrhena antidysenterica* seeds.

Methods: Different fractions (n-hexane, ethyl-acetate, chloroform, n-butanol) of hydro-methanolic extract at the dose of 20mg/100gm body weight/day for 28 days were administered orally. Biochemical and genomic sensors along with toxicity assessment if any were investigated.

Results: A significant ($p<0.05$) recovery in fasting blood glucose level, serum insulin level and hexokinase, glucose-6-phosphate dehydrogenase activity in liver along with antioxidant enzyme like catalase, peroxidase were investigated in diabetic rat after fractions treatment. Levels of thiobarbituric acid reactive substances in the liver, activities of serum glutamic oxalo-acetate transaminase and serum glutamic pyruvic transaminase were corrected by all the fraction treatment. Gene expression of Bax, Bcl-2 and Caspase-3 of hepatic tissue were also recovered towards the control after fractions treatment to diabetic rats. In all the cases, the ethyl-acetate fraction was more effective than others.

Conclusion: The results indicated that the ethyl-acetate fraction of hydro-methanolic extract of *Holarrhena antidysenterica* seeds has remedial effect on diabetes without inducing any metabolic toxicity and the bio-activity of the said fraction increase than other fraction.

Key word: *Holarrhena antidysenterica*, diabetes, gene expression, apoptosis.

Protective effect of rhizomes of *Curcuma amada* on testicular impairment in streptozotocin-induced diabetic rat: Extract selection study through genomic and flow cytometric analysis

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ABSTRACT

Abstract: Ayurveda has been first given a concept for the management of diabetic induced male infertility. *Curcuma amada* Roxb. (Zingiberaceae) used as folk medicine in India. Till today no work has yet been carried out regarding the management of this disease by the rhizome of *Curcuma amada*. This experiment has been conducted to find out the possible mechanism of most potent extrac of *Curcuma amada* rhizomes for the management of diabetes induced testicular hypofunction. Aqueous, methanol and hydro-methanol (60:40) extract of *Curcuma amada* was administered at the dose of 30mg /0.5 ml of 3% tween 80/100g body weight for 28 days. In this aspect, relevant biosensors such as oxidative stress, genomics and flow cytometric analysis along with biochemical, spermiological, histological and androgenic key enzymes of testicular tissue were assessed. Twenty eight days administration of different extracts of said plant part showed a significant recovery in different parameters such as fasting blood glucose level, sperm count, viability, motility and mitochondrial integrity, activities of testicular Δ^5, 3β-HSD and 17β-HSD, catalase and superoxide dismutase along with gene expression pattern of apoptotic markers like Bax and Bcl-2 of testicular tissue. From the results it may be stated that the hydro-methanol (60:40) extract showed maximum efficacy towards recovery. It may be concluded that among all the extracts, hydro-methanol (60:40) extract of rhizomes of *Curcuma amada* has potentiality to rectify the diabetes-induced testicular dysfunctions at maximum level.

Key words: Bax, Bcl-2, flow cytometer, testicular dysfunctions

GARLIC: A SUPER FOOD

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ABSTRACT

Garlic is a member of the liliaceae family (Allium sativum) regarded highly throughout the world for both its medicinal and culinary value. Excess production of oxygen radical species such as hydrogen peroxide, superoxide anion radical, and the hydroxyl radical are thought to cause damage in cells. The oxidative damage to cells is one of the factors causing many diseases, including atherosclerosis, diabetes and cancer. Garlic has been considered to be one of the best disease-preventive foods. Many of the health benefits of it is due to garlic's abundant antioxidant properties. Garlic contains an antibiotic principal "allin" (inactive form) which is converted to allicin (active form) by the enzyme allinase. Allicin further breaks down to allyl disulphide, which is responsible for characteristics flavor. When garlic is crushed, the cells break and enzyme is released and these compounds are formed. As garlic is rich in selenium, it helps to boost the effectiveness of the network antioxidants- vitamin C, vitamin E, glutathione and lipoic acid. With its sulfur containing compounds, high trace mineral content, and enzymes, garlic has shown antiviral, antibacterial, antifungal and antioxidant abilities. Diseases that may be helped or prevented by garlic's medicinal actions include Alzheimer's diseases, cancer and reduced inflammatory responses. It is effective in the treatment of cardiovascular diseases and lowering cholesterol levels. It is beneficial in ailments like gout, arthritis, stroke, cataract etc. As because of containing many medicinal properties it has gained the title of 'super food'.

Key words: Garlic, allicin, antioxidant, allicin

INDIAN GOOSEBERRIE OR AMLA AS A FUCNTIONAL FOOD

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ABSTRACT

Our Mother Nature has gifted mankind with tremendous medicinal plants to create a disease free and healthy life. Indian gooseberry or amla (Emblica *officinalis or Phyllanthus emblica*) is one of them. It is an extremely sour, nutritious fruit of an India tree in Middle East, and a few other Southeast Asian countries. It is known as Amla in India and Amalaki in Sanskrit. Due to its powerful antioxidant properties, it is often used as in Ayurvedic medicines to boost skin and hair health, and also overall immunity of the body. Amla fruit is widely used in the Indian system of medicine as diuretic, laxative, liver tonic, refrigerant, stomachic, restorative, anti-pyretic, hair tonic, ulcer preventive and for common cold, fever; as alone or in combination with other plants. Phytochemical studies on amla disclosed major chemical constituents including tannins, alkaloids, polyphenols, vitamins and minerals. Gallic acid, ellagic acid, emblicanin A & B, phyllembein, quercetin and ascorbic acid are found to be biologically effective. Research reports on amla reveals its analgesic, anti-tussive, anti-atherogenic, adaptogenic; cardio, gastro, nephro and neuroprotective, chemo preventive, radio and chemo modulatory and anti-cancer properties. Amla is also reported to possess potent free radical scavenging, antioxidant, anti-inflammatory, anti-mutagenic, immunomodulatory activities which are efficacious in the prevention and treatment of various diseases like cancer, atherosclerosis, diabetes, liver and heart diseases.

Keywords: Indian gooseberry, nutritious fruit, Antioxidant, Phytochemical

JUNK FOOD – A MEDIUM FOR DESTRUCTION OF HUMAN LIFE

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ABSTRACT

Junk foods are a high calorie food that is of low in nutritional value and too much of saturated fat. They contain little dietary fibre, protein, vitamins & minerals.Junk food can be prepared quickly and can be carried anywhere easily. Eating too much junk food is linked to serious health problems. Some unhealthiest junk foods are - soda, fried chicken,egg& sausage sandwich, bacon cheese burger,milk shake,chips& deep fried cheese sticks. They are called junk food because food labelled as such has almost no nutritional value other than empty kilojoules. They are high in saturated fat, salt, sugar & low in fibres & nutrients. These meals have very little vegetables or salad components. When they are processed, sometimes chemicals are added to ensure that they do not go bad.This processing destroys some enzymes & nutrients component of these foods. Junk foods increase risk of obesity,depression and chronic disease like cardiovascular disease, type - 2 diabetes, non-alcoholic fatty liver disease & some cancers.Due to high amount of fat present in junk food,it leads to undesirable health issues. Moreover, it can cause weight gain easily and may lead to obesity.

Key Words: Junk foods, Weight gain, Obesity, Disease

CYTOCHROME P450-A NOVEL BIOMARKER OF NAFLD

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ABSTRACT

Non-alcoholic fatty liver disease (NAFLD) is the most common type of chronic liver multifactorial disease closely associated with metabolic syndrome. NAFLD involves a wide range of liver pathologies with key stages ranging from simple steatosis to the more aggressive form of non-alcoholic steatohepatitis (NASH), which in turn may lead to fibrosis, cirrhosis, and in some cases, hepatocellular carcinoma. Pesticides are any substances that are used for preventing, destroying, repelling, or mitigating any pest. However, many pesticides can also pose risks to the peoples because they contaminat almost every part of environment. Pesticide residues are found in soil, air, and water. They have been linked to a wide range of human health hazards.Numerous studies have been conducted to test the association between pesticides and fatty liver disease. Many of pesticides are lipophilic and tend to accumulate in the adipose tissue. Cytochrome P450, phase I drug metabolising enzymes are present in highest amount in the liver mainly in the membrane of SER.CYPs are in general, the terminal oxidase enzymes in electron transfer chains and plays a role as biomarker. If the accumulated concentration of pesticides reaches lethal levels and cause toxicity. NAFLD causes no symptoms in most cases. It frequently comes to medical attention when tests done for other reasons point to a liver problem. This can be determined by ultrasound or enzyme test. Anti-diabetic medication, Vitamin, and Dietary supplement have been prescribed by doctor some time. No FDA-approved drug treatment exists for NAFLD, but a few drugs are being studied with promising results.

Key words: NAFLD, Pesticides, Cytochrome P450, Dietary supplement

HEALTH BENEFITS OF BLACK RICE

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ABSTRACT

Black rice is a range of rice types of the species *Oryza sativa* L. some of these are glutinous rice. Varieties include Indonesian black rice and Thai jasmine black rice. Black rice is a known as chak-hao in Manipur, an INDIAN state on the eastern border with Myanmar, where desserts made from black rice are served at major feasts. Black rice is a source of iron, vitamin E and antioxidants. The bran hull (outer most layer) of black rice contains one of the highest levels of anthocyanin found in food. The grain has a similar amount of fiber to brown rice and like brown rice, has a mild nutty taste. Black rice is higher by weight then that of other colored grains. It is suitable for creating porridge, dessert, traditional Chinese black rice cake, bread and noodles. It plays a role in the production and action of enzymes, involved in most body functions. Black rice is a carbohydrates rice mini packet loaded with abundant proportion of antioxidants, vitamins and minerals.Black rice is used for treatment like preventing life threatening diseases such as cancer, diabetes, dermatitis, asthma etc. Thus, it is not just a food but a super food.

Key words: Nutrition, Colour, health benefit, anti-oxidant, black rice

SOYABEAN: A RICH SOURCE OF ISOFLAVONES

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ABSTRACT

The soybean (Glycine max), is a species of legume native in East Asia, widely grown for its edible bean, which has numerous uses. Soy or soya products is a low cost source of protein that has been consumed in Asian Nations of many countries. Soybean seeds contain 40% protein and 20% oil on dry basis. Soy or soy products are rich source of protein, carbohydrate, omega-3 fatty acids and as well as isoflavones. Isoflavones are a type of phytoestrogen, or plant estrogen. The three forms of isoflavone are daidzein, genistein and glycitein. The chemical composition of isoflavones is similar to estrogen, and isoflavones have estrogenic activity. Soy's content of isoflavones are as much as 3 mg/g dry weight. Soy Isoflavones has beneficial effect for lowering the risk of CVD diseases, prevent osteoporosis and reduce symptoms of menopause etc. Soy phytoestrogens have been proposed as potential therapeutic agents to aid in preventing postmenopausal bone loss. Phytoestrogens promote osteoblast formation and inhibit osteoclast bone resorption. So, dietary soy intake decrease the risk of osteoporosis and many other diseases. Foods that contain isoflavones are beneficial as they are high in polyunsaturated fat, fiber, vitamins and minerals, and provide for increased intake of dietary protein, while decreasing dangerous saturated fats and unnecessary carbohydrate intake from consumption of empty calories. Dietary consumptions of soy products including soy milk, whole soybeans, soy flour, tofu, soy nuts and soy nut butter contain the highest concentration of isoflavones. These should be consumed in our daily diet to reduce the risk of many diseases.

Key words: Isoflavones, soy, osteoporosis, estrogen, menopause.

FRUITS, FOOD AND VEGETABLES TRANSMISSION OF NIPHA VIRUS: A SPECIAL NOTE

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ABSTRACT

The disease was first identified in 1998 during an outbreak in Malaysia while the virus was isolated in 1999. It is named after a village in Malaysia, Sungai Nipah. Nipah virus (NiV) is a zoonotic virus (it is transmitted from animals to humans) and can also be transmitted through contaminated food or directly between people. In infected people, it causes a range of illnesses from asymptomatic (subclinical) infection to acute respiratory illness and fatal encephalitis. People can get Nipah virus from contact with the excrement or droppings of infected fruit bats, pigs, or from other people infected with Nipah virus. People can also get infected with Nipah virus when they consume raw date palm sap (a drink found in parts of Asia) that is contaminated with bat droppings. Serious nervous disease with Nipah virus encephalitis has been shown to cause long term illness in some patients that survive, including persistent convulsions and personality changes. Symptoms usually appear five to 14 days after exposure to the virus. In the absence of a vaccine, the only way to reduce or prevent infection in people is by raising awareness of the risk factors and educating people about the measures they can take to reduce exposure to the Nipah virus. The primary treatment is focused on managing the symptoms such as controlling the fever and neurological symptoms if any. The only thing that can help a patient suffering from Nipah virus infection is intensive supportive care.

Key words: Nipah virus, discoveries, symptoms, prevention, control,

KEEP FOOD SAFE: PROTECT ALL FROM FOOD POISONING

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ABSTRACT

Foodborne illness, more commonly referred to as food poisoning, is the result of eating contaminated, spoiled, or toxic food. The most common symptoms of food poisoning include nausea, vomiting and diarrhoea. Each year many people in the world get sick from contaminated food. Common causes include bacteria and viruses. Less often, the cause may be a parasite or a harmful chemical, such as a high amount of pesticides. Symptoms of foodborne illness depend on the cause. They can be mild or serious. Most foodborne illnesses are acute. This means that they happen suddenly and last a short time. It takes several steps to get food from the farm or fishery to our dining table. Contamination can happen during any of these steps. For example, it can happen to raw meat during slaughter, fruits and vegetables when they are growing or when they are processed and refrigerated foods when they are left on a loading dock in warm weather. But it can also happen in our kitchen if we leave food out for more than two hours at room temperature. The causative organisms of most food poisoning are bacteria, parasites and viruses. *Salmonella* is by far the biggest culprit of serious food poisoning cases. *Campylobacter* and *Clostridium botulinum* are lethal bacteria that can make food poisonous. Handling food safely can help prevent foodborne illness.

Key words: Food poisoning, Pesticide, Contamination, Bacteria

RED WINE: GOOD AND BAD EFFECT ON HEALTH.

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ABSTRACT

Red wine is an alcoholic beverage made from fermented dark colour grapes. Yeast consumes the sugar in the grapes and converts it to ethanol, carbon dioxide, and heat. The alcohol content usually ranges from 12- 15%. Grapes are rich in many antioxidants. The powerful plant compounds in red wine have been linked with many health benefits, including rescued inflammation, lower risk of heart disease and cancer and extended life span. Small amount of red wine are linked to more health benefits than any other alcoholic beverage. Drinking 1-2 glass of red wine each day may lower the risk of heart disease and stroke. However, high amounts may increase the risk. Moderate red wine consumption may reduce the risk of several cancers, dementia and depression. It may also increase insulin sensitivity and reduce the risk of developing type 2 diabetes in women. While a moderate amount of red wine may provide health benefits, consuming too much alcohol can cause devastating health effects. An excessive intake of alcoholic beverages may cause alcohol dependence, liver cirrhosis, and weight gain. It may also increase the risk of depression, disease and premature death.

Key words: Red wine, Grapes, Antioxidants, Health

NOVEL FOOD PROCESSING TECHNOLOGIES: BENEFICIAL APPROACHES TOWARDS HUMAN WELFARE ASSOCIATED WITH FOOD PRESERVATION AND SAFETY

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ABSTRACT

One of the most important processes related to all food products is preservation. Food safety is one of the important components driving the development of the novel microbial intervention technologies to reduce eliminate or control food borne pathogens from food products and the contact surfaces. Over the last few decades food processing and preservation methods have been traditionally associated with a fifth altered processing concept called "Novel processing technologies." These technologies began to emerge globally in food production and preservation and that food is termed as "Novel food." In the history of technology, the novel and prominent technologies are those types of contemporary innovative techniques that represent progressive developments within a field for competitive advantage. Basically, various new challenges in food safety arise through the introduction of novel processing techniques into the food chain. Some novel technologies are like High-intensity pulsed electric fields (PEFs), High hydrostatic pressure processing (HPP), UV light and Microwave heating etc. The use of the novel or emerging technologies ultimately produces higher-quality based foods because of the reduced thermal and chemical abuse, plus higher safety attributes during extended shelf life and at an appropriate cost for the consumer. So, in the food industry, as a result of modern demands for food which are more fresher, more natural or minimally processed and additive free, novel processing techniques are currently in broad development.

Key words: Preservation, Novel food, Novel processing technologies, PEFs, HPP, Food safety.

STUDY OF ETHENO MEDICINALY IMPORTANCE PLANTS UNDER THE FAMILY LILIACEAE USED BY TRIBAL PEOPLES OF SOUTH WEST BENGAL

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ABSTRACT

Plants have been an important source of medicine for thousands of years. Even today, the World Health Organization estimates that up to 80 percent of people still rely mainly on traditional remedies such as herbs for their medicines. The civilization is very ancient and the country as a whole has long been known for its rich resources of medical plants. Today, Ayurvedic, Hoemoeo and Unani physicians utilize numerous species of medicinal plants that found their way a long time ago into the Hindu Material Media . *Aloe vera* has been used to treat various skin conditions such as cuts, burns and eczema. Evidence on the effects of *Aloe vera* sap on wound healing, however, is contradictory. The use of traditional medicines and medicinal plants in most developing countries as a normative basis for maintenance of good health has been widely observed. Further an increasing reliance on the use of medicinal plants in the industrialized societies has been related to the development of several drugs and chemotherapeutics from plant species as well as from traditionally used rural herbal preparations. South West Bengal is full of biodiversity with endangered and threatened medicinal plants, and available crude materials including 12 types of tribal community in Jangal Mahal. They have randomly used medicinal plants but they do not know their actual botanical name, family and their active principles. Our motto is to utilize their knowledge for better understanding of medicinal plants.

Keywords: Medicinal plants, active principle, Liliaceae, tribal people, South West - Bengal

MALNUTRITION AND EFFECT ON SOCIETY

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ABSTRACT

Malnutrition is a condition that results from eating a diet in which one or more nutrients are not enough or are too much such that the diet causes health problems. If undernutrition occurs during pregnancy, or before two years of age, it may result in permanent problems with physical and mental development. Extreme undernourishment, known as starvation may have symptoms that include: a short height, thin body, very poor energy levels, and swollen abdomen. Undernutrition is sometimes used as a synonym of protein-energy malnutrition (PEM). PEM is often associated with micronutrient deficiency. Two forms of PEM i.e. Kwashiorkor and Marasmus are commonly coexisting. Malnutrition increases the risk of infection and infectious disease, and moderate malnutrition weakens every part of the immune system that is observed in tuberculosis. Protein and energy malnutrition and deficiencies of specific micronutrients (including iron, zinc, and vitamins) increase susceptibility to infection. Malnutrition affects HIV transmission by increasing the risk of transmission from mother to child and also increasing replication of the virus. Scurvy and Rickets are also seen due to vitamin deficiency. Hypoglycemia can result from a child not eating for 4 to 6 hours. To prevent malnutrition, people need to consume a range of nutrients from a variety of food types. There should take a balanced intake of carbohydrates, fats, protein, vitamins, and minerals, as well as plenty of fluids, and especially water.

Key words: Malnutrition, Disease, PEM

FRUIT AND VEGETABLE CONSUMPTION CHANGES THE BIOMARKERS OF INFLAMMATION AND OXIDATIVE STRESS AMONG OVERWEIGHT AND OBESE ADULTS

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ABSTRACT

The growing prevalence of overweight and obesity among adults is concerning because of the numerous health conditions including coronary heart disease, type 2 diabetes mellitus , hypertension, stroke associated with excess weight. Rates of overweight and obesity have touched the epidemic proportions in developing countries. Underlying mechanisms believed to contribute to these detrimental health outcomes are oxidative stress and inflammation. Antioxidant systems in the body are responsible for regulating oxidative stress and subsequent inflammation. Regulation of oxidative stress and inflammation is possible via antioxidants consumed through a diet adequate in fruits and vegetables. Because of their high antioxidant content, consumption of fruits and vegetables (FV) is widely encouraged. However, adults' consumption of fruits and vegetables is below recommended amounts, which places them at increased risk for chronic diseases. After consumption of fruits and vegetables, changes are found in antioxidants and inflammation biomarkers expression among overweight and obese adults.

Key words: Fruits, Vegetables, Obesity, Biomarker, Antioxidant

FREE RADICAL SCAVENGING AND ANTIOXIDATIVE POTENTIAL OF CAPSAICIN: A PHYTOPHARMACOLOGICAL APPROACH

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ABSTRACT

Background: Phenolic compounds are an important group of secondary metabolites, which are synthesized by plants in the process of the plant's adaptation to biotic and abiotic stress conditions. Capsaicin (*trans*-8-methyl-*N*-vanillyl-6-nonenamide) is the major capsaicinoid in chili peppers and is widely used as a spice. It is also used for topical applications in cases of peripheral neuropathy.

Objective: The present study was aimed to evaluate the *in vitro* ethno-botanical effect of aqueous and methanol extracts of capsaicin in respect to free radical scavenging and antioxidant potential.

Methods: Aqueous and methanol extract of capsaicin were prepared. To establish the antioxidant potentiality of aqueous and methanol extract of capsaicin, 1, 1-diphenyl-2-picrylhydrazyl radical, hydroxyl radical, nitric oxide scavenging activity, antioxidant activity by ferric thiocyanate and reducing power were measured in chemical system *in vitro*.

Results: Significant ($P<0.05$) concentration-dependent free radical scavenging activity, antioxidant activity, and reducing power was observed by the extracts of capsaicin.

Conclusion: Hence, capsaicin presents a potentially valuable source of natural antioxidant and bioactive material.

Key-words: Capsaicin, DPPH, free radical-scavenger, antioxidant

FOOD ADULTERATION: A FATAL PROBLEM FOR SOCIETY

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ABSTRACT

Adulteration is the process of adding unwanted substances to the food, with similar appearance/colour for making profits. One form of adulteration is an addition of another substance to a food item in order to increase the quantity of the food item. Majority of adulterants used by the shopkeepers are cheap substitutes easily available.These substances may be either available food items or non-food items. Adulterated food is impure, unsafe and not wholesome. Food can be adulterated intentionally and accidentally. Unintentional adulteration is a result of ignorance or the lack of facilities to maintain food quality. This may be caused by spill over effect from pesticides and fertilizers. Some types of food adulteration are milk adulteration, honey, spices, ice cream, food grains and flour, coffee powder, vegetables, dog meat etc.Adulteration of food causes several health problems like stomach ache, body ache, anaemia, paralysis, and increase in the incidence of tumours, pathological lesions in vital organs, abnormalities of skin and eyes. Hence food adulteration should be given great importance due to its effect in the health significance of the public. Food adulteration has now become a burning problem. The adulterants used are so similar to natural foodstuffs that it becomes very difficult for a common man to detect them. A few simple tests can be done to detect adulterants found in common foodstuffs.Precautions should be taken to avoid for eating adulterated foods. The consumer should avoid buying food from places which do not maintain proper hygiene conditions. Both local and branded food stores should be inspected by government bodies.

Key words: Adulteration, Health, Disease

BALANCE DIET AND HEALTH

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ABSTRACT

Living beings can't live without food. It is essential for both health and life.A diet consisting of a variety of different types of food provides adequate amounts of the nutrients necessary for good health. According to the nutritionist, eating balanced diet including five main factors of food is encouragious to body parts. This should be taken in limited quantity. Several significant advantages are involved with this balanced diet. Protein, fat, carbohydrate, vitamins and minerals can supply the needs of body and support to work in a turbulent rhythm. This leads to have healthy nutritious organs and tissues. Due to increase number of illness around the world, fully completed diet is able to protect the body from the widespread diseases. There has been a strong connection between healthy life style and balanced diet.Grains are important source of many nutrients including fiber, vit-B and minerals. Fibre is important for healthy bowel function. Vit-B helps the body releasing energy from protein, fat and carbohydrates.Minerals are important for a healthy immune system. Consuming food rich in fibre reduces the risk of coronary heart disease, and may reduce constipation. A balanced diet is important because our organs and tissues need proper nutrition to work effectively. Without good nutrition, our body is more prone to disease, infection, fatigue, and poor performance. Children with a poor diet run the risk of growth and developmental problems and poor academic performance, and bad eating habits can persist for the rest of their lives.

Key words: Balanced diet, Health, Disease

DRAGON FRUIT: A SUPER NUTRITIOUS FRUIT

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ABSTRACT

Dragon fruit is an exotic and delicious fruit, which is also considered a tropical superfood because of its wealth of benefits. It is also known as *pitaya* or *pitahaya*, and some call it a strawberry pear. Dragon fruit, as it is more commonly known as is a fruit native to South America. Over time, its cultivation has spread to South Eastern Asia as well, and it is quite a common fruit in the countries of China, Thailand, Vietnam and India also. Dragon fruit is a healthy fruit, which is low in calories and rich in antioxidants and can be added to any weight loss diet. It contains carotene, vitamin C and B vitamins like niacin and riboflavin. The mineral wealth of this fruit includes magnesium, calcium, phosphorus, iron, and sodium. A recent study on dragon fruit showed that this fruit may help in preventing cancers such as colon cancer. Along with the antioxidant quality of vitamin C that boosts the immune system, dragon fruits also contain other sources of natural antioxidants. According to research, carotene and lycopene, found in these fruits, are potent antioxidants that have been linked to a number of anti-carcinogenic qualities. The high level of vitamin C found in dragon fruit helps boost immunity and it stimulates the activity of other antioxidants in the body as well. Dragon fruits are rich in oligosaccharides that help promote the growth of gut bacteria like lactobacilli and bifidobacteria. This study on natural prebio cs in Thailand showed that the fruit helped increase healthy gut flora, which is important for smooth digestion. This fruit helps in preventing conditions like cons pa on, irritable bowel syndrome, and even colorectal cancer. Regular consumption of dragon fruit is linked to a reduction in blood sugar levels, which is beneficial for type 2 diabetics and prediabetics. It also aids in the production of red blood cells (RBCs), which then helps in the proper oxygenation of vital organs. Antioxidant-rich dragon fruits help in detoxification by flushing out the waste metals and toxins from the body. The antioxidants in dragon fruit help fight the signs of aging by reducing the harmful effects of free radicals in the body. They also aid in treating sunburn, acne, and dry skin. Eating dragon fruit or adding dragon fruit extract powder to your daily diet helps in keeping the hair nourished and healthy. Dragon fruit powder is rich in anti-inflammatory properties, which help in reducing the pain caused by arthritis. It's high time you add dragon fruit to your diet if you are suffering from respiratory disorders like asthma. Dragon fruit is known to inhibit the growth of human cytochrome P450, a protein found in the liver. This protein is often linked with the occurrence of congenital glaucoma. It helps us to live healthy and active.

Keywords: Antioxidant; Immunity; Detoxification; Diabetics; Dragon Fruit

A COMPARATIVE MICROBIOLOGICAL STUDY BETWEEN RURAL AND URBAN KITCHEN

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ABSTRACT

A kitchen is considered the heart of a household. It is where food is made, so it is quite a natural assumption that the kitchen should be clean and hygienic at all times. An unhygienic kitchen is more likely to attract different microscopic germs which are responsible for food spoilage and human illness. To compare the hygienic condition of kitchen of rural and urban area a comparative microbial study was conducted. The samples were collected from kitchens of rural area like Mugberia and urban arealike Contai, Purba Medinipur between September to October, 2018. Randomly 14 different houses (7 rural and 7 urban) were selected for collecting the sample. The samples from kitchen towels; the palm of the left and right hand, kitchen dress and bangle of the housewives; kitchen utensils (large and small bowel, table spoon and tea spoon, plate and *bonti*), refrigerator (both handle and inner-shelf), handle of tap, sink, stove, floor, water (tap water and drinking water), air inside kitchen, in both rural and urban kitchen area were collected. For all the samples total plate count, colifrom, yeast and mold count were evaluated. The study showed that there were no significant difference ($p>0.05$) between the palm of the left and right hand, kitchen dress and bangles of the housewives, refrigerator, handle of tap, sink, large and small bowel, and table spoon, water, floor, air on total plate count, colifrom, yeast and mold count in between rural and urban kitchen. Whereas, there was significant difference ($p<0.05$) in tea spoon on total plate count, coliform count and yeast and mold count. In case of plate, stove, bonti/knife there was significant difference ($p<0.05$) on SPC count but no significant difference ($p>0.05$) was found on yeast and mold count and coliform count.

Key words: Microbiological, Bacteria, Kitchen, Hygienic, Rural, Urban,

STAR FRUIT: FROM TRADITIONAL USES TO PHARMACOLOGICAL APPLICATION

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ABSTRACT

Averrhoa carambola, is a species of tree in the family oxalidacea, common name star fruit. In West Bengal the common name is Karvanga. This fruit resembles a star when a cross-section is performed. Star fruit was used in various ailment such as chronic headache colds, food poisoning vomiting, gastroenteritis etc. After different pharmacological investigation on star fruit, it have demonstrated anti- inflammatory, anti- microbial acts on E.coli, anti- tumour, anti-fungal, and anti-ulcer activities. Various anti-oxidant is also present in this type of food which lower the oxidative stress. Overall, the fruit has an interesting nutrition profile. Unlike other tropical fruits such as mango and Pineapple, it is very low in calories and it contains minimal levels of carbohydrate /sugar.

Keywords: Averrhoa carambola, Anti-tumour, Anti-microbial, Anti-oxidant, Gastroenteritis

MICRONUTRIENTS FROM FOOD AS HORMONAL MODULATORS: ROLES OF VITAMINS A AND C

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ABSTRACT

During nineteenth century, scientists found that the main constituents present in different foods were carbohydrates, fats, proteins, minerals and water. At the beginning of the 20th century, feeding experiments were conducted in mice by some physiologists with synthetic diets based on blends of pure carbohydrates, proteins, fats and minerals salts. The results showed that animals would not grow on such synthetic diets. It was evident that natural foods contained certain unknown substances which are essential for the growth of animals. These were called *"Accessory food factors"* by Hopkins (1912) and *"Vitamine"* by Casimir Funk in 1912.Later, they were referred to as Vitamins.

Vitamins may be defined as organic compounds in small quantities (micronutrients) in the different natural foods and necessary for the growth and maintenance of good health in human being and certain experimental animals.

Our present communication deals with the roles Vitamin A in modulation of stress hormones (Ghosh *et al*, 1998) and in relation with stimulation of Growth Hormones and Sex Hormones. We also discussed the role of Vitamin C from food which plays a prominent role in modulation of Adreno-hormonal functions (McCarrison, 1919).