NITTE
(Deemed to be University)

सत्यमेव जयते
Goverment Of India

vigyaan tantragyaan anuvaadan

DEPARTMENT OF SCIENCE AND TECHNOLOGY

NITTE UNIVERSITY TECHNOLOGY ENABLING CENTRE

DST NU-TEC Chronicle | October 2021 to January 2022

DST NU-TEC, Nitte (Deemed to be University), Paneer Campus, Deralakatte, Mangaluru-575018
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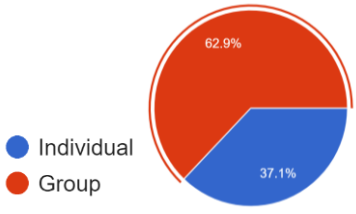
Ideation Drive –Phase 2

Evaluation process of ideation drive held on 6 December 2021

Critical thinking and creativity are the two most important aspects of innovation. With this motive DST NU-TEC along with the IIC, Nitte (DU) launched the ideation drive – 2020. A total of 33 projects from various institute's including Nitte Meenakshi institute of technology, Bengaluru; Bharati Vidyapeeth (Deemed to be University) Sangli, Maharashtra; Gardencity University, Bengaluru; NMAMIT, Nitte; Yenepoya Institute of Technology, Mangaluru; Justice K S Hegde Institute of Management, Nitte; KS Hegde Medical Academy, Deralakatte; Manipal College of Dental Sciences, Manipal; St Joseph Engineering College, Mangalore; Canara Engineering College; A.B. Shetty Memorial Institute of Dental Sciences; St Agnes College Mangalore; Anantrao Pawar College of Engineering & Research and Manipal School of Life Sciences. Projects submitted under different categories; 12 under digital heath 16 under health care and 5 under waste management. Projects were evaluated based on novelty, translational feasibility, application, differentiation from existing technology. 9 projects have been selected to be awarded cash price and for mentoring to be taken into the next phase. The centre congratulates all the innovative ideas that were submitted and offers to mentor the rest of the projects if the candidates are interested in taking them to the next level.

CATEGORY	NUMBER OF PROPOSALS
Digital Health	12
Healthcare	16
Waste Management	5



Selected projects

Unfold hidden Opportunities to Generate Revenue Through Management of E-bulbs and V-bulbs

SHUDDHI

Developing device for sampling and visualization of cervix for Cervical Cancer screening

MRI Safety Systems - Electronic Controlled MRI Door

Effectiveness of Modified FES on gait speed and functional ambulation in stroke subjects

Designing of next generation in-silico multi-epitope single vaccine against multiple RNA virus

Dead leaves from trees offer new sustainable life

Designing and Development of Vocal Care Device for Teachers

Social Media for Pharmacovigilance

Official Visit by Dr Anita Aggarwal to the TEC

Dr Anita Aggarwal, Scientist F, TEC programme Coordinator, Department of Science and Technology, GoI visited the DST NU-TEC Centre, Mangaluru on 20th November, 2021. A meeting was organized at the center which brought together various academic institutions and industries who were in active interaction with TEC at Nitte (DU). The academic institutions included NITK, Surathkal, St Josephs Engineering College, Vamanjoor, Canara Engineering College, Benjanapadavu, SDM College Ujire, Alva's Institute of Engineering & Technology, Moodabidri. The industries represented were Central Arecanut and Cocoa Marketing and Processing Co-operative Limited (CAMPCO), Mangalore Biotech Laboratory and Ishanya Beverages. Dr Anita Aggarwal appreciated the role of TEC in enabling the technologies that were displayed at the center and strongly recommended for the technologies to be taken forward for commercialization at the earliest. She highlighted the initiative by DST through the establishment of TECs that provided the much-needed thrust to the transfer of bench work research to technology. This would further lead to the emergence of startups and entrepreneurship skills among the youth. After a brief interaction with the TEC staff, she had an interactive session with the academic and industrial partners who attended the meeting. She presented the core mandates of DST, the various programs and schemes under the DST umbrella, vision behind establishing TEC in the university system, objectives and activities of TEC for social relevance. Representatives from industries and institution shared their experience with TEC, Nitte (DU) during the interactive session. The academic partners presented their problems related to DST project submissions and clarified all their doubts. Dr Anita Aggarwal explained the various opportunities that DST provides for research, technology development and transfer in areas of health technologies, agritech and aquaculture technologies. She emphasized that with a resourceful institute like Nitte (DU) and team strength, she hopes all institutes and industries in the region to take advantage of the TEC.

MICROBIOLOGICAL RISK ASSESSMENT IN FOOD SAFETY

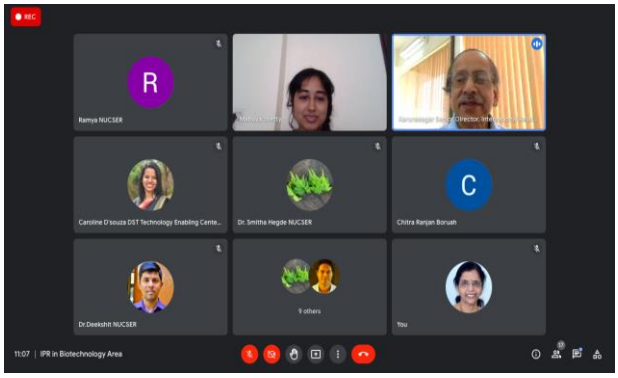
13-17 December 2021

Nitte (DU) and University of Maryland, USA, jointly conducted an ASM (American Society for Microbiology) – IUSSTF (Indo – US Science and Technology Forum) virtual course on 'Microbiological Risk Assessment in Food Safety'. ASM - IUSSTF Professorship was awarded to Dr Abani Pradhan of University of Maryland to deliver this course in collaboration with Dr Iddya Karunasagar, former Senior Food Safety Officer, FAO and Advisor, Nitte (DU) and Dr Indrani Karunasagar, Director, DST Technology Enabling Center, Nitte (DU).

Food is a highly traded commodity internationally and as per World Trade Organisation (WTO) Sanitary and Phytosanitary (SPS) Agreement, food safety standards should be based on risk assessment carried out according to protocols established by the Joint FAO/WHO Codex Alimentarius Commission. Food safety risk assessment involves use of various statistical tools to obtain probabilistic assessment of the risk and to assess the impact of risk management measures. The ASM-IUSSF sponsored course comprised lectures on risk assessment models, Monte Carlo simulations and development of risk estimates. Dr Abani Pradhan delivered lectures on these aspects and Dr Iddya Karunasagar spoke with suitable examples on how risk assessments have been used by the Codex Alimentarius Commission to develop international food safety standards.

The course was highly appreciated as it was important for faculty and students in the area of food technology, microbiology, public health and food safety. It attracted 324 registered participants and included faculty and students from Nitte (DU), Pondicherry University, Indian Agricultural Research Institute, Indian Council of Agricultural Research, State Fisheries Universities in Tamil Nadu and Kerala, National Aquatic Resources Research and Development Agency (NARA), Sri Lanka, Food Safety and Standards Authority of India and number of other academic institutions. Daily attendance exceeded 180 participants and in some institutions, the course was screened in a class room with 50 students watching on one large screen.

Before the start of the course, a pre-assessment was carried out. On completion of the course, the participants were provided with feedback form and post-assessment survey done. Over 200 participants returned the forms and obtained e-certificates. Overall the participants graded the course from 'very good' to 'excellent'.



6 October 2021

IPR IN BIOTECHNOLOGY AREA

A talk on 'IPR in Biotechnology Area' was organized by DST NU-TEC platform on 6 October, 2021. The speaker of the session, Ms Mahuva Shetty, is a Trade Mark Attorney at Mangaluru. The session was moderated by Dr Iddya Karunasagar. Speaker Ms Mahuva Shetty introduced the topic to the participants by emphasizing on the importance of IPR in recognition, financial incentives of the creator, ensuring originality of the product and promotion of R&D. She briefed on how intellectual property rights can be protected under various categories namely, patents, trademarks, copyrights, geographical indicators, semiconductor integrated circuit layout-Design, plant variety protection and how biodiversity protection and implementation policies work. She further updated the audience on how copyright and trademark is gaining popularity in recent years with relevant day to day examples that participants could connect to, like pirated drugs during Covid-19 pandemic and many household cleansing products.

Ms Mahuva Shetty detailed the importance of trademark and the need to make it unique, necessitating prior-art-search before applying for the same. Another major category of IPR-Copyrights was also addressed by the speaker. She enlightened the audience on how copyrights can protect literary works, artistry, musical and dramatic works, giving the individual right over the expression and not the ideas. She highlighted on the bundle of rights under copyright with two distinct categories - the economic and moral rights and presented several examples. Factors affecting ownership as well as exceptions to copyright were the other topics covered. The final important concept covered in the talk was on patents. Criteria for patentability and the NUNS rule that states the patent should be novel, should have industrial application, should have non-obvious inventive step and should not attract the provisions of section 3 and 4 of patent act 1970 was introduced to the audience. The talk ended with an interactive question and answer session and various doubts of the participants were addressed.

WEBINAR ON WORLD FOOD DAY

18 October 2021

DST Technology Enabling Centre in collaboration with Nitte University Centre for Science Education and Research organized a webinar on the occasion of World Food day 2021. The international event was a clarion call for collective efforts towards combating issues of hunger, food insecurity and food wastage. The theme for World Food day 2021 was 'Our actions are our future'. The key note speakers for the webinar were Padmashri Dr S Ayyappan, Former Director General ICAR & Chairman of Karnataka Science and Technology Academy, Shri Tarun Shridhar, Former secretary, Ministry of Fisheries, Animal Husbandry and Dairying, GOI and Dr Iddya Karunasagar, Advisor (Research & Patents). Dr Indrani Karunasagar accorded welcome and introduced the speakers to the audience. Hon'ble Vice-Chancellor, Nitte (DU) Prof. Dr Satheesh Kumar Bhandary, in his opening remarks highlighted the requirement for collective and comprehensive work to eradicate hunger and nutritional deficiencies. Sustainable system is a requirement to tackle the global hunger index as well as other health related burden, said Dr S Ayyappan. He spoke on aspects of better production, nutrition, better environment for a better life. He discussed the facts and presented statistics on Indian farming including strategies to improve it. This could result in enhancing farmers income through integrated farming by clustering of land, climate smart farming, agripreneurship, water footprint, innovation in water management, use of low cost technologies, use of nano fertilizers, production of high value crops, urban agriculture, cultivation floating horticulture, vertical farming, aquaponics, organic farming, biofortification, agritourism etc. Dr Iddya Karunasagar former senior Food Safety Officer, FAO explained about technical resources and standards available from FAO, their roles and responsibilities. He highlighted the various flagship publications of FAO that covers global data on food sector, process of scientific risk assessment to set the food standards, International agreements and guidelines regarding various aspects of food sector. Shri Tarun Shridhar reiterated the theme of the world food day and wanted concerted action to protect the livestock industry. He opined that livestock play a major role in the economic prosperity. To add on, he said livestock sector runs throughout the year and provides nutritional security and can also generate value added products. Yet its role is not recognised sufficiently.

"We are in the period of sustainable development. Seven of the seventeen goals are pertaining to agriculture. Food and agriculture is everybody's business and food production is the key fuel for the entire economy. However, one should not forget carbon footprint that is left for every ton of food we produce. The dialogue between health and food sector should improve in bringing innovative solutions thereby promoting "Make in India" motto - Dr S Ayyappan

" FAO has been in the forefront in helping countries to fight hunger and malnutrition, development of international agreements and guidelines for sustainable development of agricultural ecosystem. Codex Alimentarius Commission and IPPC standards have become almost mandatory due to the status given to them in WTO and SPS agreement" - Dr Iddya Karunasagar

"Chronic and acute hunger levels are rising. A serious introspection of the past actions are required to tackle this. Livestock sector can play a crucial role since hunger is still a rising issue. 60% of the dietary protein is from livestock in developed countries and 23% in developing countries implying lack of nutritious food for the latter. One needs to understand the big difference between food and nutrition security" - Shri Tarun Shridhar

Mitigating Antimicrobial Resistance in One health

26 November 2021

A webinar on "Mitigating Antimicrobial Resistance in One Health" was organized under DST TEC platform on 18 October 2021. The resource persons were Dr Patrick Sorgeloos, University of Ghent, Belgium and Dr Mathias Middleboe, University of Copenhagen, Denmark. Dr Indrani Karunasagar, in her opening remarks explained the concept of one health and the increasing antimicrobial resistance in all the sectors. Prof. Dr Alka Kulkarni, Registrar Nitte (DU) explained the theme of the webinar and the need for organizing this important event with international experts. Dr Iddya Karunasagar introduced the speakers and described their immense contributions. Dr Mathias Middleboe spoke about mitigating AMR in European aquaculture. His experimental evidence involving phage coated surfaces that could prevent biofilm formation and the use of live feed to reduce the pathogen load is a major translation of research for field application of phages. Dr Patrick Sorgeloos spoke on microbial management as an alternative to antibiotics in aquaculture. He enlightened the audience about traditional and business aquaculture and summarized various phases in aquaculture using green technology. He also elaborated on how antibiotics usage was started in aquaculture, cautioned about the repercussions and explained the difference between R and K strategist.

" Over the years there is significant increase in aquaculture. There is unpredictable performance related to microbial community activity in the system. That is how antibiotic usage was started in aquaculture which ended in development of AMR due to long term usage. The balance between R strategist and K strategist determines risk for bacterial inheritance. Integrated production system, less antibiotic usage and addition of probiotics may provide improved microbial stability'' - Dr Patrick Sorgeloos

"Increased use of antibiotics is a global issue. There is 70% increase in Florfenicol since 2013. Phages are potential alternative to antibiotics. Phage cocktail can be used for direct decontamination while phage coated biofilters have shown promising results for reducing pathogen load. Aquaculture will increase in Europe and move towards more land based recirculating system. Increased disease challenge will require novel solution like phages and probiotic bacteria'' - Dr Mathias Middleboe

IPR and its Protection in India

30 December 2021

A webinar on 'IPR and its Protection in India' was organized by DST TEC in collaboration with IP India and NIPAM on 18 October, 2021. Keynote speakers of the webinar were Dr Sharana Gouda, Assistant Controller of Patents and Designs, Patent office, Chennai and Shri Abhishek Singh, Examiner of patents and designs, Patent office, Chennai. Hon'ble VC, Prof. Dr Satheesh Kumar Bhandary highlighted the importance of patents and how Nitte (DU) encourages researchers and faculty of the University to come up with innovative research leading to patents. He congratulated the TEC for promoting patent applications by handholding the researchers and helping the patent process and patent filing.

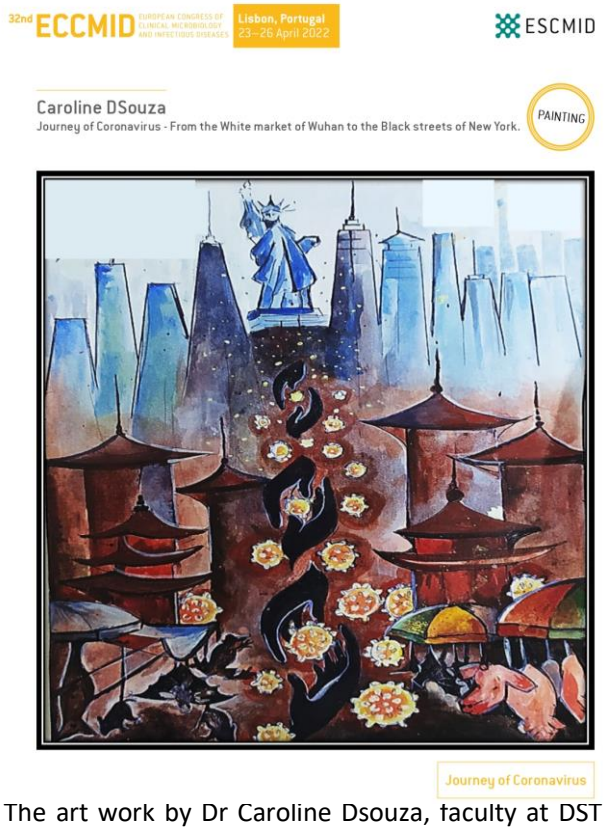
Dr Sharana Gouda spoke on patentability criteria and explained what is patentable and what is not with suitable examples to help the students and all registrants to understand clearly the concept of patenting. He continued to explain in detail about document requirements, the various forms that need to be submitted, fee structure, patent application process timeline and informed the audience on the patent offices located in India.

Shri Abhishek Singh reiterated the patent application process, filing of patents in India and abroad with details of forms shown online and was required to be filled before submitting application. He explained the detail of fee at every step and other costings related to patenting in India. He demonstrated online the comprehensive e-filing portal , criteria for patent examination process and the granting. He stressed on timelines for applications submitted and enabled the young participants to understand their right on which type of IP is applicable- When, Where and How. With relevant examples, he emphasised the importance of IPR and its protection that is being promoted by the Government of India.

Dr Indrani Karunasagar moderated the Q and A session at the end of the talk and helped the participants clear their doubts on patenting. The entire session was moderated by Dr Iddya Karunasagar, Advisor - Research & Patents with his timely inputs. The Ministry appreciated the efforts of Nitte (DU) through the TEC in promoting patenting by reaching out to students and faculty of Universities in the region and issued a certificate of appreciation to Nitte Deemed to be University.

Dr Indrani Karunasagar and Dr Iddya Karunasagar were honoured on the occasion of 42nd annual conference of the Indian association of Biomedical Scientists (IABMS) for their lifetime contribution to the field of microbiology and biomedical science.

Dr Iddya Karunasagar was selected for Prof. C.N.R.Rao lifetime achievement award by the Karnataka Science and Technology Academy. He will also be conferred the fellowship of Karnataka Science and Technology Academy at the award ceremony.



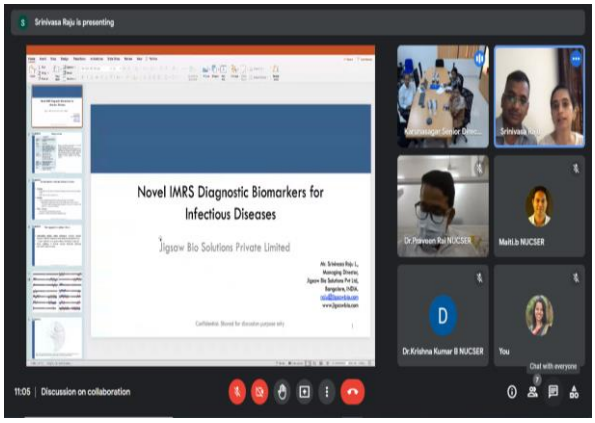
The art work by Dr Caroline Dsouza, faculty at DST TEC and an accomplished artist, has been featured in the European Congress art gallery. The theme of the artwork is "**Journey of coronavirus: from white market of Wuhan to Black streets of New York**". TEC at Nitte (DU) is proud of this recognition. click here to visit the artwork

Niite PhD scholar bags the prestigious Newton – Bhabha PhD placement fellowship

Mr Prithvisagar KS, a PhD scholar working under the guidance of Dr Krishna Kumar B, NUCSER has been awarded short term PhD placement at the University of Plymouth UK, under the Newton Bhabha funds program jointly supported by the department of Biotechnology (DBT), Government of India, the Department for Business Energy & Industrial Strategy in the UK and British Council, UK

The fellowship includes travel, accommodation and stipend for the scholar. Mr Prithvisagar will be hosted by the School of Biological and Marine Sciences and will be supervised by Dr Lucy Turner, a project collaborator of Dr Indrani Karunasagar, Nitte (DU). He will work on the environmental fitness genes of the pathogen, *Vibrio parahaemolyticus* and the impact of climate change on the virulence genes of the organism.

TEC meets Industries to sign MoU for Collaborations



ಅಡಿಕೆಗೆ ಸಂಬಂಧಿಸಿ ಸಂಶೋಧನೆ

ನಿಟ್ಟೆ ವಿವಿ, ಎಆರ್‌ಡಿಎಫ್, ಕ್ಯಾಂಪ್ಕೋ ನಡುವೆ ಒಪ್ಪಂದ

ನಿಟ್ಟೆ ವಿ.ವಿ., ಕ್ಯಾಂಪ್ಕೋ, ಎಆರ್‌ಡಿಎಫ್ ನಡುವೆ ಒಡಂಬಡಿಕೆ ಮಾಡಲಾಯಿತು.

ಮಂಗಳೂರು, ಡಿ. 3: ನಿಟ್ಟೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ಕ್ಯಾಂಪ್ಕೋ ಮತ್ತು ಅಡಿಕೆ ಸಂಶೋಧನೆ ಮತ್ತು ಅಭಿವೃದ್ಧಿ ಪ್ರತಿಷ್ಠಾನ (ಎಆರ್‌ಡಿಎಫ್) ನಡುವೆ ಅಡಿಕೆಗೆ ಸಂಬಂಧಿಸಿ ಸಂಶೋಧನೆಗೆ ಶುಕ್ರವಾರ ಒಡಂಬಡಿಕೆಗೆ ಸಹಿ ಹಾಕಲಾಯಿತು.

ಜೀವಿ ಮತ್ತು ಜೀವಕಣಗಳ ಮೇಲೆ ಅಡಿಕೆಯಿಂದಾಗುವ ಪರಿಣಾಮಗಳ ಬಗ್ಗೆ ಮೌಲ್ಯಮಾಪನ, ಅಡಿಕೆಯಿಂದಾಗುವ ಪರಿಣಾಮಗಳ ಬಗ್ಗೆ 'ಡ್ರೊಸೊಫಿಲಾ' ಎಂಬ ಕೀಟದ ಮೇಲೆ ಸಮಗ್ರ ಅಧ್ಯಯನ, ಜೀವಕೋಶಗಳ ಪ್ರಸರಣಗಳ ಬಗ್ಗೆ ಅಡಿಕೆ ಮತ್ತು ಆರೆಕೋಲಿನ್‌ಗಳ ಪ್ರಭಾವಗಳನ್ನು ತಿಳಿಯಲು 'ಜೀವ್ರಾಮೀನು'ಗಳ ಬ್ರೂಣಗಳ ಮೇಲೆ ಪ್ರಯೋಗ, ಅಡಿಕೆ ಜಗಿಯುವುದರಿಂದ ಮನುಷ್ಯನ ಆರೋಗ್ಯದ ಮೇಲಾಗುವ ಪರಿಣಾಮಗಳ ಸಮಗ್ರ ಅಧ್ಯಯನ ವಿಷಯಗಳಲ್ಲಿ ಸಂಶೋಧನೆ ಮಾಡಲು ನಿಟ್ಟೆ ವಿಶ್ವವಿದ್ಯಾನಿಲಯಕ್ಕೆ ಕೇಳಲಾಗಿದೆ.

ಅಡಿಕೆ ಪ್ರಯೋಜನಗಳು, ಅದರ ಮೌಲ್ಯವರ್ಧನೆ, ಔಷಧೀಯ ಉತ್ಪನ್ನಗಳು ಮತ್ತು ಇತರ ವಾಣಿಜ್ಯ ಬಳಕೆಗಳ ಬಗ್ಗೆ ಸಮಗ್ರ ಸಂಶೋಧನೆಯನ್ನು ಮುಂದಿನ ದಿನಗಳಲ್ಲಿ ಮಾಡಲಾಗುವುದು ಎಂದು ಕ್ಯಾಂಪ್ಕೋ ಪ್ರಕಟನೆ ತಿಳಿಸಿದೆ.

Campco, ARDF ink pact with Nitte on risks of arecanut usage

MANGALURU, DHNS: The Central Arecanut and Cocoa Marketing and Processing Cooperative (Campco) Limited and Arecanut Research and Development Foundation (ARDF) signed a memorandum of understanding (MoU) with Nitte (Deemed to be University) on establishing relationship between chewing arecanut and associated risk of developing oral cancer, on Friday.

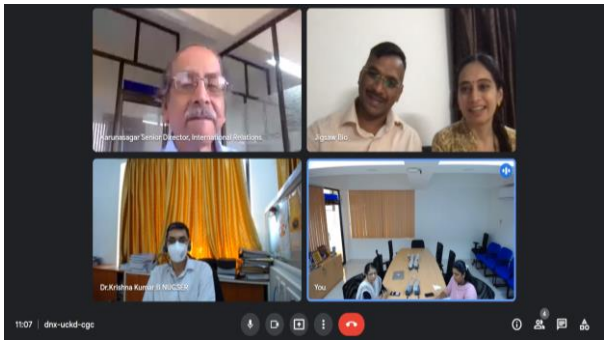
The memorandum aims at evaluation of cellular and organismal cytotoxicity of arecanut, according to a press release from Nitte (Deemed to be University).

The research will be conducted at Nitte. "This MoU will help the industry to take up focused research activities on arecanut uses and thus help farming community. The dialogues on alternate uses of arecanut like utilisaiton of certain compounds available in commodity for commercial and therapeutic uses will also be taken up in the future," the press release stated.

The memorandum was signed in the presence of Campco President Kishore Kumar Kodgi and Board of Directors, Registrar of Nitte (Deemed to be University) Dr Alka Kulkarni among others.

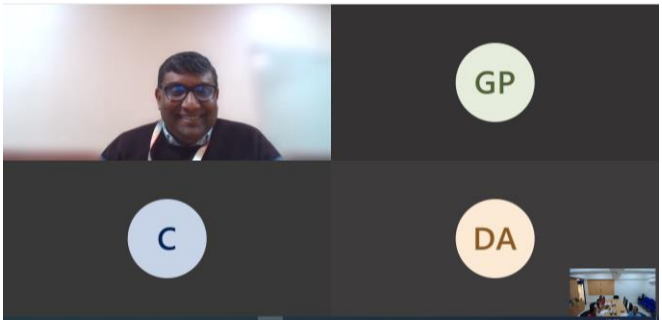
The Central Arecanut and Cocoa Marketing and Processing Cooperative (CAMPCO) Limited and Arecanut Research and Development Foundation (ARDF) signed an MoU with TEC, Nitte (DU) on 03 December 2021

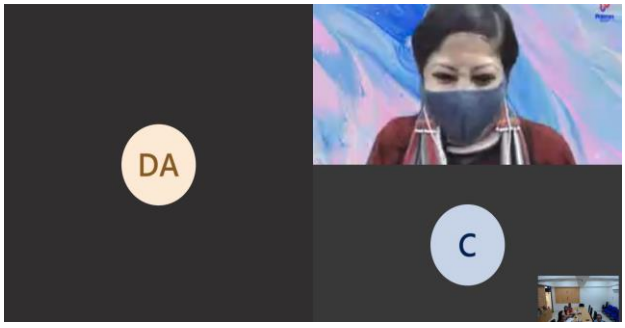
TEC mentoring Mr Partha Varanashi and team, Varanashi Research and Development Foundation (VRDF) for BIRAC-BIG grant and MoU with TEC for research support.



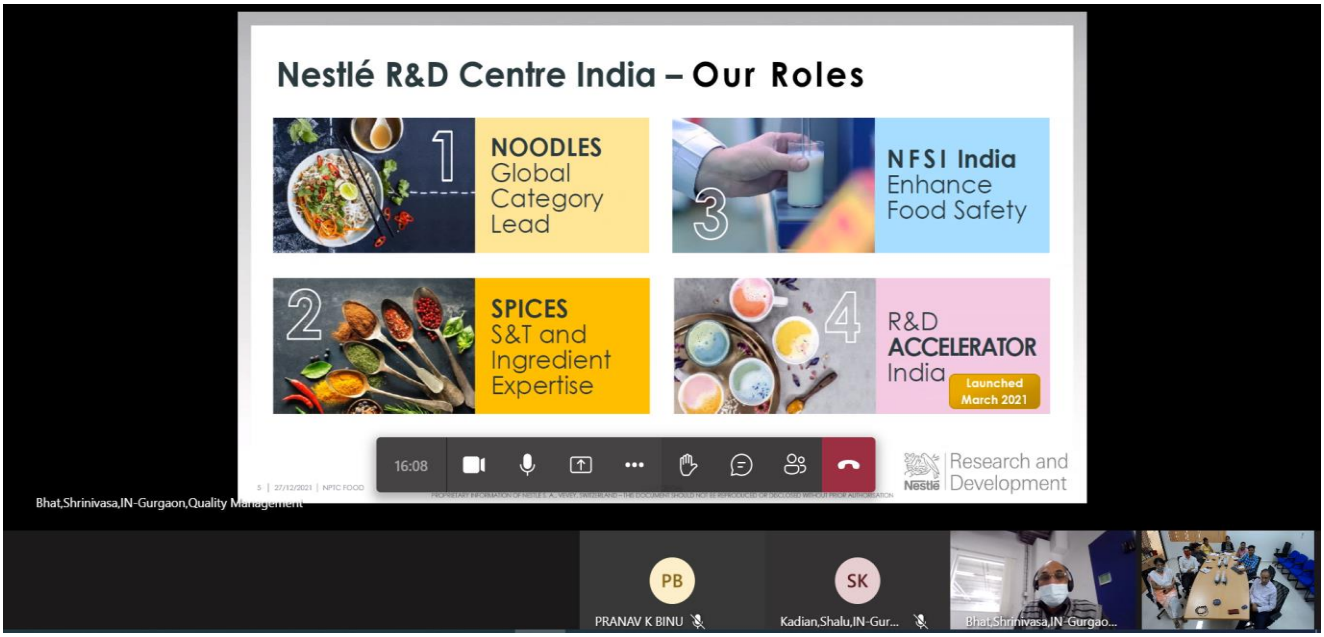
Interaction with Jigsaw Bio Solutions Pvt Ltd, Bengaluru held on 22-28 October 2021 to discuss on diagnostic kit development and MoU process with TEC

Society for Innovation and Entrepreneurship (SINE), IIT Mumbai in collaboration with **DST TEC, Nitte** and other ecosystem partners organized a guidance session for potential applicants of BIRAC **BIG**, 20th cycle on 24 January 2022. Dr Iddya Karuasagar was a panelist and the presentation was made by Dr Bratati.





Discussion with Dr Prabuddha Kundu, CEO, Premas Biotech Pvt Ltd, Haryana on 07 January 2022 regarding possible areas of collaboration . The meeting was coordinated by Dr Gita Prakash.



Interaction with Dr Shrinivas Bhat, Nestle India on 27 December 2021 on research collaboration between TEC, Nitte and Nestle followed by a virtual tour of Nestle R & D facilities at Gurgaon, Haryana for training internship.

Enabling Translational Research Projects through Mentoring

NUCSER, 8 October 2021

NUCSER, 06 December 2021

Canara Engineering College, 27 December 2021

NUCSER developing partnership on phage related research with Dr Lars Fieseler, Switzerland, 10 December 2021

Mentoring medical device development project between ABSMIDS & NMAMIT

Project Title: "Design, Development and Validation of Digital Bite Force Measurement Device for Dental Applications".

PI: Dr Ravi Dept of orthodontics ABSMIDS

Co-PIs: Dr Durga Prasad, Dept of E &C, NMAM, Dr.Murali P.S, Dept of orthodontics, ABSMIDS, Mr.Bommegowda K.B, Dept of E&C, NMAMIT and Mr.Pradyunma Dept of E&C, NMAMIT

NUCSER and ABSMIDS 03 December 2021

C-CAMP, Bangalore and NIPT 27 December 2021

Class 9 student from a small town in DK designs anti-sleep device for drivers

Discussion on the invention of Anti-sleep device for drivers with Chinmaya Gowda (freelancer), 25 November 2021

Patent related meeting held on 06 October 2021 and 07 October 2021

Dr Indrani Karunasagar and Dr Iddya Karunasagar participated in a joint Indo-Philippines project formulation meeting with Prof Mary Beth Maningas, University of Santo Tomas, Philippines. The meeting discussed various diagnostic options for aquatic animal diseases and the need for more point of care diagnostics.

Mentoring the project on ocean alkalinity enhancement. Discussion held with Arvind Singh, Physical Research Laboratory, Ahmedabad on 18 January 2022

Project Details

Project Topic	Institutions involved	Status of the project
Design, development and validation of Digital Bite Force Measurement Device for dental applications	ABSMIDS & NMAMIT	Approved (ICMR)
Target induced Core- Shell satellite structures: Creating a polyvalent multifunctional platform for multiplexed detection of nucleic acids	NUCSER	Approved (DST SERB)
Bacteriophages and their products for controlling the biofilms of drug resistant Klebsiella pneumoniae”	NUCSER, MMM, Chennai Central University Tripura	Approved (DST-CRG grant)
Polyvalent multifunctional core-shell satellites for ultrasensitive detection of target nucleic acids-a multiplexed approach”	NUCSER	Approved (UGC Start-up grant)
Screening and production of Polyhydroxybutyrate (PHB) by bacterial strains isolated from hydrocarbon contaminated soil using metagenomic approach	NUCSER	Approved (UGC Start-up grant)
Evaluation of cellular and organismal cytotoxicity of Arecanut aqueous extract. Relationship between Arecanut chewing and risk for oral cancer- A community based study.	NUCSER ABSMIDS	CAMPCO funded

Dr Iddya Karunasagar, Senior Food Safety Officer, (Rtd.) FAO, inaugurated the World Fisheries Day programme, organised by College of Fisheries, Mangaluru in association with Department of Fisheries, Karnataka and Society for Integrated Coastal Management, Ministry of Environment and Forest, GoI, on 21 November 2021. Dr Iddya Karunasagar deliberated on the role of FAO, the motto being 'Fiat Panis'. Dr Indrani Karunasagar also addressed the gathering.

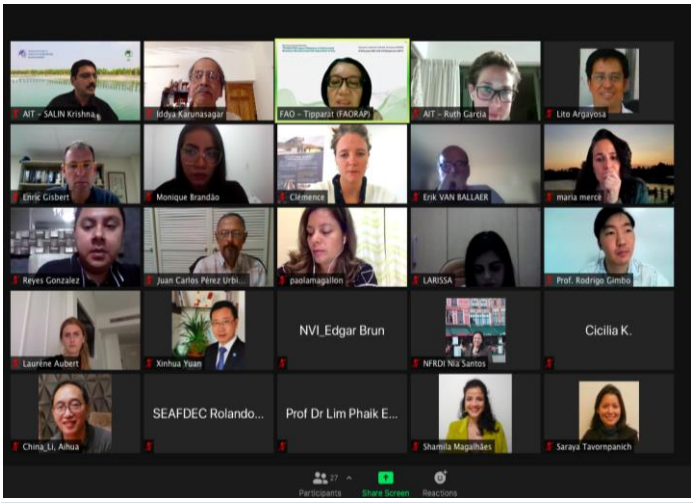
Dr Iddya Karunasagar, nominated expert, participated in the WHO Advisory Group meeting on 'Critically important Antimicrobials in Human Medicine' on 07 December, 2021

Dr Iddya Karunasagar and Dr Indrani Karunasagar, nominated experts on AMR, delivered lectures in a virtual event on AMR in aquaculture on 22-23 November 2021 as part of the celebration of the 'World-Antimicrobial-Awareness-Week 2021'.

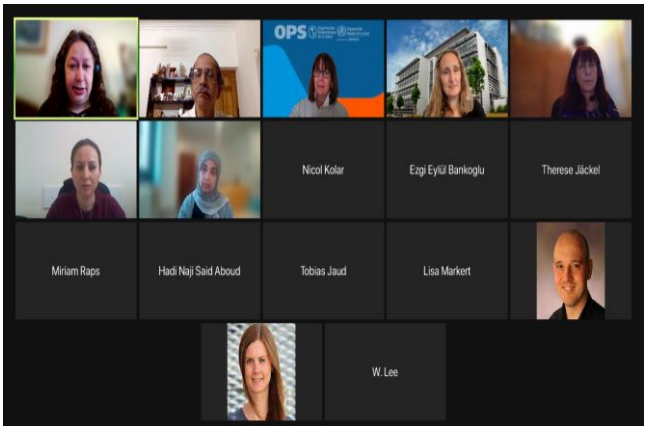
Dr Iddya Karunasagar delivered a talk on 'Critically important Antimicrobials (including colistin) and Codex risk assessment' in a webinar on 'Understanding Antimicrobial Resistance (AMR) and Biosecurity in Aquaculture: FAO candidate Reference Centres on AMR and Aquaculture Biosecurity' on 20 December, 2021

Dr Indrani Karunasagar delivered a lecture on 'Alternatives to antimicrobials in aquaculture (excluding vaccine)' and 'AMR in one health context' in a webinar on Understanding Antimicrobial Resistance (AMR) and Biosecurity in Aquaculture: FAO candidate Reference Centers on AMR and Aquaculture Biosecurity on 20 December 2021

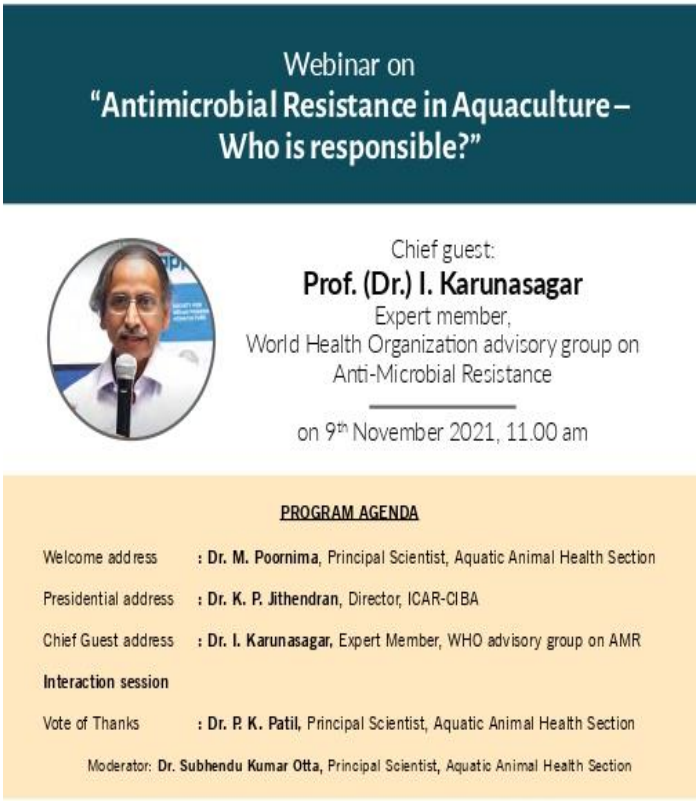
Dr Iddya Karunasagar delivered a lecture on 'Antibiotic usage in fish and marine products: its impact on AMR in food chain' in a two day national workshop on 'Antimicrobial resistance in food chain' sponsored by DHR-ICMR, New Delhi on 26 November 2021, and organized by CSIR-Central Food Technological Research Institute, Mysore



Dr Iddya Karunasagar expert member, spoke at the FAO International Workshop on 'Successful case studies in health management in aquaculture' held virtually on October 26, 2021. 19 case studies were presented from Asia, Africa, America, New Zealand and Europe. The workshop covered topics on finfish, shrimp, molluscs and the technologies available for disease diagnostics. Dr Iddya Karunasagar provided expert comments on the technologies and their applications in commercial aquaculture.



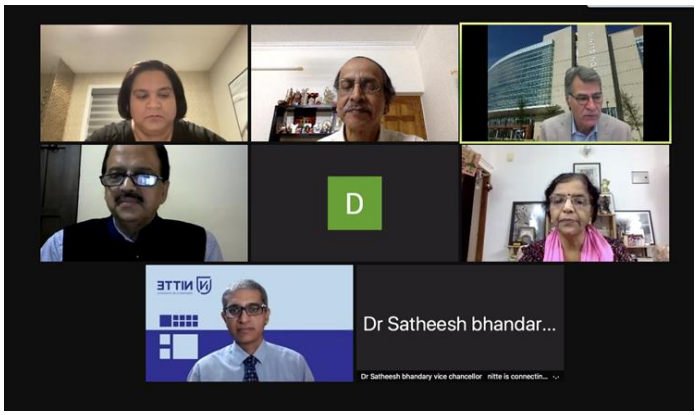
Dr Iddya Karunasagar, Humboldt fellow and alumnus of Wuerzburg University, Germany was an invited speaker at the International Symposium organized by the Wuerzburg University, on 'Sustainable living, working and doing research' during 25-29 October 2021. He delivered a talk on 'Sustainable food systems and antimicrobial resistance' on October 28, 2021. He emphasized the need to work within the framework of 'One health' recognizing the interactions between human, animal and environmental health to minimize antimicrobial resistance.



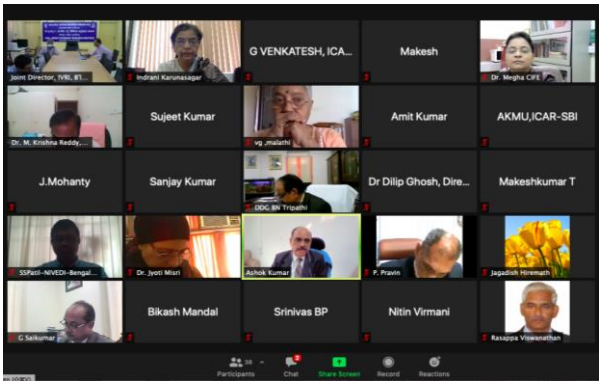
Dr Iddya Karunasagar delivered an expert lecture in a webinar on 'Antimicrobial resistance in aquaculture – who is responsible?' on 9 November 2021 during the 'Azadi ki Amrith Mahostav' celebration at CIBA.

Dr Smitha Hegde, Professor & Deputy Director at NUCSER moderated a 'National Webinar on Western Ghats: Past, Present and Future', on October 28, 2021 . Padma Bhushan Prof Madhav Gadgil was the eminent speaker during the event.

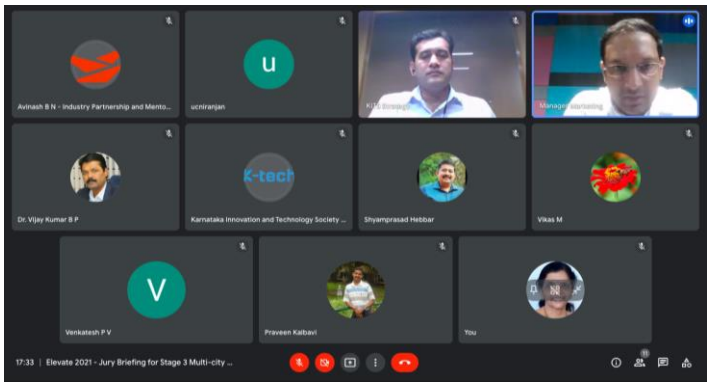
Dr Iddya Karunasagar delivered an expert talk on 'Climate change and health' during the series on 'Sustainable development goals' on 29 December, 2021 conducted by ABSMIDS.



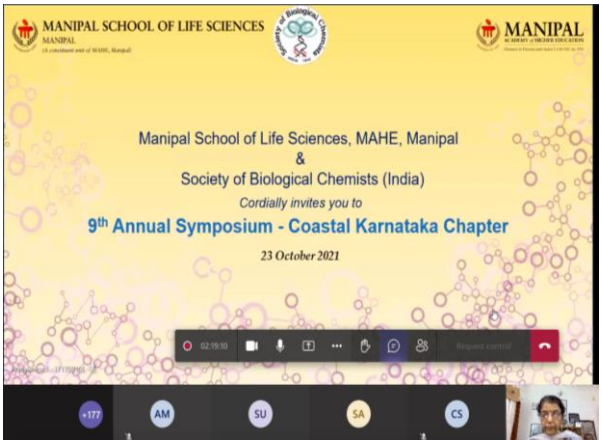
Dr Iddya Karunasagar and Dr Indrani Karunasagar participated in an online meeting with Dr Paul Major, Dean Dental School and Dr Monica Gibson, Faculty of Dental Sciences at University of Alberta, Canada on November 05, 2021. Dr Satheesh Kumar Bhandary, Vice Chancellor, Nitte (DU), highlighted the efforts of the university in promoting international collaboration. Dr Harsha Halahalli, Director, Curriculum, Nitte (DU) and Dr Rahul Bhandary, Professor, ABSMIDS were also present. The meeting discussed possible areas of cooperation between Nitte (DU) and University of Alberta in teaching and research in dental sciences.



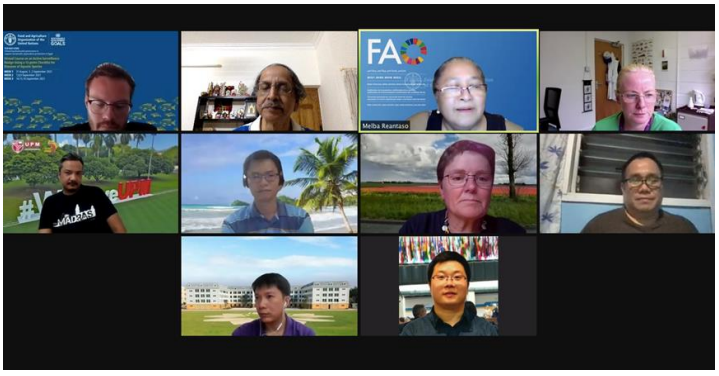
Dr Indrani Karunasagar was a expert committee member at the review meeting of ICAR-CRP on 'Vaccines and Diagnostics' held during…..



Dr Indrani Karunasagar was nominated as an expert jury member, GoK to evaluate startup projects of K-tech held on 17 December 2021.



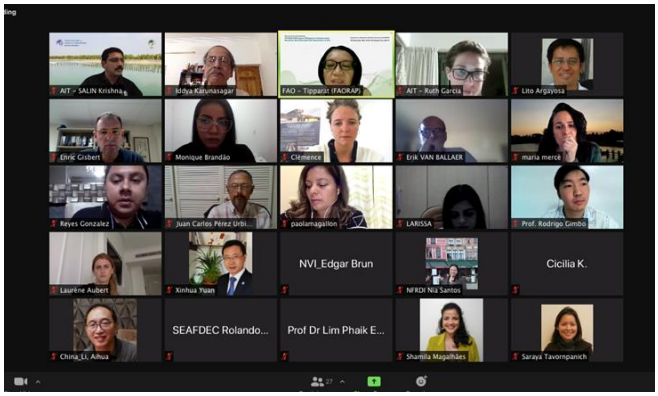
Dr Indrani Karunasagar chaired the inaugural session at the '9th Annual Symposium, Coastal Karnataka Chapter, Society of Biological Chemists India' on October 23, 2021.



Dr Iddya Karunasagar was invited speaker and panelist at the FAO international Conference entitled 'Tilapia Health – Quo Wadis' held virtually during December 1-3, 2021. He spoke on 'Group B *Streptococcus* and *Streptococcus agalactiae* in Tilapia health and food safety' on December 02, 2021.

Dr Indrani Karunasagar & Dr Iddya Karunasagar were invited speakers at the FAO Technical Seminar on 'Understanding Antimicrobial Resistance and Biosecurity in Aquaculture' during December 21-22, 2021. All the speakers were from FAO Candidate Reference Centers from China, India and United States. Nitte (DU) is slated as the candidate FAO Reference Center in India. Dr Iddya Karunasagar spoke on WHO list of critically important antimicrobials in human medicine and Codex guidelines in risk assessment for antimicrobial resistance. Dr Indrani Karunasagar spoke on alternatives to antimicrobials. She moderated two sessions and delivered a second talk on antimicrobial resistance in the context of one health. Dr Iddya Karunasagar delivered the closing remarks highlighting the planned activities of the candidate FAO Reference Center at Nitte (DU). Nitte zoom platform was used by China Reference Center for hosting the Technical Seminar. The program was organized by Dr Melba Reantaso and Dr Bin Hao of FAO, Rome.

Dr Iddya Karunasagar was an invited speaker at the FAO-Centre for Environment Fisheries and Aquaculture Science Regional Workshop on bivalve mollusk sanitation for Latin American countries during November 2-4, 2021 wherein, he detailed the FAO technical guidance for bivalve sanitation and how it could be used by member countries to initiate their own sanitation programme at national level.



Dr Iddya Karunasagar was the expert member in the FAO Regional Office of Asia Pacific (FAO RAP), Asian Institute of Technology (AIT) and global experts meet held during October 26, 2021. Several case studies of innovations in mitigation of antimicrobial resistance in aquaculture were presented and discussed. This meeting was intended to select case studies to be presented at the terminal workshop of FAO Regional Project FAO/RAS/3702 held on 23-24 November 2021.

Dr Indrani Karunasagar delivered an expert lecture on 'Antimicrobial Resistance in Fish in the context of One Health' in a 'National campaign on antimicrobial resistance in health on 22 November 2021 during the 'Azadi ki Amrith Mahostav' celebration at Central Institute of Fisheries Education, Mumbai.

Nitte DU collaborates with FAO Regional Office for Asia Pacific and INFOFISH to organize the terminal workshop of FAO project "Support to mitigation of antimicrobial resistance risk in aquaculture in Asia"

FAO supported project TCP/RAS/3702 is being implemented in three countries – India, Indonesia and Vietnam. The project is expected to deliver the following outputs:

- Output 1 – Baseline information on use and governance of antimicrobials in aquaculture commodities are generated and awareness of AMR risks associated with aquaculture is enhanced among the different stakeholders.
- Output 2 – National laboratory capacity for effective surveillance and monitoring of AMR associated with aquaculture enhanced.
- Output 3 – Good health management practices for aquaculture commodities in the participating countries are developed and disseminated to farmers.
- Output 4 – Legislative framework for effective governance of AMU in aquaculture and national strategy and action plan and effective mitigating, surveillance and minoring of AMR risk associated with aquaculture are developed.

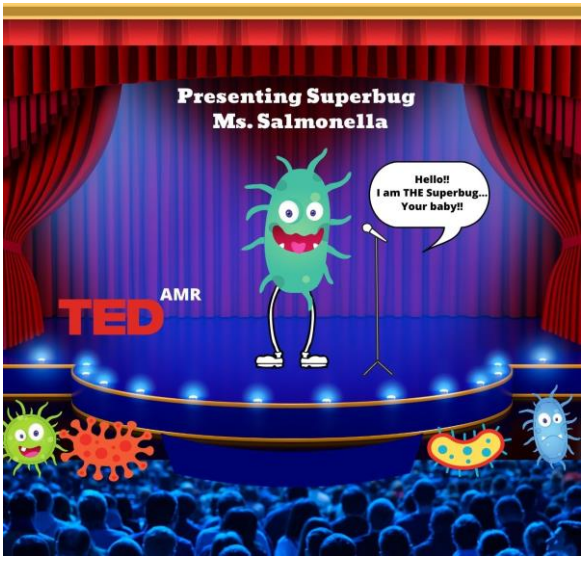
The overall objective of this terminal workshop held on November 23-24 was to review the project outputs achieved in each of the participating countries and share the information and lessons learnt across Asia and the Pacific region. The specific objectives are to:

- Share the information and experiences of AMU and AMR and understand the challenges in mitigating AMR in aquaculture in the countries;
- Share the good aquaculture practices developed in the participating countries;
- learn from international experiences on innovations and best practices in mitigation of AMR; and
- Plan future international and regional collaboration to support mitigation of AMR in aquaculture.

Dr Iddya Karunasagar prepared the workshop programme, identified international expert speakers and moderated the workshop. INFOFISH is the Regional Intergovernmental organization involved in market information and technical advisory services in Asia and Pacific region. INFOFISH organized the IT platform and communication services for the workshop.

Resistance is Bacterial Super Power
What's yours??
- A crosstalk talk with the Superbug

Akshatha K
DST TEC, Nitte (DU)



PC: Anoopkrishna DST TEC, Nitte (DU)

Ever since the discovery of the first antibiotic in 1928, countless lives have been saved from dreaded bacterial infections worldwide. With the inexorable rise in the use of antibiotics, their effectiveness in controlling bacterial infections has reduced drastically. We have with us today Ms. Salmonella a member representative from team ***SUPERBUG.*** *We would like to know the perspective from the other end, without further ado, Over to you ma'am..*

Hello!! I am THE Superbug.. Your baby!! Its really nice to see all of you talk about the **MIRACLE DRUG** that is no longer miracle in this world dominated me. But well, its not my fault that I am resistant. You humans, as always take things for granted and roam around as if you are the only ones having the rightful inheritance on this globe.
It is sad that a micro creature like me can kill the macro human like you with just a step throat, UTI, pneumonia or may be even a small bruise on your knee. Okay!! I was joking; am non-typhoidal and I just get you some diarrhea and vomiting most of the time. (*I said* ***MOST*** *of the time*) But my cousins *Escherichia, Shigella* and *Klebseilla* do not make jokes like me. But we are all persistent about resistance and that is a great virtue.

Well, to introduce myself, I am **Ms *Salmonella*** currently residing in one of the freezer facility in cryovials at -80 in Coastal South West India. A team in this lab studies me extensively ever since they found me in clams. They isolated me and further found many of my sisters who are amidst the crowd *Salmonella* Newport, Oslo, Infantis and others from poultry, egg and milk based products and seafoods. They checked my sensitivity and came out screaming *"I'm losing my sanity!!"* while I silently laughed as I knew this was just the beginning of surprises.

I pity the girl who spent sleepless nights growing me in huge tubs of nutritious media (**slurp!!**) and subjecting me to various antibiotics and the master mind boss who wanted to know me in depth. They treated me with various human gut physiological conditions, one day it was bile and the next day it was salt and the third day iron. Made me feel giddy in the rotating incubator for 30 hours. **Gosh!!** I wish I could tell the team I have seen it all before I reached here. Little do they know of my spirit and never give up attitude. But they were tough too.. they tried hacking my secret strategies of survival within the human gall bladder in a matrix called biofilms. Soon they even exposed this trait of mine and how I balance the rhythm of my genes to survive in such an harsh environment, in a suffocated area and escape all the antibiotics the humans gulp each day. The expression of my genes was well reflected by the expression in their face as they completed the qPCR study. Well, I was exposed and they published my top-notch traits. This gained me a lot attention too and I did enjoy it. You too can check it out here (**DOI: 10.1016/j.resmic.2020.06.002)**

This much of information did not stop them. They are trying to know me more and discuss me every day and currently I hear them saying they want to get a huge transcript from my transcriptomic profile. Looks like I'm losing my privacy!!
Well I wish them good luck, but do not forget I can replicate and mutate in the wink of an eye. I strongly believe in *Survival of the fittest* till date.

Since I have been given this **platform**, I would like to be humble and give you a piece of my mind (*looks like your brain needs a booster dose*).

Let me remind you, antibiotic resistance is a global threat. I have survived all the harassments you have put me through and today, I, stand strong with an ability to attack you in any age, any country and in any form. I am an absolute burden to your health and economy - You need food security, health security, robust global action plans, policy strengthening and implementation, surveillance and biosecurity in all sectors including agriculture-livestock's and aquaculture.

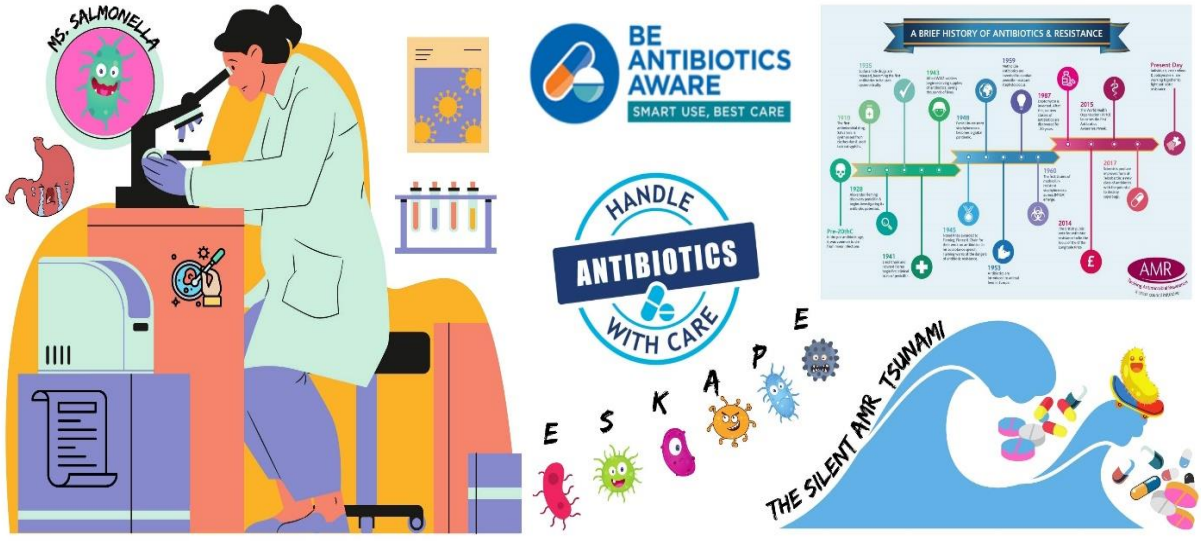
I also take this opportunity to thank all of you. **Thank you!!!** (*in a tone you already read*). You have provided me with a lot of hot spots, ranging from farm to fork. From your sunny side up omelets to your salads, from milk to sewage treatment plants you have given me all and I shall forever be grateful for that. You paved the way for my superior version.

You are even celebrating my superpower isn't it?? I heard you are having the **World Antimicrobial Awareness Week** in November. Glad to know, you want to handle the antibiotics with care!! But do not forget I am highly optimistic and opportunistic. Even the Covid-19 pandemic is a boon to me. Its like you are adding ghee to the existing fire and I am already excited seeing the number of viral infections you are trying to treat with antibiotics and the number of over the counter prescriptions.

Well, I throw an open challenge to you. As you are trying to run after the lifestyle diseases like diabetes and cancer, do not forget me. By **2050** I shall be waiting for you, in the post antibiotic era, taller stronger and tougher. The discovery void since 1987 and seeing the antibiotic resistance timeline I wonder if you will come up with new antibiotics or alternative strategy to combat infections and destroy me. Am sure the team that is currently hosting me will be proud of their contribution to mankind and society, in case we happen to meet in that era. The day is not far -you will regret the superbug - that is your creation for your destruction. My cousins are eagerly waiting for their turn, so, signing off for today.. I am sure, you had your dosage for now!!

Resistance is my super power and what's yours??

Superbug Ms. Salmonella



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