Dear Esteemed Members,

Warm greetings!

It gives us immense pleasure to launch the 16th issue of Newsletter of Probiotic Association of India. We are happy to inform that CFTRI, Mysore; Ram Lal Anand College, University of Delhi, Delhi; Dairy Science College, KVAFSU, Hebbal, Bengaluru; Department of Dairy Microbiology, College of Dairy Science and Technology, Thrissur, Kerala and Tezpur University, Assam organized National Seminars/ Workshops with the financial support from PAi to fulfill the objectives of PAi for spreading the probiotic movement in India. PAi congratulates the organizers for excellently conducting these events. This newsletter provides the highlights of the organized symposia/workshops. Besides, editorial board has tried their level best to accommodate the articles received from our esteemed members except a few which were not in order and the authors did not submit the revised ones. We thank all of them for their valuable time and contribution. We are always keen to receive articles of general interest for consumers and society, brief research findings for scientific fraternity, launch of new probiotic formulations in India and any other useful information related to probiotics. We request our readers to give their feedback and valuable suggestions to improve it further. Finally, I would like to thank my editorial team particularly Dr. Rajeev Kapila and his student Ms Shalaka Bhawal who have contributed dedicatedly to bring this 16th issue of PAi Newsletter.

Wishing you all a happy and healthy time ahead!

(SUNITA GROVER)
Chief Editor
One Day National Workshop on “Next Generation Probiotics” was organized by the Department of Microbiology and Fermentation Technology (M & FT), CSIR-CFTRI Mysuru on March 01, 2019 with sponsorship from Probiotics Association of India. Activities of the day started with registration of the participants. Among 80 participants enrolled, 70 actively participated in the workshop. The event was inaugurated by the Director of CFTRI, Dr. K.S.M.S Raghava Rao and souvenir was released. Welcome address was given by Dr. G. Venkateshwaran, Chief Scientist M & F T. The organizing Secretary, Dr. Prakash Halami briefly introduced different components of workshop and the role of Probiotic Association of India in creating awareness among Indian population about consumption of probiotics. Dr. Yogesh Shouche, the Chief Guest indicated that the microbiome offers large number of potential next generation probiotics for the new researchers and the profiling of gut microbiota that is found in Europe and US differs with the composition with reference to Indian context. Dr Raghava Rao in his presidential remarks enlisted several health benefits offered by probiotic bacteria.
He also pointed towards the possible safety measures to be taken while introducing probiotics to the consumers. Dr S.V.N. Vijayendra proposed the vote of thanks.

First lecture was delivered by Dr. Yogesh Schouche on the topic “Next Generation Probiotics & Gut microbiota” where he provided detailed information about the importance of probiotics on human health, diversity of probiotics across the globe and comparison with Indian population besides giving detailed information on microbiota found among hunters and tribals. Subsequent lecture was delivered by Dr. M. Balasubramanyam of Madras Diabetes Foundation, on the topic “Altered gut microbiota on type-2 diabetes and the need of next generation probiotics”. Preceding to this lecture, poster reviewing session was organized. Post lunch, tasting and sensory evaluation of shelf stable probiotic curd tasting was organized. The shelf stable probiotic curd was prepared using L. fermentum MCC2760 (probiotic culture) and Lactococcus lactis (Nisin producer) which was served to 40 participants. Proforma for sensory evaluation of Probiotic curd were given to the participants for their valuable feedback. Colour, texture, taste and overall acceptability were the parameters for evaluation. The method “9-Point Hedonic scale” was used for evaluation.
Most of the participants liked the texture and colour of the curd and gave 9 pointers while some participants suggested more of sourness in the curd. Large group of participants suggested for adding some sugar flavour in the probiotic curd.

The post lunch speaker, Dr. Mudassir Azeez Khan of Mysore Medical College spoke on ‘Chewable probiotics in preventing episodes of diarrhea in children’. The lecture delivered by Dr Khan promoted healthy and interactive discussion among the participants. Subsequent to the lecture, a practical session was organized. F6PPK activity which is specific for *Bifidobacterium* species identification was conducted. In addition, a visit to Anaerobic Microbiology laboratory was also arranged. The last lecture was delivered by Dr. Ramesh A on the topic ‘Probiotic lactic acid bacteria in antibacterial therapy, Techniques such as functional adherence assay using fluorescence and its applications’. The last event was the panel discussion which was coordinated by Dr. Anu Appaiah. The panelists were Dr. Praveena, Bhat Mudliar, Dr. G. Venkateshwaran, Dr. Mudassir Azeez Khan and Dr. Ramesh A, Dr AK Dubey of Tata Chemical Ltd Pune and Dr. Prakash M Halami wherein the questions asked by the participants were answered satisfactorily. Following this, probiotic lassi tasting was arranged. The Probiotic lassi prepared using native isolate of *Lactobacillus plantarum* was served to participants.

Valedictory function was chaired by Dr G Venkateswaran, Chief Scientist, CSIR-CFTRI and Chief Guest was Dr Balasubramaniyam of Madras Diabetes foundation. Best poster presentation award was given to two of the posters for their work. Organizing Secretary proposed the vote of thanks especially thanking Director CSIR-CFTRI, Head, MFT and PAi for their support and encouragements. The activity of the workshop was concluded with National anthem.
National Seminar on “Probiotics : Ameliorating The Burden of Life Style Disorders” organized at Department of Microbiology Ram Lal Anand College, University of Delhi in association with Probiotics Association of India

Department of Microbiology, Ram Lal Anand College, University of Delhi, Benito Juarez road, South Campus organized a one-day National Seminar entitled “Probiotics: Ameliorating The Burden of Life Style Disorders” on February 1st, 2019 in association with Probiotics Association of India. More than 160 students and 25 faculty members from the universities and colleges of Delhi and NCR of high repute participated in this one-day event. The aim of the program was to spread the awareness and knowledge of these beneficial probiotic products and to provide a forum for exchange of ideas on current probiotic research. The main focus was on to the use of probiotics and their role in maintaining health and preventing lifestyle diseases.

The keynote speaker Dr. Neerja Hajela, General Manager, Science and Regulatory Affairs, Yakult Danone India Pvt. Ltd. talked on “Role of Microbiome and Probiotics in Human Health”. Dr. Neerja focused on the transformative power of the probiotics in an increasingly wide range of health benefits and concomitant potential of microbiome and probiotics to exalt the health benefits. Dr. Prabhanshu Tripathi, Scientist, Translational Health Science and Technology Institute, NCR Biotech Science cluster Faridabad emphasized the therapeutic and preventive role of probiotics in food allergies in his talk entitled “Probiotics and Immune response”. He discussed the beneficial role of probiotics in reversing the sensitization to food allergens in particular by reintroducing a mix of clostridia bacteria against peanut allergy. Dr. Jasvir Singh, Regulatory Scientific and Government Affair leader South-Asia at Dupont Nutrition and Health made a presentation on “Regulatory aspects of the functional foods” emphasizing that functional foods can be regulated as conventional foods which are claimed to have health promoting benefits. In this regard, he briefed the regulations related to the labeling of conventional foods, dietary supplements, medical foods or a drug depending on the intended use and nature of the claims.

Dr. Shalini Sehgal, Associate Professor, Department of Food Technology, Bhaskarcharya College of Applied Sciences, University of Delhi provided an overview of the consumer perception and attitude towards the use of probiotic foods. Her talk titled “‘Probiotic Foods: Consumer Perception and Attitudes”
underscored the consumer awareness about the functional foods and the elevated interest of consumer relationship between diet and health. The importance of consumer surveys allow the identification of the level of knowledge and tracing strategies to consequently increasing the level of consumer awareness about the health benefits associated with the probiotics. Dr. Vijendra Mishra, Associate professor and Dean, National Institute of Technology, Entrepreneurship and Management, Kundli, Sonepat, Haryana accentuated the potential probiotic lactic acid bacteria as antioxidants in his talk titled “Antioxidative Potential of Probiotic Lactic Acid Bacteria”. He emphasized the potential of lactic acid producing bacteria in suppressing the growth of various pathogenic bacteria maintaining the balance of gut flora and thereby exhibiting antioxidant potential for health benefits. Prof. J. S. Virdi (retd.), Head, Department of Microbiology, University of Delhi, South Campus presented a talk on “Probiotics for the geriatric care management” underlining the contribution of probiotics in reducing the pro-inflammatory status and other age related pathologies in elderly people. The probiotics represents a useful intervention to prevent or treat antibiotic associated diarrhea in addition to reducing the symptoms to help the management of constipation in elderly population.

Prof. T. Ramamurthy, THSTI, National Chair & Head-CHME, working in the area of cholera and enteric diseases, enthusiastically engaged young brains and passionately responded to all the
queries of students throughout the program. To further motivate and engage young undergraduate students from various universities and institutes of Delhi & NCR, a poster presentation session was also organized. The poster on “The emergence of new Probiotics- Psychobiotics” by Deesha Gupta, Shaheed Rajguru College of Applied Sciences, University of Delhi was awarded First Prize for the best presentation. Finally, the seminar concluded with a session on innovative idea presentation by students on probiotics and its role in lifestyle diseases. The students enthusiastically took part and presented their novel ideas and expressed their interest in the field relevant to the seminar theme. The best feasible innovative idea titled “Microbial interaction may boost the probiotics action: use of *Fusobacterium* sps. to increase the effectiveness of probiotics” presented by Ms. Muskan Mittal, B. Sc (H) Microbiology of Ram Lal Anand College, University of Delhi got the first prize.

It was indeed a remarkable event where students and faculty could meet and interact with fellow students from other institutions and learned a lot about the current scenario of research in the area of probiotics. It was a very productive event with so much knowledge sharing, listening to invited speakers and certainly an enriching research exposure for undergraduate students of microbiology, biochemistry, biomedical sciences and related fields.

The college is grateful to Probiotic Association of India for giving this wonderful opportunity to organize this program to nurture the research aptitude of young and highly motivated undergraduate students.

Deesha Gupta, Shaheed Rajguru College of Applied Sciences, University of Delhi was awarded First Prize for the best poster presentation.
Workshop on “Probiotics – Ambassadors of Human Health” organised at Dairy Science College, Bangalore

The workshop on “Probiotics – Ambassadors of Human Health” organized by the Department of Dairy Microbiology, Dairy Science College, KVAFSU, Hebbal, Bengaluru-24 during 14th to 15th of February, 2019 was sponsored by ‘Probiotic Association of India’, NDRI, Karnal. The workshop was inaugurated on February 14th 2019 at 9.45 AM by Dr. H. M. Jayaprakasha, Dean, Dairy Science College, Bengaluru as President and Chief guest Dr. D. B. Puranik, Head of the Division, Dairy Science College, Bengaluru. Dr. B. Ramachandra, Assistant Professor of Dept. Dairy Microbiology as Co-organizing Secretary welcomed the guests and participants, while Dr. Prabha R., Asso. Professor and Head of the Dept., Dairy Microbiology as Organizing Secretary briefed about the workshop. The participants of workshop comprised from diversified background of agricultural, veterinary universities; technical staff from Karnataka Milk Federation, private industries and PG students.

Three guest speakers and two internal speakers delivered talks on first day and second day of the workshop respectively. Dr. P. A. Shankar who gave inaugural speech introduced the word probiotics, their characteristics and therapeutic benefits. Dr.Prakash M.Halami, Senior Principal Scientist of CFTRI, Mysore spoke on ‘Phylogeny of Probiotic Bacteria’, appraised on phylogeny of probiotics, antibiotic resistance and few probiotic products developed in his laboratory. The third speaker was Dr. G. Kumaresan, Professor of Livestock Technology, Veterinary Research Centre who spoke on ‘Naturally occurring Prebiotics’ wherein he discussed all the types of prebiotics and their effect on the growth of probiotics. Dean of Dairy Science College delivered a talk on ‘Technological Intervention in the Production of Probiotic based Functional Dairy Products’ who elaborated on the production and problems encountered with respect to probiotic products and also discussed on solutions while Division Head summarized the topic ‘Guidelines and Regulations for Probiotics’. Many participants actively participated in the discussion of all the delivered topics and clarified their doubts.

The practical demonstrations on both days were well planned in department laboratory at the end of theory sessions by Ms. Malashree L. Assistant Professor of the department, Mr. Shivalkar
Yadav, Assistant Manager (Q.C.), Telangana Dairy, Hyderabad and Mr. Viswanth Angadi, Assistant Professor, Dept. Food Science & Technology, College of Food Technology, Hassan. The demonstrations involved phenotypic, genotypic characterization of *Lactobacillus acidophilus* and *Bifidobacterium bifidum* with respect to colony, cell morphology, acid and bile tolerance, DNA extraction, PCR, nucleic acid blast, types of natural prebiotics, effect of incorporation of carrot and tomato juice to milk and effect of growth of probiotics with respect to setting time of milk, titratable acidity and direct microscopic count. The participants showed immense interest in the practicals, noted the procedures and clarified the doubts with the demonstrators.

The teaching staff of the department also talked on designer probiotics, antibiotic resistance of probiotics, synbiotics and postbiotics. The participants opined that the interactions with speakers and demonstrators helped them especially the budding researchers to take up research projects with respect to probiotics and prebiotics in their study programmes. The valedictory function of the Workshop was held at 4.00 PM on 15th February 2019, where in Dr. B. Ramachandra, Co-organizing Secretary welcomed the dignitaries Honourable Vice-Chancellor, KVAFSU, Bidar; Dean and Division Head of Dairy Science College, Bengaluru and the participants of the workshop. The highlights of workshop was extended by Dr.Prabha R., Organizing Secretary followed by distribution of certificates to participants. The gathering was then addressed by the Chief Guest, the Honourable Vice-Chancellor, KVAFSU, Bidar. Finally Mr. Viswanath Angadi, thanked all the guests, participants and Probiotic Association of India for providing the opportunity to the Department of Dairy Microbiology to organize such a workshop.
National Seminar on “Probiotics - Way forward to wellness” organized at Department of Dairy Microbiology, College of Dairy Science and Technology, Thrissur, Kerala in association with Probiotics Association of India

“Probiotics - Way forward to wellness” a one day seminar was organized on 2nd March of 2018 by Department of Dairy Microbiology, College of Dairy Science and Technology, Thrissur, Kerala with financial assistance from Probiotic Association of India with the aim to create awareness and inculcate the concept of wellness through healthy food choices, dissemination of authentic information to younger generation. The target group for this seminar was mainly the UG/PG students of general microbiology/food science/home Science/nutrition and allied science subjects. There were 170 registered delegates. In addition to the technical sessions, an E-poster competition on the theme ‘Popularization of probiotics’ and a Quiz competition were also held as a part of this event. There were 34 entries for the E-poster competition. A total of 32 teams participated in preliminary round for Quiz and five teams were selected for the final round. For assessing the general awareness on the topic ‘Probiotics and Fermented dairy products, a survey was also conducted.

The seminar was inaugurated by Dr. Joseph Mathew, Registrar, Kerala Veterinary and Animal Sciences University. He emphasized the role of traditional foods and natural food ingredients for a healthy life and also highlighted the vast market potential for functional foods. Dr. Latha, Dean, College of Veterinary and Animal Sciences, Mannuthy and Dr. S N Rajakumar, Special Officer, College of Food Technology, Thumburmuzhy felicitated the function. Dr. A.K Beena, Convenor welcomed the invitees, delegates and gathering. The inaugural ceremony was followed by prize distribution to the winners of E-poster competition by chief guest Dr. K.R Anilakumar, Scientist F and Head Food Quality Assurance Division, Defence Food Reasearch Laboratory, DFRL, DRDO, Mysuru. The first prize was bagged by Mr. Sachin M.S and Ms. Saira Renjan, second prize by Mr. Tom David and third prize was bagged by Ms. Rakendhu Saji, Ms. K Aiswarya Vijayan, and Ms. Ajuna M. The inaugural session concluded with the Vote of thanks by Dr. Ligimol James, Joint Convenor.

The first session was handled by Dr. K.R Anilakumar, Scientist F and Head Food Quality Assurance Division, Defence Food Research Laboratory, DFRL, DRDO, Mysuru. His sharing of experience in the
development of functional foods like Ajawin Munch, Nutri Mix, Soya Shrikhand for defense personnel in DFRL really evoked interest among the audience. He also highlighted the need of research mainly in the area of studying the mechanism of action of each functional ingredient. The second talk was delivered by Dr. A K Beena Professor and Head, Department of Dairy Microbiology, College of Dairy Science and Technology, Mannuthy, Thrissur on the topic Probiotics – Way forward to wellness. She covered basic concepts regarding Probiotics, Prebiotics and Synbiotics, mechanism of action, criteria for selection of Probiotics and role of fermented milk products in delivery of probiotics. The next session was led by Dr. Sathu T Assistant professor, Meat Technology unit (Centre of Excellence in Meat Science), Dept of Livestock Products Technology College of veterinary & Animal Sciences, Kerala Veterinary and Animal Sciences University. He covered mainly the applications of Probiotics in Meat Products, encapsulation techniques and development of value added Fermented meat products.

After lunch break, the final session was handled by Dr. George T Oommen, Former Professor & Head, Meat Technology Unit & Dept of Livestock Products Technology, Kerala Veterinary & Animal Sciences University. He is currently the Technical Member and Convener of Standard Revision Subcommittees-Food & Agriculture Division 18 of Bureau of Indian Standards since 2011 and Technical Member, FSMS Audit Team, EIA, Govt. of India for Dairy and Meat Processing Plants. He detailed the various regulatory aspects of functional foods and the role of FSSAI in assuring benefits of Functional foods and Neutraceuticals for the consumer.

After the technical sessions, the final round of Quiz competition was conducted by Mr. Rejeesh, Assistant Professor, Department of Dairy Microbiology, College of Dairy Science and Technology, Trivandrum. First prize was bagged by Farzana Beegum M and Amrutha S, PG students, Department of Dairy Microbiology, College of Dairy Science and Technology, Mannuthy. Second Prize was won by Aliya S and Jane Maria Stephen from Sree Sankara College Kalady. Winners were awarded with certificate, cash prize and memento.

A total of hundred people were evaluated for their awareness on probiotics and fermented milk products by giving a questionnaire. The survey results clearly indicated lack of awareness on the topic among the general public underscoring the need for hosting awareness campaign. The programme came to an end by 5.00 pm with Vote of thanks by Dr. Aparna Sudhakaran V, Joint convenor. The seminar was successful in disseminating a firsthand science based information on ‘Probiotics’ to a heterogenous group of youngsters. Similar initiatives under the aegis of Probiotic Association of India can definitely play a role in creating a healthy society through probiotic interventions.
National symposium on “Probiotics and Functional Foods on Health Management”
PFFHeM2019 organized by Department of Food Engineering and Technology, Tezpur University in association with Probiotic Association of India and supported by North East Council (NEC) India

The Tezpur University in association with Probiotic Association of India (PAi) organized National Symposium on “Probiotics and Functional Foods on Health Management” during 4th to 5th March, 2019. The inauguration of symposium was done on 4th March, 2019 in presence of Prof. Vinod Kumar Jain (Hon. Vice Chancellor, Tezpur University); Prof. (Dr.) Jyoti Prakash Tamang (Chief Guest, Sikkim University); Prof. Smriti Kumar Sinha (Dean SoE, Tezpur University); Prof. Charu Lata Mahanta (Chairman, PFFHeM2019); Dr. Brijesh Srivastava (Head, FET, Tezpur University) and Dr. Raj Kumar Duary (Convener, PFFHeM2019). The symposium witnessed a total of 72 delegates from different institutes along with PhD, UG and PG students of the department. There were a total of 18 oral presentations including invited lectures; 12 Young presenter oral presentation and 34 numbers of poster presentations. Professor Dr. Jyoti Prakash Tamang, (Dean and Professor in Microbiology, Sikkim University) delivered his keynote address on “Understanding of Ethno-microbiology of ethnic fermented foods and alcoholic beverages of North East India to Metagenomics”.

Registration at department of Food Engineering and Technology, Tezpur University
The symposium witnessed lectures from various resource persons. Dr. S.R. Joshi, from Department of Biotechnology & Bioinformatics, North-Eastern Hill University Meghalaya, shared his thoughts and findings on use of *Enterococcus* spp. from traditionally fermented products as a candidate probiotic bacterium for health management. Dr. Kanthi Kiran Kondepudi (Scientist-D) National Agri-Food Biotechnology Institute (NABI), Punjab) delivered his talk on “Improving metabolic and mental health using functional food and ingredients.”

Dr. Wahengbam Romi, a DST-INSPIRE Faculty, Institute of Advanced Study in Science and Technology (IASST) Assam, shared his findings and views on “Ethnic fermented foods of North East India as dietary sources of probiotics— an omics perspective”. Prof. Ranendra Kumar Majumdar, Professor & Head, College of Fisheries (CAU-I), Tripura, emphasized his talk on probiotic potential of shidal—an indigenous fermented fish product of northeast India.
The valedictory function was held on 5th March, 2019 with a brief report on symposium by Convener Dr. Raj Kumar Duary in presence of Prof. Manabendra Bhuyan (Chief Guest and Ex-Dean SoE, Tezpur University), Dr. Brijesh Srivastava (HoD, FET) and Prof. Charu Lata Mahanta (Chairman and Ex-Dean SoE, Ex-Dean R&D, Tezpur University).
EXPLORING THE POSSIBILITY OF MANAGEMENT OF EMERGENCY IN PSYCHOTIC CASES USING PSYCHOBIO蒂CS

Ratan Singh, Ph.D.

Nutritional & Neurobehavioral Psychology, Jaipur Hospital, Jaipur, India- 302004

Corresponding author: ratanpsych@gmail.com; URL: www.RegainMentalHealth.com/

Abstract

Two vignettes from severely mentally ill cases who would explode in uncontrollable rage that was life threatening to family members and socially disruptive of law and order have been reported. High doses of two psychobiotics successfully managed their emotional outburst immediately, thereby, avoiding police involvement and hospitalization.

Introduction

The author has discussed short vignettes from two of severely mentally ill patients whose episode of severe psychotic rage were controlled almost immediately without any physical restraint or hetero-toxic psychiatric medicine. These are ongoing cases and the report is a cross section of ‘works in progress’.

Case:1

Patient A, age 29, married. The only job for family he would do is to dress up his school going son. But he would dress and undress the son in about 20 times suspecting wrinkles on the son’s shirt. He would mumble abusive words against a particular community living in his neighborhood. On the day of episode, he started abusing that community loudly and making gestures as if he was hearing voices- auditory hallucinations. He went out in verandah such that the neighbors and the passers-by on the street could hear him shouting abusively. When brought back inside the room, he continued to shout and also started throwing household things and utensils in rage, and breaking things. He was at this stage a danger to the life of others. Psychiatric consultation and hospitalization under police custody was suggested but declined by his family.

Procedure

Having known about psycho-biotics (probiotics that regulate brain and behaviour), the family members were advised to give him high dose of probiotics mixed in lukewarm food. Although, stomach acid destroys the probiotics and heat also does the same, there was no choice except above.

Two probiotics were used, VSL#3 and Culturelle GG. VSL#3 has 8 strains of live freeze-dried lactic acid bacteria. Available without prescription because its safe, each capsule in India has 112.5 billion CFU. In USA each capsule of over 400 billion is available with prescription. The VSL#3 was given with Culturelle GG. Culturelle GG contains Lactobacillus rhamnosus. Each capsule of Culturelle GG has 10 billion CFU. Econorm (Saccharomyces boulardi) each capsule of 250 mg (Dr.
Reddy’s) was already being given 1 BD, mixed in food.

Two capsules of VSL#3 and 10 Culturelle GG capsules were cut open and the powder secretly mixed in dinner. Total in one meal was 325 billion CFU. Plan was to give these with two meals each day for two to three days.

**Results**

The patient had diarrhea once after taking the dinner that contained the said probiotics. After that he slept through the night. The probiotics were again given next day in breakfast. He had diarrhea 3 times this time. But when he emerged from the toilet the third time post-breakfast, he was relaxed and smiling. His mother said it was the first time in years that she saw relaxed smile on her son. The mother informed me that he dressed up his son for school just in first attempt.

**Case 2**

Age 23, this was actually a case of ADHD (Attention Deficit Hyperactivity Disorder). Generally such children are always over active but on the specific day, he got very violent, breaking household items. He had no speech. Previously on such occasions, his mother would shut him in a room.

**Procedure**

The procedure was the same as for Case 1, but in this case the mother gave him the probiotics only once, scared as she was of high doses- as if they were some hetero-toxic medicine.

**Results**

It was night and, in spite of his ongoing aggression, luckily his mother could persuade him to take the probiotics orally. After that he slept through the night. The mother reported that next day morning he woke up with pleasant smile and relaxed mood. Seeing the outcome, the mother asked if she could repeat the same whenever there was emotional outrage in her child.

**Discussion**

Discussion is not possible because the cases are still ongoing and I don’t know the final outcome and prognosis. I also don’t know if others will obtain the same result with this kind of treatment. But I think it is worth a try before police be called in and the patient hospitalized or psychiatric medicines started.

**Key Words**

Psychiatric emergency, orthomolecular medicine, probiotics, psychobiotics.
PROCESS STANDARDIZATION AND ORGANOLEPTIC EVALUATION OF PROBIOTIC CEREAL BEVERAGE

S.D. Katke a*, H.W. Deshpande a and A.R. Sawate b

a Dept. of Food Microbiology & Safety, College of Food Technology, VNMKV, Parbhani
b Dept. of Food Engineering, College of Food Technology, VNMKV, Parbhani

The present investigation demonstrates utilization of different cereal composite flour for the preparation of probiotic cereal beverage. A process for preparation of probiotic cereal beverage at various levels of concentration has been standardized. The data generated during present investigation revealed that the lactic acid fermentation of these cereal flour by starter culture containing Lactobacillus acidophilus and Lactobacillus plantarum results in the sensorial characteristics viz. flavor, taste and texture of prepared probiotic cereal beverage. The beverage sample prepared from composite flour (having 40:20:20:20 percent Barley, Sorghum, Amaranth and Foxtail millet flour respectively) and containing 5 percent starter culture with fermentation period of 20 hrs is most desirable in terms of sensorial quality profile. The shelf life of beverage is 15 days under refrigerated storage (4°C). The theoretical energy value of prepared cereal based probiotic beverage was found to be 69.084 Kcal. The process of preparation of cereal based probiotic beverage being a techno- economically feasible, justifies the suitability of cereals in probiotic based health or functional foods for commercial exploitation.

Keywords
Non Dairy Probiotic Beverages, Composite Flour, Probiotic Cereal Beverages

COMMONLY USE OF ORAL ANTIBIOTICS RESISTANCE IN CHILDREN AGED 1 TO 12 YEARS WITH URINARY TRACT INFECTION (UTI) - A INCREASING PROBLEM

Biswajit Batabyal
Department of Microbiology, Serum analysis centre Pvt. Ltd., Howrah, West Bengal, India.
Corresponding author: biswajit.batabyal@gmail.com

Background
The resistance of bacteria causing urinary tract infection (UTI) to commonly prescribed antibiotics is increasing both in developing as well as in developed countries. Knowledge of resistance trends is particularly important when prescribing antibiotics empirically, as is usually the case for urinary tract infections (UTIs) especially in children.

Objective
The present study was undertaken to report the commonly used current antibiotic resistance pattern among common bacterial urinary pathogens.
Methodology
A total of 512 urine samples were collected from outpatients of age between 1 to 12 years of both sexes of children at Serum Analysis Center Pvt. Ltd. [Referral Laboratory]: Howrah; West Bengal; India between December 2016 to November 2017. The urine samples were cultured on selective media and the bacterial isolates recovered of commonly used oral antibiotics were tested against Amoxicillin/clavulanate, Cefixime, Cefpodoxime, Cefprozil, Cephalexin and Co-trimoxazole (Trimethoprim/sulfamethoxazole) using Kirby Bauer disk diffusion method according to the current National Committee for Clinical Laboratory Standards (NCCLS) guidelines.

Results
Among the 512 urine samples examined, that included 276 (54.0%) in Male child & 236 (46.0%) in Female child, 220 (42.9%) of urinary pathogens were isolated. The bacteria comprised of were isolates 104 (37.7%) from male child and 116 (49.2%) from female child. In patient of male child, 50% of *E. coli*, 34.6% of *Klebsiella pneumoniae*, 15.4% of others gram negative bacteria and 52.0% Extended-spectrum Beta lactamase [ESBL] stains were the predominant isolates. In patient of female child, 72.4% of *E. coli*, 20.7% of *Klebsiella pneumoniae*, 6.9% of others gram negative bacteria and 58.7% Extended-Spectrum Beta lactamase [ESBL] stains were the predominant isolates. Resistance rates of *E. coli* isolates were 83.8% to Amoxicillin/clavulanate, 70.5% to Cefixime, 89.7% to Cefpodoxime, 80.8% to Cefprozil, 89.8% of Cefalexin and 63.2% to Co-trimoxazole.

Resistance rates of *Klebsiella pneumoniae* isolates were 66.7% to Amoxicillin/clavulanate, 43.3% to Cefixime, 90% to Cefpodoxime, 76.6% to Cefprozil, 80% to Cefalexin and 50% to Co-trimoxazole. Resistance rate of other gram negative bacilli isolates were 75% to Amoxicillin/clavulanate, 33.4% to Cefixime, 91.6% to Cefpodoxime, 91.6% to Cefprozil, 91.6% to Cefalexin and 41.7% to Co-trimoxazole.

Conclusions:
It is concluded that the clinical isolates have started developing resistance against commonly used antibiotics due to its irrational and inappropriate use. Continuous surveillance is crucial to monitor the antimicrobial resistance of pathogens. Antibiotics should only be issued when prescribed by physicians.

**Key words:**
Urinary tract infections; Antibiotic resistance; Pediatrics; Oral antibiogram.
NANO-FORMULATIONS OF PROBIOTICS: A PROSPECTIVE ANTI-BIOFILM PRODUCTS FOR COMBATING ANTI-MICROBIAL RESISTANCE

Barkha Singhal

School of Biotechnology, Gautam Buddha University, Greater Noida -201312, U.P.,

Corresponding author: barkha@gbu.ac.in, gupta.barkha@gmail.com

The phenomenal rise in antimicrobial resistance portends the elimination of antibiotic era due to the reduced efficiency of common antibiotics and therapeutic approaches for the treatment of multidrug-resistant bacterial infections. The primary level of defense system rendered by these deadly pathogens is known as biofilms. The biofilm is defined as the complex ecosystem of microbes enclosed in a self-produced extra cellular matrix that may attach on solid and liquid interfaces. This lifestyle of bacteria leads to the development of strong shield that can withstand extreme hostile conditions like desiccation and starvation as well as biofilm also shield invading bacteria against the immune system of host. This property makes the bacteria capable for causing wide variety of persistent infections and diseases. Currently, a plethora of strategies have been explored for the prevention and elimination of biofilms. The conventional antibiotics and therapeutic approaches have not been proving the required efficiency as compared with the progress of biofilms related infections.

In the past decade, the outburst of nanotechnology paved the way for the efficient utilization of nanoparticles owing to their high antimicrobial activity against multi-drug resistance pathogens [1]. The literature studies speculated that various nanoparticles like metallic and metal oxides nanoparticles have been utilized for their anti-biofilm activity but nanoparticles synthesized with probiotic bacteria receives wide spread attention now-a-days [2]. The rising momentum has been envisaged due to their biocompatibility as well as conferring beneficial effects on host cells classifying probiotics as GRAS organisms. Recent investigations on the ability of some of the probiotic strains especially Lactobacillus species has been evaluated for the anti-biofilm activity but their antimicrobial action was found to be pH-dependent and strain specific. Currently, the probiotic bacteria are being used for biosynthesizing various metallic and non-metallic nanoparticles that can be utilized for several biomedical applications. Recently, the use of nano-formulations of probiotics in combating anti-microbial resistance is fascinating area of research.

Recent studies reported that biocompatible carbon dots were prepared by Lactobacillus plantarum through one-step hydrothermal carbonization reactions and has been proven effective anti-biofilm agents against E. coli. The whole cell biomass of this probiotic has been converted to biocompatible carbon dots and these nanoparticles showed good safety and very low cytotoxicity towards animal cell lines [3]. Though carbon dots were utilized for various applications including bio-imaging, bio-sensing, photo-catalysis and targeted drug delivery applications but these studies opened avenues for the development of novel anti-biofilm materials. Therefore, this nano-technological interventions leads to the innovative concept of utilizing whole cells as nanomaterial’s with intrinsic anti-microbial effect. In future, by attaining the comprehensive knowledge about the mechanism of action of such biocompatible
nanomaterials, novel strategies for reducing the burden of anti-microbial resistance will be developed.

References

PROBIOTICS FOR INFANT DIARRHEA

Akash Arora, Yamini Rakesh Nikhariya and Jayati Ray Dutta*

Department of Biological Sciences, BITS Pilani, Hyderabad Campus, Jawahar Nagar,

*Corresponding author: jayati@hyderabad.bits-pilani.ac.in

Introduction
Diarrhea is the third leading cause of infant (under the age of 5) deaths in India. It accounts about almost 13% of the total infant deaths in India in 2012 though the number of deaths due to infant diarrhea is significantly reduced over the years but still diarrheal death still accounts for over 10% in 2015 of the infant population of the country [1]. Infant diarrhea can be due to multiple causes ranging from bacterial infection, parasitic infection, use of antibiotics etc.

Statistics
According to National Family Health Survey- 3 (NFHS-3), four billion cases of diarrhea occur each year with 90% cases in developing countries. The mortality rate was 9.1% for the children belonging to age group 0-6 yrs who were affected by diarrhea. Average estimated incidence of diarrhea in children aged 0-6 yrs was 1.71 and 1.09 episodes/person/year in rural and urban areas [2].

Infant microbiota
Regulation of an Infant gut microbiota is one of the preventive measures to prevent and cure infant diarrhea. Infant gut microbiota consists of *Bifidobacterium, Lactobacillus acidophilus* group, *Bacteroides Prevotella* group, *Enterobacteriaceae*, *Enterococcus*, *Clostridium cocoides–Eubacterium rectale* group, *Clostridium leptum* group and *Staphylococcus* [3]. An infant microbiota directly or indirectly effects the major systems of the body like immune, digestive, endocrine systems, thus proper regulation of microbiota is essential for the overall health of the Infant. Consumption of probiotics is one of the best ways to regulate the human gut microbiota [4].

Probiotic strains used to cure infant diarrhea
* Lactobacillus acidophilus, Lactobacillus bulgaricus, Lactobacillus casei, Lactobacillus gasseri, Lactobacillus plantarum, Bifidobacterium bifidum, Bifidobacterium lactis, Bifidobacterium longum, Enterococcus faecium, Saccharomyces boulardii etc.
Mechanism of Diarrhea

- Ingestion of bacterial toxin or the organism
- Colonization of microbes
- Increased toxin content
- Toxin binding to host cell receptors
- Alteration of cell membrane's ion channels
- Diarrhea

Probiotic mechanism of action

- Immunomodulatory activity
- Competition for nutrients
- Structural and functional modification of epithelial cells
- Production of various bacteriocins
- Modification of microbial population
- Food allergy reduction
Conclusion & Future aspects
Consumption of probiotics is one of the best-suited methods for curing infant diarrhea. It not only takes less time to cure the disease and is safe for infants. Genetic manipulation of probiotics is one of the promising aspects of probiotic research. This will increase the efficiency of probiotics. The major challenge that the research faces today is the acceptability of genetically modified probiotics.

References

BUFFALO MILK RICOTTA CHEESE AS CARRIER OF PROBIOTIC ORGANISMS

*Bhagwat Sameer* & *Sangita Ganguly*
Dairy Technology Division, ICAR-NDRI
Karnal, Haryana-132001

*Corresponding author:* bhagwatsameer1111@gmail.com

**Background/problem statement**
Probiotic organisms are known for their multiple health beneficial properties. Probiotics are the leading components in the “functional food” sector, where food-containing probiotics not only provide basic nutrition but also promote health. Ricotta, a soft whey cheese may offer a number of benefits over other foods in terms of delivery vehicle of probiotic microorganisms because of its intrinsic characteristics. Ricotta has relatively high moisture, high pH, low salt concentration and mechanical consistency, coupled with typically low-oxygen level; these features provide, in combination, an extra protection to probiotic cultures during storage and even later during gastric transit. Probiotic incorporation in Ricotta cheese matrix may improve sensory quality, shelf life and functional properties of product.

**Objective**
The aim of the current study was to evaluate the survival of probiotic organisms in Ricotta cheese matrix during simulated gastrointestinal condition.
Methods

Buffalo milk Ricotta cheese (RC) was prepared by admixing preheated mozzarella cheese whey with buffalo milk (1.0% fat) at 80:20 proportion. The mixture was heat treated to 90°C for 15 minutes followed by coagulation at 75°C with citric acid (1% solution). The product contained 25.64% total solids, 12.17% protein and 6.54% fat with protein recovery of 97%. Probiotic organisms *Lactobacillus acidophilus*; NCDC-291 were inoculated into cheese matrix in pellet form (@ 2%) to maintain the count > 10^8 CFU/g. The Buffalo RC with probiotics was subjected to *in vitro* simulated gastrointestinal conditions to check the survival of organism during GI transit [1]. Probiotic organisms in MRS broth were taken as control. Both samples were submitted to typical conditions in the human mouth, oesophagus-stomach and duodenum, sequentially. At the end of each step, the count of the viable cells was estimated and survival rate was evaluated by given equation 1 as described previously [2].

![Figure 1: Protocol of probiotic Ricotta cheese formulation](image)

### Table 1: Protocol for *in-vitro* simulated gastro-intestinal (GI) study

<table>
<thead>
<tr>
<th>Steps</th>
<th>Compartment</th>
<th>Condition</th>
<th>Stirring (rpm)</th>
<th>Final pH</th>
<th>Time of exposure (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Before simulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Mouth</td>
<td>α-amylase</td>
<td>200</td>
<td>6.9</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>oesophagus–stomach</td>
<td>Pepsin</td>
<td>130</td>
<td>5.5</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>4.6</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td>3.8</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td>2.8</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>Duodenum</td>
<td>Pancreatin + bile salts</td>
<td>45</td>
<td>5.0</td>
<td>30</td>
</tr>
</tbody>
</table>

A. Probiotic organisms in MRS broth (control); B. Probiotic organism in Ricotta cheese matrix
Survival rate of Probiotics

\[
\text{Survival rate (\%) = \left(\frac{\log N_1}{\log N_0}\right) \times 100}
\]  

... Eq. (1)

Where \(N_1\) is the total viable count of probiotic strain after exposure to each step of the simulated gastro intestinal conditions and \(N_0\) is the initial viable count of the probiotic strain before exposure to the each step.

Results

Probiotic RC had good sensory attributes with overall acceptability score of 90. Results showed that probiotic organism NCDC-291 survived better under simulated GI conditions in Ricotta matrix (89.23%) as compared to free cells (71.32%). During initial transit there was small reduction in probiotic count. Whereas, during oesophagus–stomach transit due to low pH a significant reduction was observed in probiotic count. During oesophagus–stomach transit at pH 2.8 probiotic count observed at MRS medium and Ricotta cheese matrix was 5.1 log CFU/g and 5.90 log CFU/g respectively. Higher survival of probiotic was observed in Ricotta cheese matrix as compared to MRS medium during oesophagus–stomach transit, which might be due to buffering quality of milk protein leading to resistance in the change in pH during GI transit. Similarly during Duodenum transit, higher count of probiotic organism was observed in Ricotta matrix. Overall, probiotic NCDC-291 at the end of the simulated GI conditions study showed a survival of 89.23% in Ricotta cheese matrix as compared to 71.32% in MRS medium.

Figure 2: Survival of probiotic organism during simulated GI study.

ab: Values with different alphabets in a graph are significantly different (P<0.05).
Conclusion

Ricotta cheese can be a good carrier medium for probiotic organism and can serve as a cost effective source of nutrition for wide segment of population.

References


ASSESSMENT OF PROBIOTIC PROPERTIES OF ISOLATES OBTAINED FROM FISH GUT

Vitika Sharma and Mitesh Dwivedi*
C. G. Bhakta Institute of Biotechnology, Faculty of Science, Uka Tarsadia University, Tarsadi-394350, Bardoli, District Surat, Gujarat, India

*Corresponding author: mitesh.dwivedi@utu.ac.in

The use of probiotics for human and animal health is continuously increasing. In the present study, unconventional source of probiotic i.e. fish was used for isolation of probiotic bacteria. There is an urgent need in aquaculture to develop microbial control strategies, since disease outbreaks are recognized as important constraints to aquaculture production and trade and since the development of antibiotic resistance has become a matter of growing concern. The present study was aimed to isolate such probiotics from Fish gut which could be one of the alternatives to antimicrobials in disease control and could be the use of probiotic bacteria as microbial control agents. The present study may find novel fish probiotics with potential probiotic properties which can be used for aquaculture as well as source of unconventional probiotics for humans. However, the multistep and multidisciplinary process is required for the development of effective and safe probiotics for commercial application in aquaculture.

Objectives

- To isolate the probiotic strains from fish gut samples.
- To identify and characterize potential probiotic strains on the basis of:
  - i) Acid tolerance, ii) Bile tolerance, iii) Antibiotic susceptibility.
Methods
1. Collection and preparation of samples: The *Clarias batrachus*, commonly known as catfish was collected and brought alive to the laboratory. Ventral surface sterilization was done using double distilled water followed by 70% ethanol. Under sterile conditions, the fish gut region was dissected out and homogenized with 5 ml of normal saline.

2. Isolation of probiotics: The homogenate was serially diluted and plated on MRS medium (pH 6.5) and incubated at 37 °C for 24 to 72 h. (pH 6.5).

3. Acid tolerance: The obtained isolates were grown in MRS broth overnight and the pelleted cells were suspended in (pH 7.4). Further, it was diluted to $10^{-1}$ to $10^{-6}$ using PBS (pH 3.0) and kept for different time durations (0, 2, 4 and 24 hrs). The 0.1 ml aliquots of $10^{-2}$, $10^{-4}$, $10^{-6}$ dilutions were plated on MRS agar. Plates were then incubated at 37°C for 24-48 hrs. The CFU/ml was calculated for each of these plates. The growth on MRS agar was used to designate the acid tolerant property of the isolates.

4. Bile tolerance: The MRS agar was prepared using different concentrations (0.3, 0.5, 1.0, 1.5 %) of Cholic acid to check the bile tolerance property of the isolates. The different culture dilutions were prepared (i.e.$10^{-1}$ to$10^{-4}$) and 0.1 ml aliquot of each dilution was plated on Cholic acid-MRS agar. All the plates were incubated at 37 °C for 24-48 hrs. The CFU/ml was calculated for each of these plates. The growth on Cholic acid- MRS Agar was used to designate the bile tolerant property.

5. Antibiotic susceptibility: The antibiotic resistance of selected isolates was carried out by the disc diffusion method (Bauer et al., 1996). Freshly grown cultures were spreaded onto Muller-Hinton Agar (MHA) plates and allowed to dry. Antibiotic discs were placed on these plates and were incubated at 37°C for 2 days. The diameter of zone of inhibition was measured by using an antibiotic zone scale. The results obtained were expressed in terms of susceptibility, moderate susceptibility and resistance.

Results
Total 42 isolated colonies were observed, which were further subjected to assessment of different probiotic properties such as acid tolerance, bile tolerance and antibiotic susceptibility etc. Out of these, 8 isolates were found to be suitable for acid and bile tolerance. The isolates FG4 and FG7 were found to be highly acid tolerant as compared to other isolates (Fig.1). The isolates FG7 and FG8 showed highest bile resistance as compared to other isolates (Fig. 2). Further, the assessment of antibiotic susceptibility of these isolates was carried out which suggested that isolates FG1 and FG8 are more susceptible to different antibiotics used as compared to other isolates; however, FG4 and FG5 isolates were found to be resistant to different antibiotics used (Fig. 3). The other probiotic properties such as antimicrobial activity etc., the biochemical and molecular characterization of these isolates are being carried out.
Conclusion  

Our results suggest that potential probiotic isolates can be recovered from non-conventional sources such as fish gut which may be employed in aquaculture to prevent the pathogenic infections of the aquatic organisms and to maintain their healthy life cycle. However, they should be subjected to other probiotic properties e.g. antimicrobial properties and their *in vitro* and *in vivo* biosafety aspects must be carried out.
Tropilite Foods Pvt Ltd (estd. 1982) located in Gwalior, Madhya Pradesh having well known reputation in food processing industry deals in different areas of food technology, industrial microbiology and biotechnology with an emphasis on probiotic culture, starter culture and different bioactive molecules. It has a worldwide market with its availability in over 20 countries across the globe with our exclusive agents and distribution network. It has acquired HACCP, KOSHER, HALAL, FSSC: 22000, DSIR and cGMP certifications. Our R&D division is recognized by Department of Science and Industrial Research (DSIR) and having state-of-the-art production facility to manufacture a wide range of quality products for broad range formulations by the team of experienced professionals.

Bioflex has established an innovative Research Center in a 5000 square meters area with world class laboratories, divided in sterile, fermentation, cryoprotection, freeze-drying, grinding, mixing and packaging areas, and quality control laboratories for product analysis and batch certifications.

The company is a pioneer in the field of “Production of direct inoculum lactic acid bacteria” for dairy industry, company initiated mass production of the indigenous starter culture in preparation of curd and fermented drinks. We have developed a simple, cost effective and time saving process for starter culture production for curd/yogurt through submerged fermentation in a continuous manner. The process was developed under the project being financially supported by DSIR. The product has already been launched under the brand name “BioFlex-ST500” in Dec’ 2014. The product is available as a freeze dried powder in sachet. The indigenous starter culture had shown an edge over already existing starter cultures in terms of retaining traditional Indian flavor, having nutraceutical benefits and doesn’t contain harmful phytoestrogens.

In terms of scientific outcomes, the company has more than 20 research publications in the field of probiotic microorganisms, nutraceuticals both for products and special manufacturing technologies. The team member also got international recognition for their work in the field of probiotics and get Research Ratna Awards 2019 in the category of “Best Scientist in Probiotics” Awarded by, “RULA Awards” Powered by, “World Research Council” & “United Medical Council”.

Besides this, an international recognition is seen in manufacturing and marketing of wide range of value added human health, animal health and aquaculture probiotic feed supplements which contains live micro organisms which when administered in adequate amounts beneficially affect the host by improving its intestinal microbial balance and sold under the brand name of “Davars BIOFLEX”. BIOFLEX offer
customized probiotic culture/ RM (singly or in probiotics blends as per customers requirement) in order to improve health, feed intake, FCE, daily weight gain and total body weight in chicken, pig, sheep, goat, cattle and equine and disease prevention. In this aspect, we have introduced a range of probiotic products on the basis of the application and research. Different products under the brand name BIOFLEX have been launched in the market i.e. Bioflex Golde, Bioflex Improver, Bioflex POULTRY (P1/ P2), Bioflex AQUACULTUR (A1/A2). It has been proven through research that, the BIOFLEX is an alternative to antibiotic growth promoters that works via similar mechanisms, promoting growth whilst enhancing the conditions efficiency.
Mystical Biotech is professionally managed for PROBIOTICS, ENZYMES & NUTRACEUTICALS manufacturing company having global standard fermentation facility established in 2005 situated in KIADB Industrial area, Hoskote, Bangalore. Karnataka State, India.

Mystical Biotech is having technically qualified skilled resources committed to excel in the areas of Innovation, Discovery, Development & Commercialisation of quality products and its formulations suitable to world class standards. Our facility is dedicated to manufacture individual strains of *Lactobacillus*, *Bifidobacterium*, *Bacillus* and *Streptococcus* species along with its formulations suitable to Applications - specific like Diarrhoea, IBS (Irritable Bowel Syndrome), Digestive Health, General Wellness, Immunity boosters, UTI care, Vaginosis, Ulcerative Colitis, Renal Health, Post Surgery supplementations, Weight Management, Stress Control & Mood Swing, Oral Health, Skin & Hair Care, Low Osmolarity ORS Formula, supplied in Capsules & Sachets formats.

Apart from the above, company offers products as - Probiotics + Enzymes for Digestive Health, Probiotics + Nutraceuticals for Supplementary food, Probiotics + Vitamin, Probiotics + Herbal Supplements for joint health, Eye Care, Skin Care, etc, Probiotics + Protein Supplements, Probiotic Protein Bars as Meal Replacer or Supplementations, Probiotic Cereal Bars, Probiotic Gummies for Supplementations, Probiotics + other ingredients for pre & post medical / Clinical Nutrition required after Surgery or treatments, Probiotics ready to drink shots, Probiotics toothpaste, High probiotic protein powders, Probiotic fortified ice cream premix, Probiotic dry syrup, Probiotic emulsions, Probiotic + ORS formula, Probiotic Chocolates.

Mystical Biotech is accredited by US FDA Registered, WHO GMP, GMP by Local Drug Authority, ISO + HACCP (ISO 22000 is under certification), KOSHER, HALAL, FSSAI (Local Food Safety Authority Certification). Our R & D centre is approved by DBT (Department of Biotechnology) and under BITP, a biotechnology industrial training program of India company trains young aspirant scientists do research & Development related to Probiotics & Nutraceuticals.

Mystical Biotech is known in the industry for unparalleled product quality and support services to its customers in India and across the Globe. We can technically support all country specific documents related to product registrations and also product’s technical support required for its Marketability.
Unique Biotech Ltd (UBL) is a world class, dedicated and a well laid out large scale facility established in 2001 for Probiotics, Enzymes, and Nutraceuticals with state-of-the-art equipment in Genome Valley, Hyderabad. It is totally committed to the discovery, development and commercialization of innovative probiotic solutions for improved healthcare at affordable cost, the vision being to decrease antibiotic use and the spread of antibiotic-resistant pathogens which is a looming threat in today’s era.

UBL is an ISO 9000:2008 and a WHO-GMP certified company. The Centre for Research and Development is recognized by Department of Scientific and Industrial Research (DSIR), Government of India. Unique Biotech works in the development of disease specific probiotic solutions and offers tested formulations for digestive health like diarrhoea, constipation, IBS and IBD, lifestyle diseases like obesity, diabetes, PCOS and Women’s health like Bacterial Vaginosis.

With an unparalleled and unique combination of technical know-how, skilled resources and quality manufacturing, UBL has gained worldwide prominence in the field of Probiotics and is well positioned to open up exciting new avenues and offer products that surpass global standards. The company with its strong technical and marketing teams extends unparalleled customer service and builds strong relationships.
## List of New Members (October, 2018—March, 2019)

<table>
<thead>
<tr>
<th>S.No</th>
<th>Name</th>
<th>E mail ID</th>
<th>Membership ID</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Life Members</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Dr. Ratan Singh</td>
<td><a href="mailto:ratanpsych@gmail.com">ratanpsych@gmail.com</a></td>
<td>519</td>
</tr>
<tr>
<td>2</td>
<td>Dr. Sanjiv Kalia</td>
<td><a href="mailto:sanjivkalia62@gmail.com">sanjivkalia62@gmail.com</a></td>
<td>521</td>
</tr>
<tr>
<td>3</td>
<td>Dr. Gunjan Goel</td>
<td><a href="mailto:gunjanmicro@gmail.com">gunjanmicro@gmail.com</a></td>
<td>522</td>
</tr>
<tr>
<td>4</td>
<td>Dr. Katke S.D.</td>
<td><a href="mailto:katkesd@gmail.com">katkesd@gmail.com</a>@mail.com</td>
<td>523</td>
</tr>
<tr>
<td>5</td>
<td>Dr. Ashwani Kumar</td>
<td><a href="mailto:ashwanindri@gmail.com">ashwanindri@gmail.com</a></td>
<td>524</td>
</tr>
<tr>
<td>6</td>
<td>Dr. Prabhrajeshwar C</td>
<td><a href="mailto:p.v.chidre@gmail.com">p.v.chidre@gmail.com</a></td>
<td>525</td>
</tr>
<tr>
<td></td>
<td><strong>Student Members</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Mr. Basavaprabhu H.N</td>
<td><a href="mailto:basavaprabhu73@gmail.com">basavaprabhu73@gmail.com</a></td>
<td>518</td>
</tr>
<tr>
<td>2</td>
<td>Mr. Chathyusaha K.B.</td>
<td><a href="mailto:chathyushyakb@gmail.com">chathyushyakb@gmail.com</a></td>
<td>520</td>
</tr>
</tbody>
</table>

Contact us:
Probiotic Association of India,
ICAR-National Dairy Research Institute, Karnal – 132 001
(Haryana),
Tel: 91-184-2259100,
Fax: 91-184-2250042
E. mail: drprobiotic@gmail.com