



Probiotic Association of India

Volume1 Issue 6

Six Monthly Probiotic Newsletter, March 2014

Office bearers

Chief patron	: Dr. V. M. Katoch
Patron	: Dr. N. K. Ganguly
President	: Dr. A. K. Srivastava
Vice President	: Dr. B. Sesikera
Secretary	: Dr. V. K. Batish
Treasurer	: Dr. Sunita Grover

Advisory Committee:

1. Dr. G. P. Talwar
2. Dr. Rakesh Tuli
3. Dr. V. Prakash
4. Dr. B. Sivakumar
5. Dr. C. S. Yajnik
6. Dr. Rajesh Kapur
7. Dr. Rama Chaudhary
8. Dr. Bhuvaneshwari Shankar
9. Dr. Anura V. Kurpad

EDITORIAL BOARD

Dr. S. Prapulla
prapullasg@yahoo.co.in

Dr. Sheela Srivastava
srivastava_sheela@yahoo.com

Dr. Sunita Grover
sungro@gmail.com

Dr. J. B. Prajapati
prajapatijashbhai@yahoo.com

From Secretary's Desk

Dear Members

Greetings from Secretary PAi!

As it is rightly said, the show must go on. In keeping with the tradition, we are now back with the launch of next issue of Probiotic Newsletter with a bang. Probiotics continue to be in the limelight and still remain the major focus of attention amongst the researchers, healthcare professionals and consumers despite the rejection of some of the health claims attributed to probiotic formulations by EFSA. In fact, it has been witnessed that the consumer interest and faith in probiotics both as dietary supplements and biotherapeutics to manage their healthcare, well being and diseases has grown more stronger during the last couple of years as can be reflected from the current global market status of probiotic products touching new heights. This has largely been possible due to growing awareness and knowledge of the general public on the remarkable health benefits of these magic bugs and their understanding of the probiotic concept from scientific perspective. At the same time, recent scientific initiatives on hard core probiotic research and understanding of probiotic genome and mode of action at molecular level through advanced bioinformatics tools have added a new dimension to probiotic health applications in the gut and beyond. This issue of Probiotic Newsletter touches some of these emerging probiotic domains to keep all our esteemed members of PAi and other stake holders updated with the new developments and recent happenings in probiotic research in this direction. We earnestly hope, the readers will find the contents of this issue of PAi Newsletter interesting and stimulating and help us in spreading probiotic movement in the country by sharing this knowledge with the public and other stakeholders.

We always look forward to your valuable suggestions and request you to kindly send us your inputs for any improvement in the quality of the Newsletter from Scientific perspectives. Besides this, we expect our members from all the streams of science including industry to contribute technical articles on Probiotics related to both basic and applied research and product development or clippings of new discoveries, novel strains and product profiles etc. on regular basis so that we could review them critically at our Editorial board level for inclusion in the next issue of the Newsletter on time. Furthermore, as already communicated to you, we also look forward to your whole hearted support and active participation in the upcoming 2nd PAi conference and the international symposium scheduled for 3rd and 4th Nov, 2014 at India habitat Center, New Delhi. Kindly bring it to the notice of your colleagues and students and motivate them to become registered members of PAi to enable them to participate in the conference as early birds.

Inside this issue:

Assessment of <i>in Vitro</i> adhesion and <i>in Vivo</i> Colonisation of <i>Pediococcus acidilactici</i> MTCC5101 in Human Gut	3-4
The Unexplored Effect of Probiotics on Protozoan Parasite	4-5
PROBIOTICS: An alternative to Antibiotics for the treatment of Tuberculosis	5-6
Probiotic Ice cream incorporated with probiotic <i>Saccharomyces boulardii</i>	6-8
Medical Nutrition Therapy and Probiotics	8-9
Development of a novel fermented snack food having -glucosidase inhibitory and other functional properties	10
Characterization of tannase production by <i>Lactococcus lactis</i> subsp <i>lactis</i> and its potential in enhancing nutritional value of a composite sourdough	10
<i>Escherichia coli</i> : does it merit a probiotic status ?	11
Symposium by YAKULT INDIA MICROBIOTA AND PROBIOTIC SCIENCE FOUNDATION	12-13
Sixth International Conference on “Fermented Foods, Health Status and Social Well-being”	14-15
Microbax (India) Ltd – A Profile	16
Announcements	17
PAI Family Details	18

Assessment of in Vitro adhesion and in Vivo Colonisation of *Pediococcus acidilactici* MTCC5101 in Human Gut

Praveen P. Balgir, Baljinder Kaur, Tejinder Kaur, Natisha Daroch, and Gurpreet Kaur

Department of Biotechnology, Punjabi University, Punjab, Patiala 147 002, India Correspondence should be addressed to Baljinder Kaur; baljinderbt@hotmail.com

The metabolically active microflora of human intestine is majorly constituted by the genera *Lactobacillus*, *Pediococcus*, and *Lactococcus*. These probiotic strains are generally recognized as safe (GRAS) and often used as starter cultures at commercial scale in food industries. Probiotics have been used in various therapeutic applications due to their protective effect on the human intestine. Improvement in health status by probiotics is attributable to the fact that these bacteria stimulate immunity, reduce colonization of pathogens, reduce toxin production and enhance absorption of vital nutrients. Survival and colonization of the gastrointestinal (GI) tract involve their ability to overcome highly acidic environment of stomach, action of digestive enzymes and bile salts in the small intestine. Other characteristics like adherence of bacterial cells to intestinal epithelial cells and/or mucus, etc. are the major attributes of probiotic strains and serve as important criteria during their selection for further use. The probiotic attributes of *Pediococcus acidilactici* MTCC5101, an acid and bile tolerant probiotic strain, capable of secreting bacteriocin Pediocin CP2 are presented. Prophylactic and therapeutic effects of *Pediococcus* sp. are attributed to the wide range of anti-microbial activity of the pediocin it produces. *In vitro* assay of bacterial adhesion to intestinal epithelial cell line of human GI tract was performed using Caco-2 cell line and the *in vivo* survival of the strain in the GI tract was assessed via oral feeding to 10 healthy volunteers. The survival of the bacteria was assessed using PCR-based detection of *P. acidilactici* MTCC5101 in fecal samples. The adherence property indicative of its probiotic nature is evidenced by SEM analysis of this strain based on its adherence to the intestinal epithelial Caco-2 cell lines (Fig.1).

Oral feeding study revealed that *P. acidilactici* MTCC5101 could establish in the in GI tract of volunteers and could survive for about 2 weeks after feeding. The biochemical analysis of blood parameters such as WBC and RBC counts, Haemoglobin level, bleeding and clotting time of volunteers were assessed. Results indicated that small yet insignificant increase in the values of RBC counts and Hb levels of subjects. The findings confirm the safe oral consumption of this probiotic strain for improved health.

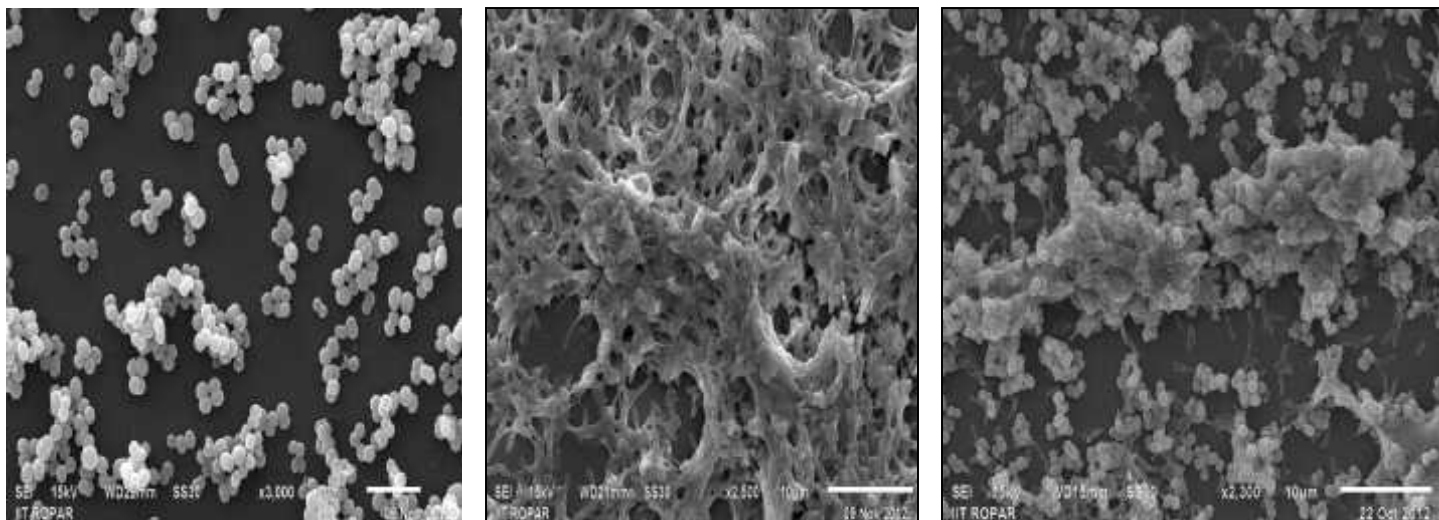


Fig. 1: SEM micrographs of (a) *P. acidilactici* MTCC 5101 (magnification level 3,000x), (b) untreated Caco-2 cells (magnification level 2,500x) and (c) *P. acidilactici* MTCC 5101 adherent on Caco-2 cells (magnification level 2,300x).

For more details please refer to:

Praveen P. Balgir, Baljinder Kaur, Tejinder Kaur, Natisha Daroch, and Gurpreet Kaur (2013) “In Vitro and In Vivo Survival and Colonic Adhesion of *Pediococcus acidilactici* MTCC5101 in Human Gut,” *BioMed Research International*, vol. 2013, Article ID 583850, 9 pages. doi:10.1155/2013/583850

The Unexplored Effect of Probiotics on Protozoan Parasite

Bratati Mukhopadhyay and Nirmal K. Ganguly

Policy Center for Biomedical Research, Translational Health Science and Technology Institute, at National Institute of Immunology, New Delhi

The conception of probiotics controlling the development of eukaryotic pathogens is emerging. Therapeutic approaches with probiotics could minimize the risks of infestation by specific parasites or complement classical anti-parasite treatments. *L. casei* ATCC 7469 has conferred a protective effect against the malaria parasite *Plasmodium chabaudi* AS in NIH mice and *Trypanosoma cruzi*, the agent of Chagas disease. Probiotic yeast *Saccharomyces boulardii* accompanying antibiotics has demonstrated beneficial effect in acute amoebiasis. A probiotic action via the secretion of an active principle that can inhibit parasite development in the experimental studies on *Cryptosporidium*, *Giardia*, or *Eimeria* are available, however, the molecular nature of these components remain unknown. The concerted effect of probiotic administration, immune effectors induction, and parasite elimination seem highly probable. Currently, studies of probiotic effects on parasites are still in their infancy, and need further investigations.

Importantly, studies are needed to standardize protocols in each model (administration, dose, time, etc.), along with the gut microflora of the experimental animal models which is a variable factor influencing the results of the studies. Hence, models with inbred strain and a controlled microflora with the same feeding are beneficial. It is known that probiotics can kill intestinal pathogens through secretion, inhibit their adhesion or invasion, inactivate toxins, or compete for nutrients. Importantly, more defined protocols (specific probiotics and experimental models), as well as extended clinical investigations underlying the beneficial effects of probiotic on the parasite infection is essential to validate the approach. The effect of probiotics in the treatment of Leishmaniasis is not yet reported. India has targeted for the elimination of the disease, hence the effect may be explored on this keeping in mind the studies on non-gut pathogens (*Plasmodium*, *Trypanosoma*, *Babesia*, etc.) with a remote effect provided by probiotics probably through a nonspecific immune stimulation. However, systematic effort needs to be put in place in the elucidation of the mode of action of the promising organisms.

Probiotics for the Control of Parasites: an Overview; M.Travers, I. Florent, L. Kohl, and P. Grellier; J of Parasitology Research, Vol. 2011, Article ID 610769, 11 pages.

PROBIOTICS: An alternative to Antibiotics for the treatment of Tuberculosis

Mr. Anindya Basu, SRF (GATE), CSIR-CFTRI, Mysore

Tuberculosis is a highly infectious disease with about one third of the world's population including 40 per cent from India estimated to be infected by it. However, this problem has become a serious health concern as *Mycobacterium tuberculosis* developed resistance against both the first line as well as also the second line drugs. Due to this, there is emergence of **multi-drug resistant (MDR) and extensively-drug resistant (XDR)** strains of *M. tuberculosis* all over the world including India. Multi-drug resistant Tuberculosis (MDR-TB) is defined as an in vitro resistance of *Mycobacterium tuberculosis* (MTB) to at least rifampin and isoniazid. Multi-drug resistance (MDR) has become a major concern to control TB particularly in the developing countries. The development of mutations in different genes of *mycobacterium* leads to drug resistance and subsequent MDR-TB. Management of MDR-TB entails intense chemotherapy for up to 2 years which is very damaging to a patient's health due to high levels of drug toxicity. Because of treatment failure for MDR-TB, extensively drug resistant tuberculosis (XDR TB) emerged. It was originally defined as MDR-TB resistant to at least three of the six classes of second-line drugs used to treat patients with MDR-TB. Due to the increasing problem of antibiotic/drug resistance, it is recommended to explore alternative anti-TB agents.

Studies on some probiotic lactobacillus strains have shown that these strains present inhibitory activity on the multiplication of pathogenic bacteria such as some species of *Salmonella*, *Shigella* and *Escherichia coli* etc. This is due to lactic acid bacteria's ability to produce bioactive soluble molecules (organic acids, fatty acids, hydrogen peroxide, bacteriocine and bacteriocin-like substances). Although very few reports are available on

antagonistic effect of probiotics on pathogenic *Mycobacterium tuberculosis*, Lazovskaia *et al.* showed that two probiotics actively elaborate bactericidal agents that suppress the growth of pathogenic mycobacteria and reduce the number of colony-forming units in the solid egg culture medium by 2-17 times. Thus probiotics supplementation can be explored as an alternative therapy to tuberculosis.

Probiotic Ice cream incorporated with probiotic *Saccharomyces boulardii*

C.Pandiyan, Associate Professor

Department of Dairy Science, Veterinary College and Research Institute,

Namakkal - 637 002, Tamil Nadu, India. E mail: ch.pandiyan@gmail.com

Introduction: Food processing industries are aligning with the consumer's expectancy and demand for products with beneficial effects. Products with probiotics are in great demand, realizing the market potential created by the numerous positive health benefits of these. Dairy products serve as the ideal system for delivery of probiotic bacteria to the human gastrointestinal tract due to provision of a favourable environment that promotes the growth and enhances the viability of these microorganisms (Hattingh and Viljoen, 2001). Lactobacilli and Bifidobacteria are predominantly incorporated into fermented dairy products. However, the active use of yeasts as dietary adjuncts for human being has been limited (Fleet and Mian, 1987). This indicates the potential use of yeasts for incorporation into dairy products as probiotic agents (Jakobsen and Narvhus, 1996).

***Saccharomyces boulardii*:** During 1923, French scientist Henri Boulard isolated a tropical strain of a yeast *Saccharomyces*, (eukaryotes) of Endomycetes family (Ascomycetes group) from Lychee fruit and Mangosteen in Indochina and named it as *Saccharomyces boulardii*. It has an unusually high optimal growth temperature of 37°C., is a unique probiotic, known to survive gastric acidity and is not adversely affected or inhibited by antibiotics or does not alter or adversely affect the normal microflora in the bowel (McFarland and Bernasconi, 1993). Upon consumption, *S. boulardii* quickly achieves high concentration in the colon, maintains constant levels, Neither permanently colonize the colon nor does pass out easily of the gastrointestinal tract (Sazawal *et al.*, 2006). Further, the probiotic effects were enhanced by its ability to produce polyamines, enzymatic proteins, including a protease that degrades *Clostridium difficile* toxins and a phosphatase that inactivates endotoxin such as the lipopolysaccharide produced by *E. coli*. *S. boulardii* also promotes production of lactase, sucrase, maltase, and N-aminopeptidase in the brush border allowing increased carbohydrate degradation and absorption in patients with diarrhea, and restores normal levels of short chain fatty acids in the colon which are necessary for absorption of water and electrolytes. In addition, *S. boulardii* may reduce inflammation in the gastrointestinal tract by stimulating regulatory T cells and inhibiting mitogen-activating protein kinase (MAPK) and nuclear factor-kappa B-signal transduction pathways, resulting in decreased secretion of interleukin and tumor necrosis factor alpha. *S. boulardii* also decreased inducible nitric oxide synthase activity and up-regulated proliferators-

activated receptor gamma, leading to a reduction in intestinal inflammation (Marcia, 2009).

Ice cream incorporated with *S. boulardii*: Ice cream mix was prepared by using prebiotic substances viz., honey, oligofructose and inulin, each added at 3 per cent level. Ingredients were homogenized and then heated to 80°C for 30 sec, cooled to 5°C and aged overnight at the same temperature. After ageing, the mix was heat treated to 80°C for 30 sec and cooled to 37°C. Probiotic cultures such as *L. acidophilus* and *S. boulardii* (alone and/or in combination) were inoculated into ice cream mix at 4 per cent and incubated at 37°C until the pH of 5.5 was reached. *L. acidophilus* maintained in the sterile skim milk was inoculated in the ice cream mix. The culture was initially activated in YPD broth, inoculated into the sterile skim milk, incubated at 37°C for 24 h and was inoculated in the ice cream mix. After freezing, the ice cream was filled in 50 ml food grade paper cups, covered with food grade lids and stored at -18°C to -23°C. All the ice cream samples supplemented with or without prebiotics and with probiotic *L. acidophilus* and *S. boulardii* and a combination of both, were found acceptable, without any off flavor and retained the therapeutic level of 10⁶ cell counts/ml. (Pandiyan, 2010). The ice cream samples either with *L. acidophilus* or *S. boulardii*, or in combinations, consumed by human volunteers could significantly improve the gut health by increasing probiotic population thereby reducing the coliforms in the faeces.

A combination of *L. acidophilus* and *S. boulardii* had pronounced effect on the gut of human volunteers by increasing the counts by symbiotic growth. Since, ice cream is a delicious product consumed by all age groups; it can be used as a medium for the growth and transfer of probiotic bacteria and yeast as well as prebiotic substances to maintain the normal flora and also for restoration of the gut microbes in combating the gut associated disorders.

References

- Czerucka, D., Piche, T. and Rampal, P. 2007. Review article: yeast as probiotics –*Saccharomyces boulardii*. *Alimentary Pharmacology and Therapeutics*, 26 (6): 767–778.
- Fleet, G.H. and Mian, M.A. 1987. The occurrence of the growth of yeasts in dairy products. *International Journal of Food Microbiology*, 4 (2): 145-155.
- Hattingh, A.L. and Viljoen, B.C. 2001. Growth and survival of a probiotic yeast in dairy products. *Food Research International*, 34 (9): 791-796.
- Jackobsen, M. and Narvhus, J. 1996. Yeasts and their beneficial and negative effect on the quality of dairy products. *International Dairy Journal*, 6: 755-768.
- Marcia, L.B. 2009. *Saccharomyces boulardii* as a probiotic for children. *Pediatric Pharmacotherapy*, 15 (7): 1 - 5.
- Markowitz, J.E. and Bengmark, S. 2002. Probiotics in health and disease in the pediatric patient. *Journal of Pediatric Gastroenterology and Nutrition*, 49(1):127–41.

- McFarland, L.V. and Bernasconi, P. 1993. "*Saccharomyces boulardii*: a review of an innovative biotherapeutic agent". Microbial Ecology in Health and Disease, 6: 157–171.
- Pandiyani, C. 2010. Development of synbiotic ice cream enriched whey protein concentrate. Chennai, Tamil Nadu, India: Tamil Nadu Veterinary and Animal Sciences University, Ph.D. thesis.
- Sazawal, S., Hiremath, G., Dhingra, U., Malik, P., Deb, S. and Black, R.E. 2006. Efficacy of probiotics in prevention of acute diarrhoea: a meta-analysis of masked, randomised, placebo-controlled trials. [Lancet Infectious Diseases](#), 6(6): 374-382.

Medical Nutrition Therapy and Probiotics – Emerging Nutrigenomic approach to explain the interaction between probiotics, genome of foods and intestinal micro-biota in health promotion and disease prevention

Subhasree Ray, PhD student, SNTD Women's University Mumbai, Maharashtra, Nutritionist, NRC, NRHM, Dept. Of Health & Family Welfare, Govt. Of West Bengal, India Email - roysubhoshree@gmail.com

Biochemistry, Molecular Biology and Nutrigenomics represent a key band of Science in explaining the mechanism of action of nutrients and other food bio-active compounds in health and diseases. Nutrigenomics coupled with medical nutrition use the molecular and genomic tool to study molecular responses to dietary factors and metabolic consequences of food.

Molecular insight into the interaction among probiotics & Human host : Probiotics have been found to be extremely beneficial for the gut health, can modulate immune responses in the host gastro-intestinal tract to promote health and prevent diseases. The ‘omics’ era has provided explanation and opportunities as to how probiotics interact with other two genomes – food genome as well as human host genome. Nutrigenomics analyses the response to probiotics in signaling and immune response pathways. Among the possible mechanism of probiotic therapy, one is the promotion of non-immunogenic gut defense barrier, which includes the normalization of increased permeability and altered gut micro-ecology. Another mechanism of the therapy is the improvement of the intestinal immunologic behavior through intestinal immunoglobulin by alleviating intestinal inflammatory responses, which provides the gut a stabilizing effect.

Besides the immune response, a new concept of ‘Gutome’ has been launched off in 21st Century. ‘Gutome’ is nutritional system biology of gut and host-microbiome interaction. This interaction can be explored as a novel strategy to promote personalized, tailored-based nutrition, personalized health and wellness. It is possible to choose individual diet for individual persons in the context of clinical nutrition therapy. Nutritional metabolomics therefore provides a systematic approach through the comprehensive analysis of metabolites

aiming today at the quest for homeostatic balance which is dependent not only on the host but also on the crucial metabolic interactions with microbial symbionts.

Now, most recently molecular insight of interaction between IBD and probiotics is in focus and is included in the existing discussion. IBD arises in part from a genetic predisposition, through the inheritance of three polymorphisms. An observation has shown that any of these polymorphisms of the Caspase-Activated-Recruitment Domain (CARD15) gene are more prevalent in IBD. Similar response is observed in Autophagy-Related 16 Like 1 (ATG16L1) and Human Defensin (HBD -2, 3 and 4) genes. Nutrigenomics could help in understanding the particular gene involved in IBD and suggests more strategic approach in choosing Probiotics and prebiotics for intervention. Both these functional foods reduce symptoms of gut inflammation by secreting certain omega – 3 fatty acids and polyphenols. But, such approaches require that the gene of interest is functioning normally and is not mutated or down-regulated. Use of potent probiotic mixture of *Lactobacillus* and *Bifidobacteria* in place of antibiotics is one of the new ways of treating and managing IBD and Ulcerative Colitis. This approach also addresses the chief concern in the use of antibiotics i.e. side effects and the threatening drug resistance of the pathogens, being acquired over long and heavy usage of antibiotics.

Discussion: Human gut microbiota encompasses a complex ecosystem in the intestine with profound impact on host metabolism. Genomic, proteomic and metabolomic studies of the human gut have led to the identification of several factors that are involved in modulation of the immune system and mucosal barrier, and have revealed that a molecular ‘bandwidth of human health’ could represent a key determinant in an individual’s physiological responsiveness to probiotics. Gene and protein expression studies as well as metabolite profiling in humans investigating (rather acute) responses to nutritional interventions have become standard for mechanistic nutritional research; validation and translation of these results are still challenging.

Conclusion: Finally, we are only at the beginning to appreciate how epigenetic programming is not only a natural part of development and differentiation but also a mechanism of long-term gene expression changes that result in “metabolic memory.” The new information about interaction between genomes is helping to set a rationale for selection of a next generation of probiotics. Candidates include *Clostridia* clusters IV, XIVa and XVIII, *Faecalibacterium prausnitzii*, *Akkermansia muciniphila* and *Bacteroides uniformis* etc, the effects of which have been evaluated in preclinical trials with promising results for inflammatory and diet-related disorders like IBD, Ulcerative Colitis and diarrhea. Yet, the extent to which new probiotic formulations consisting of nonconventional indigenous gut bacteria will be effective on humans at a population level or in personalized nutrition strategies remains to be explored.

Keywords – Probiotics, Nutrigenomics, Personalized nutrition, Intestinal microbiota, Gutome.

Development of a novel fermented snack having multifunctional properties including , -glucosidase inhibitory activity.

Arkadeep Mukherjee, Arashdeep Singh and Abhijit Ganguli*

Department of Biotechnology and Environmental Sciences, Thapar University, Patiala 147004, India *Email: aganguli@thapar.edu

This study aimed to develop a fermented snack having -glucosidase inhibiting bioactive peptides and other functional properties. Batter made of flour mixture of *Vigna mungo* and chickpea were fermented with a *Lactococcus lactis* strain (previously characterized in the laboratory for probiotic attributes) and then steamed. Under optimized conditions of inoculum size (1% v/v) and fermentation time (4 hours), one serving size of approximately 100 grams of the prepared snack provided almost 54.76 mg of riboflavin and about 115 mg of ascorbic acid. Extract of the prepared snack (200mg/ml) demonstrated 13.6 % -glucosidase inhibition. Sensorial analysis based on 9 point hedonic scale scored adequately for general acceptability both for adults and elderly. Shelf stability of the prepared product was 48 hours at 4°C. Desirable sensory attributes and nutraceuticals produced were retained over 48h. The results of this study suggest a potential of applicability of this functional snack for both adults and the elderly. However stability of these peptides in acidic environment (gut) and clinical studies are of utmost importance prior to application of this functional food.

Conference proceeding: Paper presented at DST, ICMR and DBT sponsored International Conference on Technological Advances in Super Foods for Health Care ICTASH-2013 organized by IIFANS, New Delhi and BGCW, Puducherry, Pondicherry, May2013.

Characterization of tannase production by *Lactococcus lactis* subsp *lactis* and its potential in enhancing nutritional value of a composite sourdough

Varsha¹, Arkadeep Mukherjee², Seema Bhanwar³ and Abhijit Ganguli⁴

^{1, 2, 3, 4} Department of Biotechnology, Thapar University, Patiala, Punjab, INDIA

¹saivarsha150@gmail.com, ²arkadeepm@gmail.com, ³seema.bhanwar@gmail.com, ⁴aganguli@thapar.edu

In the present study, the tannin degradation ability of probiotic strain *Lactococcus lactis* subsp *lactis* has been reported. This strain was able to tolerate a tannin concentration of 0.25 mM, tannin degradation occurred primarily by enzyme tannase and significant (p<0.05) degradation (44.2%) was observed at tannin concentration of 0.08mM, pH-6.8, temperature 37°C and without agitation after 6 h of fermentation in MRS medium. Tannase production was inducible, found to be thermostable and detected both intracellularly and extracellularly. Intracellular tannase showed higher activity in comparison to extracellular, was not affected by the presence

of anti nutrients such as saponin, phytic acid and lectin. In order to access the applicability of *L. lactis*, an experimental composite sourdough containing *Vigna mungo* and wheat flour was prepared. Fermentation was initiated by inoculating overnight culture of *L. lactis* followed by incubation at 37°C for 4 h. Analysis of sourdough extracts indicated a complete reduction of tannin (100%), saponin (72%) and lectins - the principal anti-nutrients in *Vigna mungo*. The result of this study suggests a potential applicability of *L. lactis* subsp *lactis* in removing antinutrients, thus enhancing the nutritional value of traditional Indian sourdough.

Conference proceedings: Paper published at International Congress on “Agriculture, Food Engineering and Environmental Sciences- Sustainable Approaches” (AFEESSA- 2014) Organized by “Krishi Sanskriti” JNU, New Delhi, INDIA.

Escherichia coli : does it merit a probiotic status ?

Prasant Kumar and Rushabh Shah

C.G. Bhakta Institute of Biotechnology, Department of Fundamental and Applied Science, UKA Tarsadia University, Bardoli, Surat-394 350, Gujarat, India E-mail: prasant.kumar@utu.ac.in

One of the most developing areas of food microbial science is the modulation of intestinal microbial balance by intervention of beneficial probiotics. Probiotic bacteria in general are Gram-positive strains (bifidobacteria and lactobacilli besides Streptococcus, Leuconostoc and Pediococcus as the key members) and have the ability to persist within the gut ecosystem and produce short chain fatty acids such as lactate, acetate and butyrate etc. Stability, oxygen tolerance, adherence, acid and bile tolerance are some of the most desired probiotic properties. For effective colonization of the host intestine, bacterial respiration is essential. Most of strains used as probiotics are strictly anaerobic, thus, the process and product development becomes a challenge. Majority of intestinal pathogens belong to a group of Enterobacteriaceae. There are various pathogenic variants of *E. coli*, which cause many intestinal disorders such as diarrhea, dysentery, and ulcerative colitis etc. However, commensal *E. coli* which occur in abundance and represent the normal flora in the gut have distinct advantages due to their ability to secrete bacteriocins, and hence could be better candidate probiotic to defend against their own pathogenic forms and other Enterobacteriaceae. Certain *E. coli* (such as Nissle 1917, M17, H22 and G3/10) are less fastidious and exhibit better stability, survivability and efficient colonization of the intestine. Most significant discovery hold in favour of *E. coli* as a Probiotic was reported by Gionchetti. As per their report, Gram-positive bacteria did not induce interleukin-8, whereas the nonpathogenic, Gram-negative *E. coli* Nissle 1917 strain induced interleukin-8 in a dose-dependent manner. Therefore, use of commensal, non-pathogenic, less fastidious, colicin and microcin producer with better oxygen tolerance and good colonization ability such as *Escherichia coli* could probably be considered as a probiotic with better health promoting options for leading a healthy life.

Symposium on “Probiotics, Microbiome and Gut Function – Transforming Health and Well Being” by Yakult India Microbiota and Probiotic Science Foundation

The Yakult India Microbiota and Probiotic Science Foundation was established in India in 2011 by a group of eminent scientists under the Presidentship of Prof. N.K. Ganguly. The primary objective of the Foundation is to capture the renaissance in therapeutic Microbiology and promote and advance the science of gut microbiota and probiotics. The Foundation organized its series symposium, “Probiotics, Microbiome and Gut Function –



Transforming Health and Well Being” in association with the Translational Science and Technology Institute (THSTI) and Apollo Hospitals group. The scientific program of the symposium was designed to unravel the factors that shape the microbial communities of the gut and identify the latest developments in probiotic science that will positively affect the microbiota for clinical intervention. Presentations by leading International and National experts like Prof. Colin Hill (President International Scientific Association of Probiotics and Prebiotics) and Prof. Satoru Nagata (Professor and Chairman, Department of Pediatrics, Tokyo Women’s Medical University), Prof. Sunil Sazawal, Director –Centre for Micronutrient Research, New Delhi allowed for a better understanding of the influence of diet and infection on the gut microbiota, mechanism of action of probiotics, the role of probiotics in preventing infections and an insight into the **Alimentary Pharmabiotic Centre**

that serves as a model of for scientists, clinicians and industry to work together with shared goals. An insight into the epidemiological studies conducted on probiotics and the integration of probiotics in day to day clinical and nutritional practice were also some exciting attractions of the symposium. The highlight of the symposium this year was the Young Investigator Awards that were instituted to recognize and promote young talent in the



country. The three young Investigators who were felicitated were **Dr. Tarini Shankar Ghosh** - *Scientist, TCS Innovation Labs, Tata Research Design and Development Center, Pune* (Metagenome informatics based investigation of gut microbiomes and their probable role in antibiotic resistance and childhood malnourishment), **Dr. Suja Senan**, *Assistant Professor, Dept. of Dairy Microbiology, SMC College of Dairy Science, Anand Agricultural University, Ahmedabad* (Influence of probiotic *Lactobacillus helveticus* MTCC 5463 on geriatric gut metagenome analysed by ion torrent 16S rRNA gene amplicon sequencing) and **Dr. Bhupesh Kumar** - *DBT Senior Research Fellow (DBT), National Institute of Cholera and Enteric Diseases, Kolkata* (Screening of indigenous probiotic strains and study of their role in the generation of regulatory responses and protection against inflammatory diseases). The proceedings of the symposium will be edited by International experts – Prof. Yoshifumi Takeda, Prof. G. Balakrish Nair and Prof. B.S. Ramakrishna and will be published as a book with an ISBN number for distribution to healthcare professional across the country and to libraries in the country to serve as a repository of information.

Sixth International Conference on “Fermented Foods, Health Status and Social Well-being” December 6-7, 2013 organized at Anand Agricultural University, Anand (Gujarat) India.

JB Prajapati, SMC College of Dairy Science, AAU, Anand

Email: jbprajapati@gmail.com

The Sixth International Conference on “Fermented Foods, Health Status and Social Well-being” was organized by SAS-NET-Fermented Foods in collaboration with Anand Agricultural University, Anand, Lund University, Sweden and Hildur Functional Foods, India during December 6-7, 2013 at Anand Agricultural University, Anand, Gujarat State, India. The two-days programme was attended by 271 delegates from various parts of India as well as from Australia, Sweden, Egypt and Hong Kong. During the conference, there were six technical



sessions in which 35 papers were presented. Two poster sessions of 38 posters on research work; and one session on “Industry forum” were also conducted. Minister of Agriculture, Shri Babubhai Bhokhiriya inaugurated the conference traditionally by lighting the lamp.

In his inaugural address, he highlighted that Gujarat is one of the largest milk producers in India and also succeeded in achieving the highest growth rate in Agriculture in the country. Besides in the state Government, the credit for achieving these distinctions also goes to Agricultural Universities of the State. Looking at the quality of on going research, these SAUs will emerge as Centres of Agricultural Excellence in the coming future. He stated that farm production in Gujarat which was valued at Rs. 9000 crores in 2001-2002, has been valued at Rs.1,11,000 crores in the current financial year 2012-2013. He congratulated all the scientists and the farmers for their dedicated efforts in achieving this 'ton'. He expressed that dairy sector in the state is recognized as a noble business where maximum share of consumer's rupee goes to the farmer primarily as a result of adopting the Amul model. Dr B.P. Shah Principal and Dean of Dairy Science College delivered the welcome address, while Dr BabooNair, Emeritus Professor from Lund University and Chairman of the Network briefly introduced the theme of the conference.



Dr. K.B. Kathiria, Director of Research & Dean, PG studies was the guest of honour and addressed the gathering and Dr. A.M. Shekh, Hon. Vice Chancellor of AAU presided over the function. Dr. Rickard Oste, CEO of Aventure AB and Professor, Lund University was the chief guest and appreciated the collaboration between AAU and Sweden which has not only provided a platform for students for higher education, but also has resulted in successful commercialion of the research.

The Industry Forum Session was chaired by Dr. Rickard Oste, CEO, Aventure AB; Co-chaired by Shri D. R. Shah, MD, Vidya Dairy and Dr. Cecilia Lindstorm Lund University, Sweden was the rapporteur. The representatives of Chr. Hansen India Ltd., Glucanova AB, DSM Foods, Amul and Yakult Danone India Ltd. presented the research pursued in their respective industries. A talent search program was also organized where the students of AAU and some neighboring institutions participated in slogan writing, rangoli drawing, poster making and developing advertisements for promotion of fermented foods for public health. Respective session rapporteurs presentaed the summary of each session. The session was conducted by Dr. Baboo M Nair, Dr. B.P. Shah and Dr. J.B. Prajapati. The winners of best poster, best oral presentations and other talent search events were awarded certificates and prizes.

Microbax (India) Ltd – A Profile

Microbax (India) Ltd is a leading manufacturer of Probiotics in India. The people behind the project have expertise of over three decades in producing probiotics.



The sophisticated facility is located near Hyderabad. It is an ISO 9001:2008 certified company and follows cGMP. Microbax supplies its products to various leading Pharmaceutical companies in India and also exports its products to various countries. It also undertakes contract manufacturing of probiotics. State of the art computer controlled fermenters, modern downstream equipment, well equipped Labs, qualified and experienced people help to produce products of highest quality.

Microbax in collaboration with Talwar Research Foundation under the able guidance of Prof. G. P. Talwar has successfully developed a product for vaginal application for controlling AVDS /Vaginosis. Three strains of Lactobacilli have been isolated, characterised and tested by TRF out of several strains isolated from eco healthy women. Microbax is growing these strains on a large scale. Clinical trials with the product have been largely successful with excellent results. This project has been funded by the DBT under the SBIRI scheme.



In house R&D facility is recognised by DSIR and the company plans to work on innovative probiotics for Human and animal health care. Two projects for developing probiotics for large animals and canine health in collaboration of TANUVAS have also being undertaken. Microbax is also interested in taking up new collaborative projects for scaling up of the processes for large scale manufacture and commercialization of probiotics.

Microbax is also interested in taking up new collaborative projects for scaling up of the processes for large scale manufacture and commercialization of probiotics.

Microbax is also interested in taking up new collaborative projects for scaling up of the processes for large scale manufacture and commercialization of probiotics.

www.microbax.com

Announcement

We are Pleased to inform you that the forthcoming 2nd Annual PAi Conference along with the International Symposium on "Probiotics and Microbiome: Gut and Beyond" is going to be held on 3rd and 4th November, 2014 at IHC, New Delhi, India. The programme details will follow soon. Please keep looking into PAi website (www.probioticindia.com) for further details.



Life Membership Fee	: Rs. 3500 (Ten Years)
Student Member	: Rs. 500 annually
Ordinary Member	: Rs. 1000 annually
Institutional Membership	: Rs. 10,000 annually
Corporate Membership	: Rs. 25,000 annually

Contact Us:

Probiotic Association of India,
National Dairy Research Institute,
Karnal-132001

PAi Family Details (New Members)

Life Members

Student Members

L138	Dr. Sriprakash Mohanty	S76	Kr. Siddharth Singh
L139	Mr. Manish Kapoor	S77	Ms. Sonu Bisht
L140	Dr. Prasant Kumar	S78	Ms. Sonia Khatri
L141	Dr. Palok Aich	S79	Ms. Urvashi Motwal
L142	Ms. Subhasree Ray	S80	Mr. Syed Mohd. Aaamir Suhail
L143	Mr. Vamshi Saliganti	S81	Ms. Ritu Devi
L144	Dr. Geeta Shukla	S82	Mr. Dipak D. Chaudhari

The technical support rendered by Ms. Anu Bhagat and Ms. Namita Rokana from DM Division, NDRI, Karnal in compilation of this issue of the Probiotic Newsletter is duly acknowledged. The editorial board also expresses thanks to all the authors who contributed their inputs for the newsletter.

**Contact us : Probiotic Association of India, National Dairy Research Institute, Karnal –
132 001**

(Haryana), India

Tel : 91-184-2259190, Fax: 91-184-2250042

E. mail: drprobiotic@gmail.com
