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**International Journal of Probiotics & Prebiotics 4(3): 175-182**

175-182      **USE OF PROBIOTIC BACTERIA AS AN ADJUVANT FOR AN INFLUENZA VACCINE**

Peter W French and Ronald Penny

**ABSTRACT:** *A double-blind, placebo controlled trial on 47 subjects showed that daily consumption of a probiotic bacterium, Lactobacillus fermentum strain VRI 003 (PCC®), prior to and four weeks after an intramuscular influenza vaccine injection significantly enhanced the serum hemagglutinin antibody inhibition titre to H1N1. The mean HAI titres to the two other antigens, H3N2 and FluB present in the vaccination were also slightly increased. The number of days of respiratory symptoms experienced by the subjects in the probiotic group was significantly less than the placebo group. Additionally, the probiotic group also had a much lower percentage of non-seroconverters (5.5% compared to 28% in the placebo group). This study provides suggestive evidence that oral consumption of a specific probiotic bacterium may provide a low cost and low risk adjuvant for influenza vaccines.*

**International Journal of Probiotics & Prebiotics 4(3): 181-186**

181-186      **INTRINSIC RESISTANCE IN LACTIC ACID BACTERIA AND BIFIDOBACTERIA: THE ROLE OF MULTIDRUG RESISTANCE TRANSPORTERS**

Miguel Gueimonde, Ana Belén Flórez, Clara G. de los Reyes-Gavilán and Abelardo Margolles

**ABSTRACT:** *Intrinsic resistance to cytotoxic compounds, including antibiotics, is one of the main determining factors in bacterial survival in the intestinal and food ecosystems. One of the mechanisms that bacteria utilize to respond to this life-threatening condition, and to evade the toxic effects of antibiotics, is the active extrusion of drugs from the cell by expressing powerful drug extruding systems. This extrusion is mediated by multidrug resistance (MDR) transporters, efflux pumps able to transport noxious compounds with very different chemical structures and cellular targets. The presence of MDR pumps in the cytoplasmic membrane of lactic acid bacteria (LAB) has been extensively documented. Especially in Lactococcus lactis, several transporters were found to confer resistance to antibiotics and toxic inhibitory substances, and to be involved in the transport of several drugs. More recently, other MDR systems from lactobacilli, bifidobacteria, and Oenococcus oeni have been functionally characterized. This review summarizes the current knowledge of MDR transporters in LAB and bifidobacteria, and the accumulating evidence that these efflux pumps have roles in the normal bacterial physiology and in the intrinsic resistance phenotype to antibiotics of these bacteria.*

**International Journal of Probiotics & Prebiotics 4(3): 187-194**

187-194      **BACTERIAL STRAINS FROM LOCAL CURD, ICE-CREAM AND NATURAL MILK CULTURES AS POTENTIAL PROBIOTIC**

## CANDIDATE: ISOLATION, CHARACTERIZATION AND *IN VITRO* ANALYSIS

Swati Jaiswal, Kanika Kundu, Sourish Karmakar, and Subir Kundu

**ABSTRACT:** *The Probiotics are the live feed supplements basically in the form of microorganisms that cause potential benefit to health. It is implicit in the definition that consumption of the probiotics beneficially affects the intestinal microflora. It has been reported of utilization of Probiotics in curing severe gastronomical diseases. The basic facility of producing Probiotics is that it does not require high input, and thus can be produced at a cheaper cost. Microorganism can be grown with minimal food nutrients and can be used to harvest a lot of output in terms of nutritional value and other medicinal benefits. The biggest challenge to use live feed supplement for human is the fear of antibiotic resistance transference to the gut flora. The evaluation of existing strains to develop a strong probiotic product is important because it is difficult to enhance the strains genetically which uses antibiotic resistance as a marker for selection of the modified strains. The present investigations are to identify the various bacterial strains commonly present in daily food materials and to evaluate their probiotic potential in-vitro. Specifically, the strains were isolated from ice cream, curd and milk for developing safe probiotic strains. The strains were identified, characterized and named as SJ1 (Streptococcus lactis), SJ2 (Bacillus coagulans), SJ3 (Lactobacillus casei) and SJ5 (Bifidobacterium bifidum). One more strain, Streptococcus thermophilus (NCIM 2412) was procured and tested for its probiotic potential as reported in various existing studies. Probiotic parameters such as acidity tolerance, bile tolerance, lactic acid production, adherence capability and phenol tolerance were evaluated. The strains were also passed through an artificial simulation of gastronomical pathway to ensure their survivability in the harsh in-vivo conditions. Minimal antibiotic resistance is an important factor that was tested on all strains isolated so as to minimize the antibiotic resistance transference to the already existing gut flora. Out of the above mentioned strains, Streptococcus thermophilus, Streptococcus lactis and Bifidobacterium bifidum showed a great potential to be developed as Probiotics. Probiotics is the next generation product of biochemical engineering with enormous scope in studies and commercial utilization.*

### International Journal of Probiotics & Prebiotics 4(3): 195-200

195-200      **Effect of Acidophilus – casei dahi (Probiotic curd) on lipids in 1, 2 dimethylhydrazine induced intestinal cancer in rats**  
Arvind, Pushpalata Rabindra Sinha, Nikhlesh Kumar Singh, and Raj Kumar

**ABSTRACT:** *An in vivo trail was conducted on 90 rats allocated to six groups to study the effect of Acidophilus-casei dahi (Probiotic curd) on lipid levels and lipid peroxidation in 1,2 dimethylhydrazine (DMH) induced intestinal carcinogenesis in rats. The Acidophilus-casei dahi (Ac Dahi) was given at three different phases i.e. pre initiation (Ac Dahi-DMH-Ac Dahi), initiation (DMH-Ac Dahi) and post initiation (DMH+ Ac Dahi). The results were compared with protective effect of normal dahi (DRC-1 dahi). At 40<sup>th</sup> week, rats were sacrificed and total cholesterol, phospholipids, free fatty acids and lipid peroxidation (TBARS level) were estimated in liver and colon tissues. The results show that Ac Dahi maintain the lipids level and inhibited the lipid peroxidation at all phases as compared to DMH control group and DRC-1 dahi group. The protective effects of Ac Dahi may be correlated with the low level of cholesterol and TBARS and high phospholipids level during progression of intestinal carcinogenesis.*

## International Journal of Probiotics & Prebiotics 4(3): 201-204

### 201-204      **INHIBITION OF 1,2 DIMETHYLHYDRAZINE INDUCED GENOTOXICITY IN RATS BY THE ADMINISTRATION OF PROBIOTIC CURD**

Arvind, Nikhlesh Kumar Singh and Pushpalata Rabindra Sinha

**ABSTRACT:** In the present study, anticancer effect of probiotic curd was evaluated by monitoring the DNA damage through comet assay, during the early stages of 1, 2 dimethylhydrazine induced colon carcinogenesis in male rats. Rats were divided into four groups, first group was pre-initiation group in which curd was given for 4 weeks before the DMH (1, 2 dimethylhydrazine) injection, second one was initiation group in which curd was administered with first DMH injection, third group was DMH control group and Fourth group was normal control group. All animals received subcutaneous injection of DMH dissolved in normal saline at a dose rate of 20mg/kg body weight, once weekly for 15 weeks. Blood was collected one week after the last injection and comet assay in blood was done to assess the DNA damage. A significant reduction in DNA damage (55%) was observed in first group as compared to third group (93.33%). The difference between the pre-initiation group (55%) and the initiation group (48.83%) was not significant. Probiotic curd was significantly effective to reduce the L: W ratio. The present results showed that probiotic curd is able to reduce the DNA damage in colon cancer induced rats.

## International Journal of Probiotics & Prebiotics 4(3): 205-210

### 205-210      **EFFECT OF THE BACTERIOCIN PRODUCED BY *LACTOCOCCUS LACTIS* SUBSP. *LACTIS* CCSUB202, ON MODE OF ACTION OF *LACTOCOCCUS LACTIS* SUBSP. *LACTIS* MTCC3038**

Archana Kumari, Kousar Makeen, A.P Garg, F. Marotta, Charu Gupta and Divya

**ABSTRACT:** *In the present study we have checked mode of action of bacteriocin produced by Lactococcus lactis subsp. lactis CCSUB202 isolated by Indian cheese. The cells of indicator bacterium Lactococcus lactis subsp. lactis MTCC3038 were mixed with four different concentrations of bacteriocin viz. 400, 4000, 40000 and 400000 AU/ml, which were then incubated at 37°C. Growth was monitored at 2-h intervals by determining the OD<sub>600</sub> and by viable cell counts (cfu/ml). The results indicated that addition of higher concentration of bacteriocin brought complete destruction of L. lactis subsp. lactis MTCC3038 in less than 30 min as no survivors could be detected when 0.1 ml undiluted sample was spread on MRS plates. The bacteriocin added at lower concentration viz. 400 and 4000 AU/ml resulted in about 3 and 3.2 log cycle reductions, respectively in the first half-an-hour of addition reaching to 4 and 4.3 log cycle reductions at the corresponding concentrations at the end of 4 h incubation. It may be concluded that bacteriocin of L. lactis subsp. lactis CCSUB202 exhibits a bactericidal non-bacteriolytic mode of action. The indicator cells that survived the bacteriocin treatment were, however, found to be sensitive to the bacteriocin.*

## International Journal of Probiotics & Prebiotics 4(3): 211-218

### 211-218      **A PROBIOTIC FERMENTED MILK PREPARED BY MIXED CULTURE REDUCES PATHOGEN SHEDDING AND ALLEVIATES DISEASE SIGNS IN RATS CHALLENGED WITH PATHOGENS**

Manoj Kumar, Dheeraj Mohania, Devastotra Poddar, Pradip Vishnu Behare, Ravinder Nagpal, Ashok Kumar and P.K. Aggarwal

**ABSTRACT:** *Salmonella typhimurium, Shigella flexneri and Escherichia coli O157:H7 are common threats for human infection which comprises gastroenteritis caused by Salmonella*

*spp.*, dysentery by *Shigella flexneri*, where as *Escherichia coli* O157:H7 is an enterohemorrhagic strain of the bacterium *Escherichia coli* and a cause of foodborne illness and leads to bloody diarrhea. The use of probiotics offers the potential to improve this situation. Here, we investigate the effects of oral treatment of rats with a defined mixed lactic acid bacteria culture on microbiological signs of pathogens infection. The mixture consisted of two strains of *Lactobacillus acidophilus* LA1 and *Lactobacillus casei* strain Shirota. Following probiotic administration for 6 days, animals were challenged orally with these pathogens; the health of the animals and the microbiological composition of their feces were monitored for 23 days post-infection. Animals treated with probiotic showed reduced incidence, severity, and duration of diarrhea. Mean fecal numbers of pathogens were significantly reduced in probiotic-treated animals at 15 days post-infection ( $P < 0.01$ ). The administered probiotic bacteria improved both the clinical and microbiological outcome of pathogenic infection. These mixed strains offer significant benefit for use in the food industry and may have potential in human applications.

### **International Journal of Probiotics & Prebiotics 4(3): 219-228**

219-228      **POTENTIAL OF *LACTOCOCCUS LACTIS* AS A PROBIOTIC AND FUNCTIONAL LACTIC ACID BACTERIA IN DAIRY INDUSTRY**  
K. Yadav, A. Bhardwaj, G. Kaur, R. Iyer, S. De, N. Kumar and R. K. Malik

**ABSTRACT:** *Lactococcus lactis* species forms an important part of the group Lactic Acid Bacteria (LAB) having GRAS status. Strains belonging to this species have been featured in dairy industry for decades due to its specific biochemical traits such as lipolysis, proteolysis, and citrate breakdown, hence contributing typical taste and flavor to a variety of fermented dairy foods. Furthermore, the production of bacteriocins by some of the *Lc. lactis* strains is well documented. These technological applications have led to propose this organism as major starters or protective cultures in fermented dairy products. Strains of Genus *Lactobacilli* and *bifidobacteria* are extensively studied and most commonly used commercial probiotic cultures and discovery of new LAB genus with more feasibility, efficiency and health attributes have been awaited. Recently *in vitro* and *in vivo* studies on the probiotic attributes of *Lc. lactis* have proposed them to be as new potential probiotic bacteria, which are claimed for the maintenance of normal intestinal microflora, stimulation of the immune system and improvement of nutritional value of foods. Whereas, several workers have reviewed technological properties of *Lc. lactis* species, the present review describes the broader insight of probiotic and functional attributes of the *Lc. lactis* species in dairy foods.