PRESS RELEASE

The 3rd International Probiotic Conference highlighted the current advances in probiotic science and witnessed a bright future for new probiotics and novel applications.

Probiotics reach new frontiers also in space.

The 3rd International Probiotic Conference held on 4th – 7th June 2008 at High Tatras, Slovakia. focused on the current state of probiotic science and research.

200 scientists from 56 countries presented and discussed the achievements and current advances of probiotic research. Participants from Japan, China, South-Korea, India, South-Africa, Brazil, Mexico, United States and Canada and from all European countries provided evidence that probiotic science has moved from the empirical early stage to a multidisciplinary scientific field with promising perspectives.

The highlights of the conference were the numerous new approaches to identify and characterize novel probiotic strains. In addition to routine culturing methods state-of-the-art approaches like cell line adhesion tests, gene sequencing, molecular cloning are gaining more and more importance. As Prof. Alojz Bomba - President of the 3rd International Probiotic Conference – states: "Due to these new methods not only broader perspectives open up for probiotics but the required time between strain isolation and marketable applications can be reduced substantially. Hence the achievements of probiotic science faster can reach the stage of applicable products, and deliver new benefits to the customers and patients faster. With other words the body of knowledge about probiotics reached the critical mass and can be transferred faster in products than ever before."

One of the most interesting lectures about probiotics was about their possible role in maintaining the intestinal health of astronauts during long-term space missions. Probiotics herewith reached a new frontier and may contribute to the maintenance of human health even under the most unearthly circumstances.

The participating scientist presented scientific evidence that probiotics are not only able to stabilize the beneficial intestinal flora but have potential to improve immune defense, prevent allergy and help cancer prevention. The young scientist award was presented to Dinesh Thapa, University of Hohenheim for his work on the antimutagenic property of exopolysaccharide producing lactic acid bacteria. Mr. Thapa's work further strengthens the vision of using probiotics in cancer prevention.

On behalf of the

Organizing Committee of 3rd International Probiotic Conference, High Tatras, Slovakia

The abstract of the referenced works are attached in the Appendix.

When using the attached or other conference material please refer to the 3rd International Probiotic Conference 2008, High Tatras.

If you wish to receive an electronic copy of the proceedings or would like to have further information about 3rd International Probiotic Conference please contact:

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Appendix

PROBIOTIC MICROORGANISMS FOR HUMAN HEALTH ON SPACE

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As forthcoming space programmes are going to be mainly focused on long-term manned missions, an important issue will be
the development of nutraceuticals and novel (or better) functional foods for both feeding and health of astronauts. Such an issue is fundamental for the success of future manned missions, so current research needs to investigate extensively to achieve feasible solutions for life support on space.
In order to improve astronaut health, the application of microorganisms as Single Cell Proteins (SCP) integrators, in either nutraceuticals or probiotic foods is investigated and further studies on the survival of beneficial microorganisms under space condition are needed.

An innovative experiment, carried out during the ESA ENEIDE mission implied the exposure of microorganisms inside the International Space Station (ISS) for a maximum time of 226 days; the aim of the experiment was to study the response of representative non pathogenic microorganisms to the environment inside the space vehicle and at different mission stages.

The following microorganisms belonging to the three domains were chosen: *Escherichia coli*, *Thermococcus guaymasensis*, *Saccharomyces cerevisia*e (a commercial strain and a type strain), *Bacillus subtilis*, *Lactobacillus acidophilus*, *Enterococcus faecium* (a commercial strain and a type strain), *Pseudomonas fluorescens*, *Rhizobium tropici*.

The data collected during the experiment allowed to get new insights into the biological traits of microorganisms exposed to space environment during a flight on a spacecraft and to evaluate the feasibility of long-term storage of beneficial microorganisms on space for their application as food integrators or plant growth supports. Survival rates were observed for all investigated strains and different responses were obtained according not only to the species but also to the strain under study. For instance both strains of *S. cerevisiae* and both strains of *E. faecium* showed different survival responses.
Moreover, morphological alterations were observed in the samples kept aboard for 226 days for *E. faecium*, *E. coli* and *S. cerevisiae*, particularly as far as regard the cell wall structure.

Current microbiological research activities on agrofood issues for space are mainly focused on: **1.** microbial/plants interactions under simulated microgravity; **2.** selection of appropriate growth-promoting bacteria for edible plants, particularly dwarf tomatoes, soybean, and rocket; **3.** development of soilless growing systems for vegetable crops under microgravity; **4.** novel food supplements for astronauts health.

The limitation of astronauts' diet and the physiological stress occurring during long-term missions certainly require new efforts in food research, including the addition of novel probiotic microorganisms and/or nutraceuticals with the aim to improve the wellness of humans and eventually to allow the *in situ* production of fermented foods.

EFFECT OF CULTURE CONDITIONS AND SUBSTRATES ON EXOPOLYSACCHARIDE PRODUCTION BY ACID AND BILE SALT TOLERANT LACTIC ACID BACTERIA

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Lactic acid bacteria (LAB) produces great varieties of exopolysaccharides (EPS). EPS from LAB are used as food additives and viscosifying agent. LAB also produces immunogenic, anti-tumoral and mitogenic polysaccharides. Acid and bile salt tolerant EPS producers can be of probiotic importance. Both, the efficiency of synthesis and the sugar composition of EPS, are influenced by culture conditions. However, the culture conditions (carbon source, medium
composition, temperature, pH, pO2 and kinetics of growth) do not influence the monomer composition of polymer. Studies have shown medium supplemented with high concentration (100 g/L) of different sugars: glucose, fructose, maltose, raffinose, sucrose, galactose or lactose are used for screening of several Lactobacillus strains originating from fermented food, the gastrointestinal tract of animals, and of human dental plaque.

In our research, it was aimed to investigate the influence of various factors like temperature, sugar source and medium composition on the production and recovery of EPS from acid and bile tolerant LABs. We have isolated and identified the LABs of Lactobacillus rhamnosus YHOC137, L. brevis NVC14 and L. plantarum NYC30, isolated from oral cavity of healthy Chinese adult, naturally fermented vegetables and naturally fermented yoghurt „DAHI“, respectively. Effects of temperatures (30 °C, 37 °C and 42 °C) and substrates (glucose and sucrose) on EPS- production were tested. The different media; MRS, Skim milk (SKM) and SKM supplemented with casein hydrolysate and peptone, were used for EPS production.

Growth rate and acid production were higher on glucose containing medium compared to sucrose containing medium with the highest value at optimum growth temperature whilst EPS production was favoured by lower temperatures in both substrate types. Sucrose bioconversion resulting EPS was observed only at 30 °C and 37 °C with proper growth for the tested strain. The different fermentation media greatly influenced the EPS production capabilities of LABs with significantly higher production in 0.5 % casein hydrolysate supplemented SKM medium.

Conclusion: The results conclude EPS production was not growth associated in mesophilic LAB and effect of substrate on EPS production was less significant at optimum growth temperature. Moreover, fermentation media and substrate supplementation influences the EPS- production. Acid and bile salt tolerant EPS producers can be used as probiotics regarding the physiological importance of polymer matrix. The EPS producing ability might assist the bacteria to adhere to intestinal villi, but this needs to be confirmed for the investigated strains in further experiments. On the other hand, EPS can be added to already fermented milk or in combination with lactic acid bacteria as starter culture in order to facilitate fermentation process with production of a functionally bioactive polymer matrix.