Satellite Symposium
Probiotics: Current Challenges and New Opportunities

Delivery of probiotics to the gastrointestinal tract for optimal efficacy
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Background – Several studies demonstrate that probiotic cultures have beneficial effects on human health. Some of these studies have used food products as delivery vehicles, whereas other studies have used dietary supplements to deliver probiotics to the gastrointestinal tract (GIT). It is hypothesised that (1) the physiological state of the probiotic cells will affect their survivability and beneficial activity, particularly in the harsh conditions of the human stomach, and that (2) consuming probiotics in conjunction with food will improve survival and activity of probiotics in the GIT.

Objectives – The current study had two objectives. Firstly, to investigate if the physiological state of the probiotic cells (fresh or lyophilised) affects the survival and metabolic activity of probiotic cultures, following an incubation of probiotic cultures in artificial gastric juice. Secondly, to investigate if co-administration of probiotics with cows milk and soymilk improves survival and/or metabolic activity of probiotics in gastric juice.

Design – Lyophilized and fresh (cultivated overnight) cultures of three probiotic strains (Lactobacillus acidophilus LAFTI® L10, Lactobacillus casei LAFTI® L26 and Bifidobacterium animalis LAFTI® B94) were re-suspended in peptone water, soymilk and cows milk. Gastric juice (pH 2.0) was inoculated with suspensions containing probiotic cultures (1/10), and the survival and metabolic activity of probiotic cultures were monitored for 30 min.

Outcomes & Conclusions – After 30 minutes in the gastric juice, the viability of fresh cultures was reduced by 0.5 to 4 log10 units per ml depending the strain used. The corresponding viability losses of lyophilized cultures were between 0.5 and 2.5 log10 units per ml. Cows milk and soymilk did significantly improve the survival, and metabolic activity, of the probiotic cultures in artificial gastric juice. When cultures were delivered to gastric juice in sweet (unfermented) milk, soymilk or yoghurt, viability losses of less than one log10 unit were detected after 30 minutes incubation in the gastric juice. These results suggest that the lyophilized cultures are more tolerant to gastric acid than fresh cultures and that both survival and activity of probiotics are enhanced if they are delivered to the gastrointestinal tract together with milk, soymilk or an excipient that protects the probiotic cultures from the harsh conditions of the human stomach.

Clinical studies on alleviating the symptoms of irritable bowel syndrome
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Background – Irritable bowel syndrome (IBS) is one of the most common diagnoses in gastroenterology, but current therapies are inefficient. Recent clinical trials suggest beneficial effects of certain probiotics in IBS.

Objective – The aim was to evaluate the clinical efficacy of a probiotic combination (L. rhamnosus GG, L. rhamnosus Lc705, P. freudenreichii ssp. shermanii JS and a bifidobacterium) in IBS patients.

Design – Two randomised, double-blind, placebo-controlled clinical intervention trials were conducted. In the first trial, altogether 103 IBS patients received during six months daily either probiotic supplementation or placebo. In the second trial, 86 IBS patients received during five months daily either probiotic supplementation or placebo. IBS symptoms (bowel movements, abdominal pain, distension, flatulence, rumbling) were followed by symptom diaries.

Outcomes – In the first trial, the total symptom score (abdominal pain+distension+flatulence+rumbling) was 7.7 (95% CI 13.9 to 1.6) points lower in the probiotic group compared to placebo (p=0.015) at six months. This means a median reduction of 42% in the symptom score of the probiotic group compared to 6% in the placebo group. The total symptom score decreased significantly also in the second trial when the probiotic group was compared to placebo (14 points vs. 3 points; p=0.0083). When each symptom was analysed separately the probiotic combination had a beneficial effect on abdominal pain (p=0.052) and bloating (p=0.023).

Conclusions – Two long-term clinical interventions indicate that the combination of these four probiotics is a useful and safe treatment option for IBS. Studies on the mechanisms of the beneficial effects are in progress.