

Concurrent Session 7A: Micronutrients, Cereals and Milk

Soluble products secreted from the newly identified probiotic *Lactobacillus fermentum* BR11 improves viability of rat intestinal cells

LD Prisciandaro^{1,2}, JK Fauser¹, RN Butler¹, AG Cummins², GS Howarth¹

¹School of Agriculture, Food and Wine, University of Adelaide, SA 5005

²Department of Gastroenterology and Hepatology, The Queen Elizabeth Hospital, SA 5011

Background – Recently, soluble products secreted from probiotics have been demonstrated to exert their own beneficial effects. The probiotic *Lactobacillus fermentum* BR11 (BR11) has previously demonstrated efficacy in the treatment of experimental colitis *in vivo*. However, its secreted products have yet to be investigated.

Objective – We sought to investigate the potentially deleterious effects of BR11 supernatant products on cell viability in the IEC-6 rat intestinal cell line.

Design – Using standard cell culture methods the IEC-6 cell line was seeded into 24 well plates at 6×10^5 cells/ml in Dulbecco's Modified Eagle Medium and 10% Fetal Calf Serum. 24 hrs later, cells were incubated with either 10 or 25 % BR11 supernatant and MRS broth (MRS), 25% MRS or PBS control. Cells were harvested at 24hr intervals up to 96hrs. Viability and cell counts were determined by trypan blue exclusion dye assay. Significance was assumed at ($P < 0.05$) using a Student's t-test.

Outcomes – Compared to PBS controls, MRS decreased cell viability at 72–96 hrs ($P < 0.001$). At 96 hrs, MRS+10% BR11 ($93 \pm 1.6\%$) and MRS+25% BR11 ($94 \pm 1.7\%$) improved cell viability ($P < 0.05$) compared to MRS controls ($85 \pm 3.2\%$). At 72 hrs, MRS + 25% BR11 decreased cell numbers (3 ± 0.4 vs $6 \pm 1.3 \times 10^5$ cells/ml), while MRS control ($3 \pm 0.6 \times 10^5$ cells/ml), MRS + 25% BR11 ($4 \pm 1.0 \times 10^5$ cells/ml) and MRS + 10% BR11 ($3 \pm 0.5 \times 10^5$ cells/ml) also decreased cell numbers compared to PBS controls ($7 \pm 0.3 \times 10^5$ cells/ml, $P < 0.05$).

Conclusion – Compared to MRS-treated cells, soluble products of BR11 tended to normalise cell viability following co-treatment with MRS broth. In this preliminary study we conclude that BR11 supernatant appears safe following administration to intestinal cells, supporting further investigations into its potential therapeutic utility *in vivo* for the treatment of gastrointestinal disorders.

Minimising colonic fermentation of high fructan foods: Using food processing techniques to reduce levels of fructans in onion and garlic

SM Ferris¹, JG Muir², PR Gibson², R Rose², O Rosella², S Smith¹

¹School of Exercise and Nutrition Science, Deakin University, Vic 3125

²Department of Gastroenterology, Box Hill Hospital, Vic 3128

Background – Irritable Bowel Syndrome (IBS) is a chronic functional disorder of the bowel, affecting up to 15% of Australian adults. Dietary triggers need to be identified and controlled. Researchers have shown that short chain carbohydrates, fructans (high in onion and garlic) play a major role in triggering IBS symptoms. Current dietary management aims to limit the intake of fructans in the diet. Another approach may be to use simple food processing to reduce fructans in foods.

Objective – To investigate if pickling will reduce fructan levels in garlic and shallots, and if pickled garlic and shallots reduce colonic fermentation, and abdominal symptoms in human volunteers.

Design – Fructan levels of the garlic and shallots were measured using the Megazyme fructan assay. 18 volunteers (13 healthy and 5 IBS) participated in a single blinded, randomised cross over study. Subjects were randomly assigned to receive a breakfast (potato and salmon patty) that was either high (unprocessed) or low (processed/pickled) in garlic and shallots. Breath hydrogen was measured every hour over a ten hour period, and abdominal symptoms were assessed using validated questionnaires.

Outcomes – Pickling over a 12 day period significantly reduced fructan levels in both garlic ($p = 0.00$) and shallots ($p = 0.00$). Consumption of the low fructan breakfast resulted in significantly lower breath hydrogen ($p = 0.05$), abdominal pain ($p = 0.032$), and wind ($p = 0.04$).

Conclusion – Pickling results in significantly lowered fructan levels in problem foods- shallots and garlic, and lowered colonic fermentation and abdominal symptoms in both healthy and IBS volunteers. This study provides another dietary strategy for dietetic counselling of patients with IBS.