

Satellite Symposium

Probiotics: Current Challenges and New Opportunities

Adhesion and competitive exclusion - basis for development of new probiotics

MC Collado¹, J Meriluoto², S Salminen¹

¹Functional Foods Forum, University of Turku ²Department of Biochemistry, Åbo Akademi, Turku, Finland

Background – Adhesion and colonization of the mucosal surfaces by probiotics are possible protective mechanisms against pathogens through competition for binding sites and nutrients (2) or immune modulation (1).

Objectives – The objective was to test the abilities to inhibit, to displace and to compete with pathogens in order to screen the most effective adhesive probiotic combination, and to develop methods for new probiotic characterization.

Design – A human intestinal mucus model (2) was used to assess probiotics strains and their combinations. The strains were selected on the basis of their use as a commercial probiotic strains and they have each demonstrated to have beneficial *in vivo* health effects.

Outcomes – All probiotic strains showed abilities against pathogens adhesion, but the displacement, inhibition and competition were clearly strain- and combination strains- dependent indicating the need of a case-by-case characterization of each probiotic strain and their combinations. The selection of probiotics to inhibit or displace a specific pathogen could be the basis for both product development and future clinical intervention studies on prevention or treatment of dysfunctions.

Conclusion – Our results suggest that different probiotic combinations can be formulated to enhance the inhibition and the displacement percentages to pathogen adhesion to intestinal mucus. New combinations could be useful in inhibition and displacement of pathogen adhesion than a single strain. Further studies are needed to characterize each combination and to understand their role in inhibition mechanisms.

References

1 Salminen S, Bouley C, Boutron-Ruault MC, et al. Br J Nutr 1998; 80 Suppl 1:S147-71.

2 Ouwehand AC, Salminen S, Tolkkio S, Roberts P, Ovaska J, Salminen E. Clin Diagn Lab Immunol 2002; 9:184-6.

Safety of probiotics

DC Donohue

School of Medical Sciences, RMIT University, Bundoora, VIC 3083

Background – New species and more specific strains of probiotic bacteria are constantly being sought for novel probiotic products. Their safety cannot be assumed. Prior to incorporating novel strains into products a careful evaluation of their efficacy is required and an assessment made as to whether they share the safety status of traditional food-grade organisms. Probiotic products which claim specific nutritional, functional or therapeutic characteristics blur the boundaries between what is a food, a diet supplement or a medicine, posing challenges for regulators.

Objective – To report on the adequacy of contemporary studies to characterize and substantiate probiotic safety.

Design – Probiotic studies were examined in relation to the guidelines proposed for safety of probiotics.

Outcomes – Evidence for the safety and efficacy of probiotic organisms has until recently been largely anecdotal or based on relatively little, and often poorly designed research. Food organisms intrinsic to the production of traditional foods have been arbitrarily classified as safe in the absence of scientific criteria, partly because they exist as normal commensal flora, and because of their presence for generations presumably without adverse effect.

Many bacteria are being tested to find a putative probiotic, yielding conflicting data, sometimes for the same organism. Comparisons between studies and organisms cannot be readily made because of non-standardised dosing procedures, particularly for the number of bacteria and the duration of dosing. Information is not readily available on the equivalence or comparability of formulations in different probiotic preparations. Intake data are not generally available for those countries where products are used.

Conclusions – The demonstration of efficacy in probiotics offers vast opportunities to develop human and veterinary products. A new probiotic culture must be at least as safe as its conventional counterparts. There is vigorous debate on what constitutes appropriate safety testing for novel strains proposed for human consumption. Conventional toxicology and safety evaluation is of limited value in assessing the safety of probiotic bacteria. The addition of novel bacterial strains to foods and therapeutic products requires reconsideration of safety assessment procedures.