
Abstract
Probiotics are usually defined as products which contain viable non-pathogenic micro-organisms able to confer health benefits to the host. There are specific gastrointestinal effects of probiotics such as alleviating inflammatory bowel disease, reducing acute diarrhoea in children, inhibiting Salmonella and Helicobacter pylori, removing cholesterol, secreting enzymes and bacteriocins and immunomodulation. However, many of the effects obtained from viable cells of probiotics are also obtained from populations of dead cells. Heat-killed cells of Enterococcus faecalis stimulate the gastrointestinal immune system in chicks. Dead bifidobacteria induce significant increases in TNF-a production. Administration of heat-killed E. faecalis to healthy dogs increases neutrophil phagocytes. The probiotic paradox is that both live and dead cells in probiotic products can generate beneficial biological responses. The action of probiotics could be a dual one. Live probiotic cells influence both the gastrointestinal microflora and the immune response whilst the components of dead cells exert an anti-inflammatory response in the gastrointestinal tract. This is quite analogous to a proposed mode of action of antimicrobial growth promoters in animal production. This has several implications for the production and application of probiotics, as it will be difficult to assess the relative proportions of live and dead cells in a probiotic culture. Variable amounts of dead cells might contribute to the variation in response often seen with live probiotic cultures. However, the use of dead probiotics as biological response modifiers has several attractive advantages; such products would be very safe and have a long shelf-life.