

# THE GUTS TO SURVIVE!

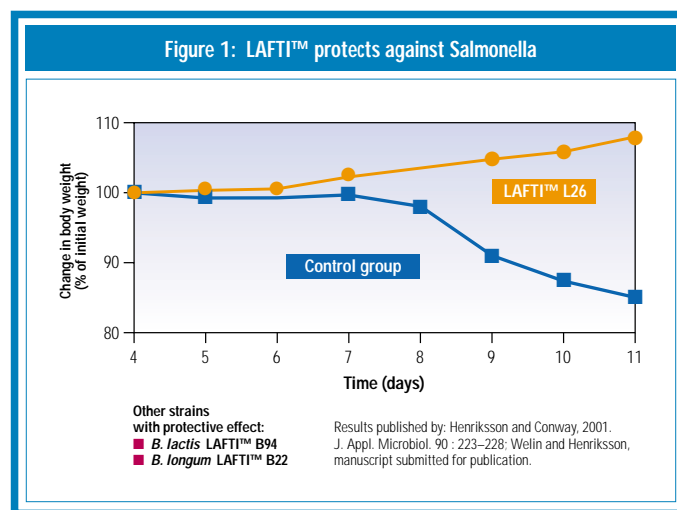


Interest in probiotics (literal meaning: “for life”) has surged in recent years as the dairy sector has emerged as one of the most dynamic and innovative areas of functional foods in Europe. Consumers are increasingly aware of the many potential health benefits of probiotics – including improved intestinal health, reduced cholesterol and stimulated immune system. As scientific and consumer interest has grown, so too has the size of the market – estimated to have mushroomed from zero to \$ 350 M in Europe alone in just five years .

Research into the health benefits of probiotics continues apace. Fundamental to the “positive health” message that is central to the marketing of many probiotic-based products is good science:

- What probiotic strains deliver the best benefits?
- Which strains survive best in the gastrointestinal tract?
- How can manufacturers ensure survival of their probiotic products during processing and packaging?

At the forefront of probiotics research is the Dairy Ingredients unit of Dutch-based global Life Science Products concern, DSM. The company's LAFITM series of probiotics – developed as an extension of the well established Delvo-Pro™ range – comprises three strains: *Lactobacillus acidophilus* LAFITM L10, *Bifidobacterium lactis* LAFITM B94 and *Lactobacillus paracasei* LAFITM L26. These strains have been shown to survive well in the gastrointestinal tract and through subsequent incorporation into end products such as yoghurt and fruit juice.



## For life

Like all functional foods, probiotics deliver proven health benefits beyond basic nutrition. Approximately 70% of the bacteria in the human intestine should be “good” probiotic (lactic acid producing), with the rest being “bad” bacteria such as *E. coli*. By consuming probiotic bacteria in foods such as yoghurt, fermented milk drinks and fruit juices, individuals can help maintain the right balance and gain significant health benefits.

Recently, research has pointed the way towards the development of specially selected, highly effective probiotic strains

which maximise the health benefits to consumers without compromising end-product enjoyment. *Salmonella* and *Listeria* are recognised by consumers as threats to their health – but not all probiotic strains are equally effective at preventing their spread.

## Protection from salmonella

In recent trials, researchers explored the effectiveness of DSM's LAFITM strains in inhibiting the growth of the potentially pathogenic microbial *Salmonella*. In vivo tests compared the percentage body weight

loss over 11 days of a control group of mice infected with *Salmonella typhimurium* vs *Salmonella*-infected mice that were given a range of LAFITM probiotic cultures.

The results clearly indicated that the mice that received LAFITM lost less weight than the control groups – for example see diagram 1 showing the effectiveness of LAFITM L26.

The success of the LAFITM B94 strain - *Bifidobacterium lactis* – in offering protection against *Salmonella* is an interesting result since the probiotic activity of bifidobacteria has traditionally been less well documented than that of *Lactobacillus*.

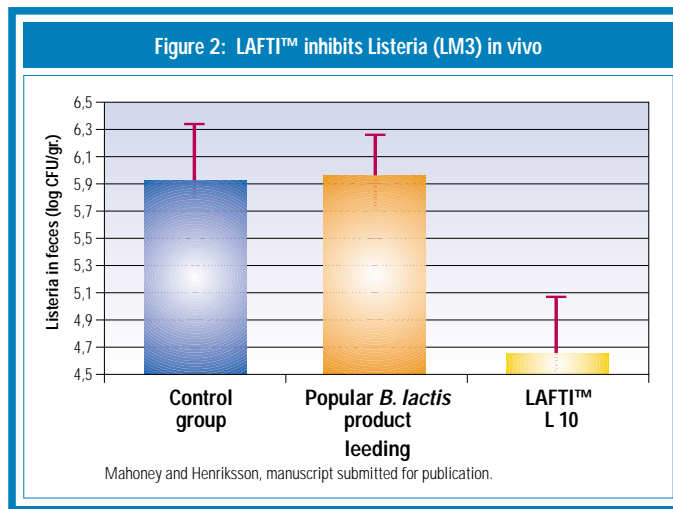
## Licking listeria

The pathogen *Listeria monocytogenes* is of major concern to food manufacturers. It is transmitted via contaminated foodstuffs, particularly meat and unpasteurised dairy products.

Separate trials examined the effect of probiotic cultures on the survival of *Listeria monocytogenes* in the gastrointestinal tract and its subsequent ability to cause listeriosis.

Body weight and faecal levels of the pathogen were monitored in mice given the most pathogenic strain of listeria virulent in mice (LM3).

Addition of *Lactobacillus acidophilus* LAFTI™ L10 to the mice's diet provided significant protection against listeria. Diagram 2 shows the significantly reduced pathogen levels in LAFTI™ 10 treated mice compared to the control group – dosed with listeria and no probiotic cultures and a second group that was given a popular, commercially available probiotic.



There are currently few probiotic fruit juices commercially available since probiotic cultures traditionally do not survive over time in this type of product. The ability of LAFTI™ strains to remain active in end products opens up new opportunities for manufacturers to enhance fruit juices with probiotic claims.

### Conclusion

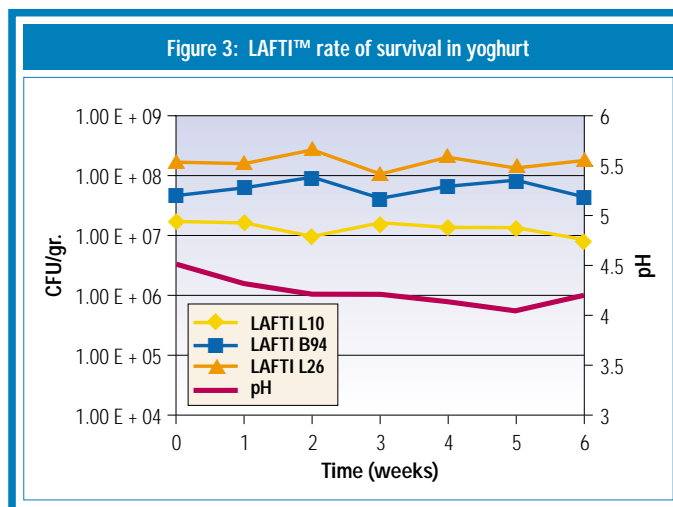
With scientific backing supporting the use of probiotics to stabilise the microbial population of the intestines, demand for them looks set to rise. Their proven effect in reducing the incidence of certain types of disease, stimulating the immune system and providing essential vitamins while protecting against harmful pathogens ensures consumers will continue to view them as a positive addition to their diet.

Research into specific probiotic strains is maximising their effect, allowing stronger pro-health claims to be made by food formulators. LAFTI™ strains survive particularly well in yoghurt and fruit juice and can also be incorporated into cheese, fermented milk and meat products.

With ongoing scientific research by DSM to build on already positive results and demonstrate further beneficial health effects, the future for probiotics looks healthy for the foreseeable future. □

### Survival of the fittest

To induce demonstrable health benefits, probiotic microbes must be live and metabolically active when in the digestive tract – which means they must survive processing and storage. For manufacturers keen to convince consumers of the efficacy of their products, survival of probiotic ingredients through processing and subsequently the gastrointestinal tract is key. To measure ability to survive, the colony forming units (cfu) per gram of three LAFTI™ strains in yoghurt was measured over six weeks (see diagram 3).



All LAFTI™ strains survived well, with low post acidification, preserving the probiotic effectiveness of the cultures and the organoleptic properties of the yoghurt.

In fruit juice, too, LAFTI™ strains remained effective over four weeks and easily outperformed other probiotic strains.

### LAFTI™ survival in fruit juice

Probiotic culture Logarithmic reduction after four weeks

LAFTI™ L10	0.4
LAFTI™ L26	0.0
Commercially available probiotic	1.1