3. Inulin and FOS alter the metabolic activity of the colon by fermenting selected species of bacteria. Abnormal functions may occur.

4. Safety on the use of prebiotics could be an issue as they rapidly ferment in the colon and stimulate selective species and strains of bacteria. Intestinal problems such as altered bowel habits, flatulence, bloating and abdominal pain may result.

5. Inulin and FOS could easily influence the growth of yeast, *Klebsiella,* or possibly other pathogenic organisms. This may counteract any help the probiotics may provide.

6. You must know if the prebiotic will nourish and stimulate the growth of the particular bacteria present in the product. Why should the manufacturer include FOS or inulin in their product if they cannot prove that the bacteria included in their product will utilize it?

7. Bacteria are not simple organisms. They are very adept in using sources of nourishment if it benefits their dominance amongst the other resident microflora. Using direct substrates such as inulin or FOS changes the normal balance of resident bacteria and may lead to unhealthy distortions in the bacterial composition of the host microflora. ■



NATREN'S EXCLUSIVE EXCELLENCE**

International cGMP certified and audited by Australia's TGA (Therapeutic Goods Administration) - signatory to the PIC/S (Pharmaceutical Inspection Convention / Scheme, Geneva Switzerland).

CONTACT US
1.800.992.3233
www.natren.com
www.natrenpro.com
3105 Willow Lane, Westlake Village, CA 91361 USA

The symbol ® denotes registered trademark of Natren Inc. ©2011 by Natren Inc.
All rights reserved.

**Other commercial names may be used. **Natren has no data to show this is a natural process. †Unsolicited information provided to Natren by manufacturer. Whether inulin is produced by a natural or artificial process is unknown to Natren.* Issued June 16, 2003; supercedes previous Natren communications on FOS.

1. Niness, K.R. Inulin and Oligofructose: What are they? J Nutr 1999; 129:1402S-1406S.
2. Gibson, G.R., Roberfroid, M.B. Dietary modulation of the human colonic microbiota: introducing the concept of prebiotics. J Nutr 1995; 125(6):1401-12.
3. Apajalahati, J.H.A. *et al.* Culture-independent microbial community analysis reveals that inulin in the diet primarily affects previously unknown bacteria in the mouse cecum. Appl Environ Microbiol 2002; 68(10):4986-95.
4. Cummings, J.H., Macfarlane, G.T., Englyst, H.N. Prebiotic digestion and fermentation. Am J Clin Nutr 2001; 73(Suppl):415S-20S.
5. Pajari, A.M., Oikarinen, S., Grasten, S., Mutanen, M. Diets enriched with cereal brans or inulin modulate protein kinase C activity and isozyme expression in rat colonic mucosa. Br J Nutr 2000; 84(5):635-43.
6. Mutanen, M., Pajari, A.M., Oikarinen, S.I. Beef induces and rye bran prevents the formation of intestinal polyps in Apc(Min) mice: relation to beta-catenin and PKC isozymes. Carcinogenesis 2000; 21(6):1167-73.
7. Oikarinen, S.I., Pajari, A.M., Mutanen, M. Chemopreventative activity of crude hydroxysmatairesinol (HMR) extract in Apc(Min) mice. Cancer Lett 2000; 161(2):253-8.
8. Salminen, S., Roberfroid, M., Ramos, P., Fonden, R. Prebiotic Substrates and Lactic Acid Bacteria. In: Lactic Acid Bacteria. Microbiological and Functional Aspects. Seppo Salminen, Atte von Wright (Eds.) 2nd Edition. New York: Marcel Dekker Inc., 1998. p. 343-58.
9. European Commission. Scientific Advisory Commission on Nutrition SACN/02/01, Fructo-oligosaccharides (FOS) and Galacto-oligosaccharides (GOS) in Infant Formulae. 27/03/02. http://www.doh.gov.uk/sacn/sacn0201.pdf
10. Hidaka, H., Eida, T., Takizawa, T., Tokunaga, T., Tashiro, Y. Effects of fructooligosaccharides on intestinal flora and human health. Bifidobacteria Microflora. 1986; 5(1):37-50.
11. Tani, Y., Sato, H., Tanaka, N., Hukuda, S. Antibodies against bacterial lipopolysaccharides in Japanese patients with ankylosing spondylitis. British Journal of Rheumatology. 1997; 36:491-3.
12. Ebringer, A. *et al.* Molecular mimicry: the geographical distribution of immune responses to Klebsiella in ankylosing spondylitis and its relevance to therapy. Clin Rheumatol. 1996; 15 suppl 1:57-61.
13. Maki-Ikola, O., Lehtinen, K., Nissila, M., Granfors, K. IgM, IgA and IgG class serum antibodies against *Klebsiella pneumoniae* and *Escherichia coli* lipopolysaccharides in patients with ankylosing spondylitis. Br J Rheumatol. 1994; 33(11):1025-9.
14. Shnayerson, M., Plotkin, M. The Killers Within. Boston: Little, Brown and Company, 2002. p.210.
15. Oda, Y., Ouchi, K. Construction of a sucrose-fermenting bakers' yeast incapable of hydrolyzing fructooligosaccharides. Enzyme Microb Technol. 1991; 13(6):495-498.
16. Poncet, S., Jacob, F.H., Berton, M-C., Couble, A. [Alcoholic fermentation of inulin by various strains of yeasts]. Ann Inst Pasteur/Microbiol. 1985;136B(1):99-109.
17. Kaplan, H., Hutkins, R.W. Fermentation of fructooligosaccharides by lactic acid bacteria and Bifidobacteria. Appl Environ Microbiol. 2000;66(6):2682-2684.

*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

PREBIOTICS

NATREN®

UNIQUE & POWERFUL PROBIOTICS



PRE-BIOTICS

NATASHA TRENEV'S POSITION ON PREBIOTICS & THEIR USE IN PROBIOTICS



Natasha Trenev is the Founder and President of Natren Inc., Chairwoman of The National Institute of Probiotics, a renowned author, host of TV and radio shows, and guest lecturer at leading universities. As a probiotic scholar, developmental scientist, researcher, educator, and health advocate, she has surpassed her centuries-old family tradition of culturing probiotics. She is now leading the scientific community in the acquisition of knowledge about probiotics and their applications for improved human health and is devoted to passing along that knowledge to the general public.

INULIN OR FOS – NOT IN NATREN PROBIOTICS

Natren products have never contained prebiotics, some of which are commercially known as inulin* or fructooligosaccharide (FOS)*. Prebiotics are a class of simple carbohydrates found naturally in plants like the Jerusalem artichoke, chicory and onions. Most of the inulin or fructooligosaccharide commercially available on the industrial market is either synthesized from sucrose or extracted from chicory crops. Inulin and FOS can be obtained from the sliced plant through a hot water extraction process**. FOS can also be manufactured through chemical synthesis using a fungal enzyme to convert cane or beet sugar into FOS.[1]

Inulin and FOS are non-digestible food ingredients that selectively stimulate the growth or activity of one or a limited number of bacterial species already present in the colon.[2] However, current research is warning that careful analysis of the effects of prebiotics on the total bacterial community rather than just a selected few, is required.[3]

ABNORMAL FUNCTIONS MAY OCCUR

Prebiotics change the metabolic activity of the colon through selective fermentation by resident bacteria. Abnormal functions may occur.[4] Research undertaken by the University of Helsinki and the University of Montana studied mice fed with inulin diets and discovered shifts in the total bacterial community, including previously unknown bacterial categories. There were significant chemical changes with higher levels of residual lactic acid.[3] Other studies have reported increased potential for intestinal tumors and colon cancer in mice fed on inulin-supplemented diets. These pose a negative aspect to the use of inulin as a prebiotic.[5 6 7]

SAFETY IS AN ISSUE

Safety on the usage of oligosaccharides is an issue. FOS and inulin influence many aspects of bowel function through fermentation. Consumption of FOS causes rapid fermentation in the colon and produces adverse effects such as fullness (bloating), abdominal pain and meteorism (production of copious amounts of gas) and production of loose stools.[4 8] As a result of concerns raised by the U.K. and other European Member States, the European Commission initiated an investigation into the safety of FOS and GOS (Galactooligosaccharide) in infant formula. The conclusion made by the Scientific Committee on Food was that:

FOS stimulates the growth of *Klebsiella pneumoniae* and possibly other pathogenic organisms.[10] Researchers have found that there is an association between *Klebsiella pneumoniae* and the autoimmune disease known as ankylosing spondylitis.[11 12 13] *Klebsiella* has been identified as one of the "big three" gram-negative pathogenic bacteria with growing antibiotic resistance in the United States and abroad.[14]

FOS & YEAST

Some types of FOS are derived from cane or beet sugar. Probiotics are meant to help the body maintain proper levels of yeast. Since yeast like to use sugar/sugar derivatives as a source of food, why would anyone take a supplement that contains a sugar derivative? The FOS could easily influence the growth of yeast and counteract any help the probiotics might provide.[15 16 17]



NATREN RETAINS THE SUPERNATANT

All Natren products have been formulated to retain the supernatant. Prebiotics are known to be species specific as well as strain specific, and not all beneficial bacteria are compatible with oligosaccharides.[3 4] Since the supernatant already provides specifically designed food for the beneficial bacteria in Natren probiotics, there is no need to add fillers such as FOS or inulin. Natren has taken a strong stand against the use of prebiotics, such as FOS and inulin, in probiotics since we introduced our own line of products in the early 1980s. Our position has not changed since then.

With this in mind, Natren has chosen not to include inulin and FOS in its products for these reasons:

1. Chemically manufactured FOS† is a synthetic product. Because it is not naturally occurring, there may be effects that have not yet been determined.

2. Inulin and FOS are inert in the mouth, stomach and small intestine because they are non-digestible carbohydrates (similarly, olestra is a non-digestible fat, adding no calories to the diet). Inulin and FOS cause undesirable side effects in the gastrointestinal tract. Olestra causes separate, unrelated, side effects.

*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure or prevent any disease.

Capsules not actual size.