

Breaking the mould

Indulgent and hedonistic by today's healthy food standards confectionery should, in theory, present a bit of a challenge to the developers of "functional" and "healthy" new products. Confectionery manufacturers have had to wise up and slim-down to compete in an increasingly health conscious market. However developments in nutritional ingredients are creating new opportunities for confectionery manufacturers to tap into the expanding market for foods with functional benefits.



The functional confectionery sector itself is predicted to reach global sales of \$7 billion by 2004 and, although "sugar-free" makes up a significant proportion of this, the market for confectionery with specific health benefits is expected to be one of the fastest growing sectors.

As is the case with many food and drink categories, new product development is being driven by the increasingly sophisticated consumer expectations and the market for healthy products that don't compromise on taste is becoming more important. With confectionery, however, enjoyment has always been, and will continue to be, by far the most important consideration in the consumer's mind.

This is one of the reasons why the nutritional food ingredients, Raftiline® (inulin) and Raftilose® (oligofructose) from Orafiti are particularly suitable for confectionery applications. These multifunctional ingredients are making an enormous impact on new products in many food sectors, including bread, biscuits, dairy products and beverages. Opportunities in the confectionery sector are also beginning to be realised.

Formulating food with inulin and oligofructose has several advantages. In confectionery applications they act as functional ingredients in the technological sense as they can replace sugar. As importantly, they are functional food ingredients in the nutritional sense, in that they provide a spectrum of health benefits, including fat and calorie reduction. Inulin and oligofructose are also prebiotics which means that they increase

the level of beneficial bacteria in the digestive system (bifidogenic effect). As a direct consequence of better gut health, these prebiotics may help to increase the absorption of minerals, including calcium, from the diet.

INULIN AND OLIGOFRUCTOSE

Inulin is found naturally in more than 36 000 plant species, including artichokes, leeks and onions although the chicory root is a particularly good source and one which is increasingly well understood. Produced in the same way as sugar, inulin is obtained by hot water extraction from chicory followed by refining and spray drying. Our company produces oligofructose from a partial enzymatic hydrolysis of inulin.

NUTRITIONAL BENEFITS

Calorie reduction: Inulin and oligofructose contribute fewer calories than sugar or fat. Products can be developed that replace sugar (4 kcal/g) with inulin (1 kcal/g) with oligofructose (1,5 kcal/g) resulting in a significant calorie reduction.

Prebiotics: Extensive research with these ingredients shows that eating moderate amounts of inulin or oligofructose selectively stimulates the growth of beneficial bacteria, mainly Bifidobacteria, in the colon, while inhibiting harmful micro-organisms such as Clostridia. These findings have been confirmed in in vitro models, animal studies and in human intervention studies. Human studies on the prebiotic effect of chicory inu-

lin and oligofructose have all demonstrated a major shift in the intestinal bacterial composition, with Bifidobacteria significantly increasing in numbers and becoming numerically predominant whereas pathogens, such as Clostridia, decrease. This selective effect, the bifidogenic effect, on the bifidus population in the large intestine is beneficial to well-being and health. A more healthy intestinal flora means that our digestive system works better and that we absorb more of the goodness from our food. Equally, fewer damaging bacteria in our intestines may mean that we are less likely to suffer from infections and may be help to reduce the risk of colon cancer.

Improved calcium absorption: Nutritional studies in animals and humans have also shown that the bioavailability of calcium is increased following intake of inulin and oligofructose, due to better gut health. Raftilose®Synergy1, a unique enriched inulin, has been developed specifically to increase calcium absorption. Recent human studies with that product have shown an increase of 18,2 % in calcium absorption effective at a daily intake of only 8 g. At this level is it easy to develop foods that enable consumers to eat a sufficient amount to have a beneficial effect.

FORMULATING FOODS WITH FUNCTIONAL INGREDIENTS

We produce a range of inulin and oligofructose powders and syrups developed for specific applications and benefits. The addition of these ingredients increases body, gives a creamier mouthfeel and imparts a better

balanced, more rounded flavour to many products.

Raftiline has a neutral taste, without any off-flavour or aftertaste. A classified dietary fibre, Raftiline is moderately soluble in water, which allows its incorporation in watery systems where the precipitation of other fibres would be a problem. The long chain inulin, Raftiline®HP is completely sugar-free and is not sweet at all.

Raftilose is more soluble and is moderately sweet. The quality of the sweetness closely approaches that of sugar and the taste is very clean. It contributes to texture and mouthfeel, has humectant properties, reduces water activity and modifies boiling and freezing points. The viscosity of oligo-fructose syrups is comparable with the viscosity of glucose syrups. Combinations of Raftilose and aspartame have been shown to enhance fruit flavours widely used in confectionery, to give long-lasting taste performance.



NEW DEVELOPMENTS IN CONFECTIONERY

Products already on the market in the confectionery sector containing these ingredients include chocolate, toffees, biscuits, bars, cakes and chewing gum. Some of the most recent developments are detailed below:

Chocolate: We have just developed a completely sugar-free chocolate using its specially formulated long-chain inulin, Raftiline®HP. A unique combination of polyol and sugar-free Raftiline®HP results in a delicious tasting chocolate with excellent mouthfeel and a balanced chocolate taste. Using this formulation also results in a similar

cooling effect to sucrose making the sugar-free chocolate taste more like its high-calorie counterpart. This is because Raftiline®HP modifies the cooling effects of polyols such as maltitol.

A recent taste test on the new formulation found that the panel could not tell the difference between the low-sugar version with maltitol and the completely sugar-free chocolate with Raftiline®HP.



Because the optimum concentration of Raftiline®HP is 7-8 % in this recipe, the product is not only an excellent tasting sugar-free chocolate, but contains a sufficient amount of prebiotic ingredients to have a nutritional effect. As yet there are no products on the market using this newly-developed recipe but Raftiline has already been used to develop low-sugar chocolate products including "Diet Milka" range and the Morinaga range in Japan.

Chewing gum: The Belgian company has also recently developed a sugar-free chewing gum again using Raftiline®HP in combination with polyols. The addition of 20 % Raftiline®HP to sugar-free chewing gum enables manufacturers to develop nutritional concepts because the formulations contain a sufficient prebiotic ingredients to have a beneficial effect.

Sugar-free chewing gums which are kind to the teeth now dominate the European market. Ingredients which have no cariogenic activity are therefore of interest to new product developers in this sector.

In telemetry tests (tests measuring the evolution of the pH in the mouth during the consumption of chewing gum) with chewing gum produced with Raftilose as the only sweetener, there was no decrease in the pH below the critical level of 5.7.

Fruit chews and candy: Another recent development is the introduction of fruit chews containing calcium and Raftilose®Synergy1, the enriched inulin formulated specifically to increase calcium absorption as well as having a bifidoeffect. Products using a combination of Raftiline and Raftilose are already on the market in the United States and Canada.

Adam's Body Smarts are fruit chews positioned as a breakthrough in functional confectionery for adults as they are less sticky and more natural-tasting than children's chews. Adams believes that there is considerable potential to develop the market for nutritional confectionery products that provide an alternative to sugary products but fulfil cravings for sweets and chocolate.

REAL EXPERTISE

Orafti has unique experience and expertise in the development and marketing of prebiotic ingredients and the science which supports their benefits. The team works very closely with its customers to develop excellent formulations.

Food designers working in many different product categories have found that Raftiline and Raftilose can open up new opportunities to develop products which appeal to today's consumers who are demanding that their food choices not only taste good, but also have specific nutritional benefits.

For confectionery manufacturers, the potential of the functional food market is, as yet, relatively untapped but the opportunities are certainly there.

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