



ROXLOR

International

Supplier of Fine Functional Food Ingredients

Technical Information
Regarding
BeFlora[®] and BakeFlora[™] Products

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BeFlora Plus[®] and BakeFlora[™]

BeFlora and BakeFlora are versatile sweet bulking agents, which impart excellent organoleptic qualities to your finished product and provide your customers with dietary health benefits. Both are rich in soluble fiber, which can provide prebiotic feeding of the beneficial intestinal bacteria when ingested on a regular basis.

They are clean white to off white powders with no odor with a sweet perception. They help to accentuate the flavors of your formulation but impart **no perceptible aftertaste**.

There are currently two formulations in the BeFlora line. Both are a synergistic blend of oligofructose, fructose (hydrolyzed from the oligofructose), and a proprietary enriched sprouted mung bean extract. The oligofructose has a consistent molecular structure. The fructose present in the formula is a result of *in situ* hydrolysis of the oligofructose during the blending process. BeFlora Plus is ten times as sweet as sugar, while BeFlora contains more fiber and has a sweetness equivalent to sugar.

There also are two formulations in the BakeFlora line, BakeFlora and BakeFlora HP. Both are Inulin based products that are blended with our proprietary sprouted mung bean extract. Both products have a sweetness characteristic equal to sugar. BakeFlora is made with standard Inulin, while BakeFlora HP is produced with high performance Inulin. The high performance Inulin offers application benefits for certain products.

Inulin and Oligofructose

Inulin is a natural food ingredient that is extracted from the root of a chicory plant through hot water extraction. Oligofructose is then formed through a partial enzymatic hydrolysis of the Inulin. Both are considered to be soluble prebiotic fiber.

Inulin is defined as a mixture of oligo- and polysaccharides composed of fructose units linked together by $\beta(2-1)$ linkages where almost all the molecules are terminated by a glucose unit. The degree of polymerization or DP (total number of fructose or glucose units) of Inulin ranges mainly between 2 and 60. High performance Inulin has had the majority of the smaller molecules removed giving it an average DP of 23.

Oligofructose is a mixture of oligosaccharides comprised of the same linkages as Inulin but with a DP ranging mainly between 2 and 8.

Mung Bean Extract

The proprietary enriched sprouted mung bean extract used in the BeFlora and BakeFlora blends is produced using biologically cultivated mung bean that is certified to be free of all pesticides and herbicides and to be non-genetically modified. During the growth stage, the sprouted mung bean plants are physically enriched with a nutritive medium containing small amounts of Acesulfame K. The physical absorption of the Acesulfame K by the plant into its structure masks the aggressive aftertaste of the Acesulfame K while maintaining its sweet taste. This absorption is the only way that Acesulfame K is introduced into any of the products. The enriched sprouted mung plants are subsequently processed using a cold temperature extraction process. The resulting enriched sprouted mung extract is blended with oligofructose or Inulin producing the finished BeFlora and BakeFlora products.

Product Specifications

	BeFlora®	BeFlora Plus®	BakeFlora™	BakeFlora HP™
Sweetness Characteristics (Sugar is equivalent to 1)	1	10	1	1
Ingredients	<u>Per 100 g</u>	<u>Per 100 g</u>	<u>Per 100 g</u>	<u>Per 100 g</u>
Dietary Fiber	88 ± 5 g	47.0 ± 5 g	88 ± 3 g	95 ± 3 g
Fructose	4.0 ± 0.2 g	42.0 ± 5 g	9.5 ± 2 g	< 0.5 g
Sprouted Mung Bean Extract	2.0 ± 1 g	6.0 ± 1 g	.002 ± .002 g	.002 ± .002 g
Acesulfame K:	< 1 g	< 3.5 g	< 0.75 g	< 0.75 g
Maximum Recommended Inclusion (/Serving)	5 g	7 g	5 g	5 g

Custom formulations are available, subject to minimum order quantities.

(See the data sheets for more detailed information.)

Using BeFlora and BakeFlora

BeFlora and BakeFlora products are oligofructose or Inulin based products that have a sweetness either equal to or ten times as sweet as sugar. Using BeFlora or the BakeFlora products provides you with an easy way to formulate healthy, diet or sugar free products because they have the same sweetness as sugar. BeFlora Plus is a more concentrated product that has ten times the sweetness of sugar and therefore is used more in beverages and applications where replacing bulk is not as important.

BeFlora and BakeFlora are sweet bulking agents that replace not only the bulk of sugar, but also the sweetness without aftertastes. Adding these products adds fiber to your products, which creates healthier products without sacrificing taste.

BeFlora Plus is used in beverages because of its excellent solubility and enhanced sweetness. It can also be used as a masking agent in both beverage and food applications. It provides a clean, sweet taste without any aftertaste. It allows the flavoring system to have its full effect and will mask off notes created by other ingredients.

BakeFlora and BeFlora products are extremely versatile products. They can be used in applications such as confections, bars, ice creams, bakery, dairy, beverages, condiments, and prepared foods as well as many other applications. All of these products can be used in just about any of these applications, but some products work better in certain applications than others.

Please contact us for more specific application data.

Application Benefits:

BakeFlora

- 1. Sugar Alcohol Enhancer**
- 2. Fiber Supplement**
- 3. Fat/Sugar Substitute**

BakeFlora can be used as a sugar alcohol enhancer, as a stand alone bulking agent or as a partial fat substitute in products. The easiest way to use the product and the most widely used is as a sugar alcohol enhancer.

BakeFlora can be blended with Maltitol, Sorbitol, Mannitol or other sugar alcohols in order to create healthier and better tasting products. Blending BakeFlora with these products can remove the cooling effect (minty aftertaste) of the sugar alcohols. It also will remove any other off notes that are in the product from sugar alcohols or other ingredients. Blending BakeFlora into a formulation also removes the need to add additional high intensity sweeteners in most applications. The addition of BakeFlora should not change manufacturing processes in most cases.

Blending BakeFlora also creates a product with better mouthfeel and other sensory evaluations. It creates products with better structural advantages depending on the application. Because BakeFlora will bind with water it will increase the shelf life and moisture retention of products. It also will reduce the drying in products.

BakeFlora helps create a healthier product by adding fiber and reducing the sugar alcohol content. Removing sugar alcohols will reduce the laxative effect of the end products. BakeFlora will then further reduce that effect with its prebiotic properties. The inclusion of BakeFlora can lead to possible label claims from the addition of fiber depending on the inclusion rate and application.

BakeFlora can also be used as a stand alone sweet bulking agent to replace sugar or as an easy way to add fiber to a product. BakeFlora can be used in many applications to partially or fully replace sugar. Because it contains prebiotic fiber BeFlora is an excellent source for supplying foods with beneficial soluble fiber while improving the taste.

BakeFlora also possesses fat mimicking properties. When BakeFlora combines with water it creates a fat like mouthfeel which improves the overall texture of products. It also leads to the possibility of replacing fat and sugar with the same product.

BakeFlora is used primarily in bakery, confection, dairy, bars and powdered beverages. In Bakery applications it performs particularly well in cookies, muffins, brownies, cakes, pastries and inclusions in order to provide a better flavor and mouthfeel than with sugar alcohols alone. In chocolates, BakeFlora removes the cooling effect of the sugar alcohols and provides and improved mouthfeel. In Ice Cream and dairy the sugar replacement and fat replacement properties of BakeFlora allow you to replace both with one product. In bars and powdered drinks BakeFlora is an easy way to add fiber to create healthier bars or it can be blended to improve the flavor of low carb or sugar free bars.

BakeFlora HP

- 1. Sugar Alcohol Enhancer**
- 2. Fiber Supplement**
- 3. Fat/Sugar Substitute**

BakeFlora and BakeFlora HP can be used in many of the same applications. However, BakeFlora HP has a lower sugar content and performs better in high sheer applications. Because the shorter DP molecules have been removed from the product there is less hydrolysis to fructose in low pH and high temperature systems. This makes BakeFlora HP ideal for fruit preparations and pie filling applications.

BakeFlora HP's improved stability causes less browning in products when they are baked for long periods of time at high temperatures. BakeFlora HP also has improved functionality over the standard product. It provides better fat mimic properties and therefore better mouthfeel in certain applications.

BakeFlora and BakeFlora HP can be used in a wide variety of applications. For more detailed information concerning a specific applications please contact us.

BeFlora

- 1. Sugar Replacement**
- 2. Fiber Supplement**

Because BeFlora has an oligofructose base it is a better stand alone sugar substitute than BakeFlora products that are made with Inulin. Oligofructose will perform almost identically to sugar in most applications and will provide structure to a product that is closer to sugar than Inulin based products. BeFlora is also easy to formulate with because it is the same sweetness as sugar. This allows for a 1:1 substitution ratio with sugar. For this reason, one popular application is to blend the product with fructose. A 60% fructose, 40% BeFlora blend creates a product that not only has a better taste and appearance, but also one that can carry a fiber claim.

BeFlora is also an excellent way to add fiber to a product. Oligofructose has superior prebiotic properties to Inulin and therefore is more effective in a product. Because its sweetness is equal to sugar, BeFlora is also easy to formulate into a product for fiber inclusion applications.

BeFlora can be used in many of the same applications as BakeFlora. The difference between the two products is that BakeFlora will generally be blended, where as BeFlora can stand alone as a sugar replacement. For applications where you do not want to use a sugar alcohol BeFlora may be a viable alternative. In bars and supplements Oligofructose is a more effective prebiotic fiber and therefore may be beneficial. BeFlora is also more soluble than BakeFlora and would be appropriate in beverages or other applications where solubility is an issue.

BeFlora Plus

- 1. Blends with High Intensity Sweeteners**
- 2. Masking Agent**
- 3. Sugar Replacement**

BeFlora Plus Cont.

BeFlora Plus has a sweetness ratio of 10:1 to sugar. Its sweetness characteristic allows for small inclusions to be effective in a wide variety of applications such as beverages, condiments and sauces. Its instant, clear solubility is especially important in beverage applications.

BeFlora Plus also works extremely well as a masking agent. It will cover the off notes caused by products such as soy, protein and heavy vitamins and minerals. The combination of the oligofructose and the sweetness negate the off-notes from these ingredients in both sugar and sugar-free applications. An inclusion rate of between 0.5% to 2% will generally cover any of these aftertastes.

One major area where BeFlora Plus is used is blending with high intensity sweeteners such as Aspartame, Acesulfame K and Sucralose. A 75% high intensity sweetener, 25% BeFlora Plus blend will provide improved flavor, economic benefits and better formulating properties. By blending the products you will round out the flavors of the sweeteners and remove any strong initial punch as well as any lingering aftertaste. When blending the product there is no need to increase the inclusion rate from its original levels. This provides economic benefits as it reduces the cost of your sweetening system, in some cases quite substantially.

It also provides better formulating properties when blended with Aspartame and Sucralose. With Aspartame it lowers the levels that are need in the product because BeFlora Plus is heat stable. With Sucralose it offers better dispersion and uniformity throughout the product because of the slight addition in bulk and BeFlora Plus' flow properties. A 50/50 blend of the high intensity sweetener and BeFlora Plus can be used in baking applications to improve the sweetening and flavoring systems.

Benefits of Fiber

The active principles, Inulin and Oligofructose, in BeFlora[®] and BakeFlora products are non-digestible and become a nutrient, or prebiotic, to the "beneficial bacteria" (particularly Bifidobacteria and lactobacillus) located in the large intestine. This bacteria growth helps maintain and produce balanced intestinal flora. One to three grams per day will produce a five fold increase in beneficial bacteria.

Intestinal flora provide many benefits including:

- Nutritionally support digestive transit time and thus support regularity
- Assist and strengthen the immune system
- Help protect the intestine through the barrier effect of Bifidobacteria
- Assist in controlling the formation of free radicals

In addition, the Bifidobacteria ferments the dietary fiber which produces short-chain fatty acids that may have beneficial effects, such as:

- Help provide B vitamins
- Help in the improved absorption of calcium
- Help balance lipid and cholesterol metabolism

Regulatory Status

BeFlora and BakeFlora products are considered GRAS via self-affirmation. Roxlor has conducted a review of literature and an extensive array of analytical tests on these blends, an in depth review of manufacturing methods and procedures employed in the manufacture of these products and an analysis of estimated daily intakes (EDI) for certain present formula applications. The results of these studies were part of a determination that these products are eligible to be considered Generally Recognized As Safe (GRAS) for the appropriate applications.

An extensive listing of test procedures, scientific proceedings, and AOAC methods regarding dietary fiber is available upon request.

Possible label claims from BeFlora and BakeFlora include:

- Prebiotic fiber
- Soluble fiber
- Sugar Free
- Reduced Sugar/Calorie/Fat
- Improved Calcium Absorption
- Good source of fiber**
- Excellent source of fiber**

**depending on the grams of fiber per serving

The mung bean seed used in the manufacture of BeFlora and BakeFlora is certified to be biologically cultivated and non GMO by the supplier. Acesulfame K is uniquely introduced into the product through the physical absorption by the sprouted mung bean plant.

The addition of a BeFlora to a final food product requires compliance with food labeling procedures.

BeFlora and BeFlora Plus are described as:

“Oligofructose, Fructose, Sprouted Mung Bean Extract and Acesulfame K”

BakeFlora and BakeFlora HP are described as:

“Inulin and Acesulfame K”

These components may be placed in the ingredient listing in descending order of predominance by weight. Any mandatory nutrients should be listed in the Nutritional Facts Box.

Sugar, fiber source claims, and the labeling of acesulfame K content will depend on the individual formulation and serving size.

All labeling recommendations are subject to your company's regulatory officer's final approval.

Product History

The BeFlora formulations have been sold commercially in Europe since 1993. They are presently used in the French health care system as a dietary supplement. The recommended use of BeFlora products by its diabetic members has been strongly endorsed by the Diabetic Syndicate of France (AFD) for the past 5 years.

BeFlora products were introduced to the US market in 1998 and were considered to be GRAS through a self-determination process concluded in 2001. Because of their many health benefits, excellent solubility, heat stability, and ease of use, they are presently used or under development in soy powders, beverages, chocolates, energy bars, yogurt, pies, cakes, cookies, chewable tablets, ice cream and other applications.

Product and Nutritional Data

Please see attached sheets.

Note: Kosher Certificates are available upon request.

Dosage

The recommended dosage level is 3-5 grams of BeFlora or BakeFlora products per day.

Toxicology

BeFlora products are GRAS through a thorough self determination process. Toxicology tests have been performed in France under the auspices of Centre de Recherches Biologique (CERB), Study No. 980229ST. The study found BeFlora to be non-toxic. A copy of the study is available upon request.

Certificate of Analysis

Available on request.

Product Life

Adhere to the optimal product usage date marked on each container. The product has a minimum shelf life of 18 months when stored under recommended conditions.

Product Storage

Must be stored in a cool, dry environment (59° F - 86°F) and in sealed containers or bags.

Material Safety Data Sheet

Please see attached sheet.

Typical Packaging Information

BeFlora and BeFlora Plus

Dimensions of the 25 Kg Drum

Height:	24.8 inches
Diameter:	14.5 inches
Gross Weight:	61.2 pounds
Net Weight:	55.0 pounds

Pallet Information

Number per Pallet:	18 drums
Weight per Pallet:	1100 lbs.

BakeFlora and BakeFlora HP

Packaging:	50 lb poly lined bags
Pallets:	40 bags, 2000 net lbs.

For More Information concerning BeFlora and BakeFlora Products contact:

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