Cup Oligo®

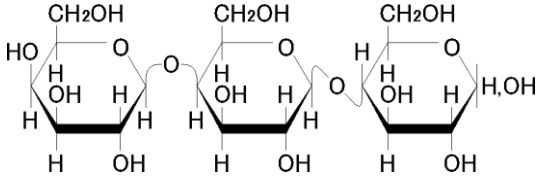
Bifidus growth factor
High-content galactooligosaccharides

A. Introduction of Cup Oligo

Cup Oligo is made of oligosaccharides developed by the biotechnology of Nissin Sugar Co., Ltd., based on lactose contained in milk.
It is a functional ingredient for food and is mainly composed of galactooligosaccharides(GOS), which is effective as a bifidus growth promoting substance, having superior physical properties and being safe as a natural material.
Two types, syrup type and powder type, are available according to customers' needs.
It can be used as a new health-oriented food material for various products.

B. What is Cup Oligo?

GOS, main components of Cup Oligo, are mixture of oligosaccharides shown by the following structural formula, including 4'-galactosyllactose.
These oligosaccharides are produced by getting enzyme to work on lactose contained in milk.



4'-galactosyllactose

Gal-Gal-Glc (bond: β 1-4, 4'-galactosyllactose)

Gal-(Gal)n-Glc (n=1 to 3, bond: β)

Gal-(Gal)n-Gal (n=1 to 3, bond: β)

*Gal:galactose, Glc:glucose

In terms of physical properties, Cup Oligo is very stable under heat and acidic conditions, and has such a superior feature that its composition does not change during long-term storage.

C. Gentle to human body

1. Component contained in breast milk
GOS, main components of Cup Oligo, are safe and superior sweetener.

2. Nutritional source for bifidus
GOS are an important nutritional source for growing bifidus.

3. Functional even by adding a small amount
Cup Oligo is highly pure and is not digested/absorbed in the intestine, so that only a small amount of it is effective for growing bifidus. It can be used to replace part of sugar.

4. Best suited for processing because of its heat resistance and acid resistance
GOS are not decomposed when heated during processing and when processed/stored under acidic condition.

5. 1/4 the sweetness of sucrose
Since Cup Oligo is low in sweetness and plain, it reduces the sweetness of the conventional sugariness by replacing part of it, compensates for sugariness of food not requiring sweetening, and dose not impede the keeping quality.

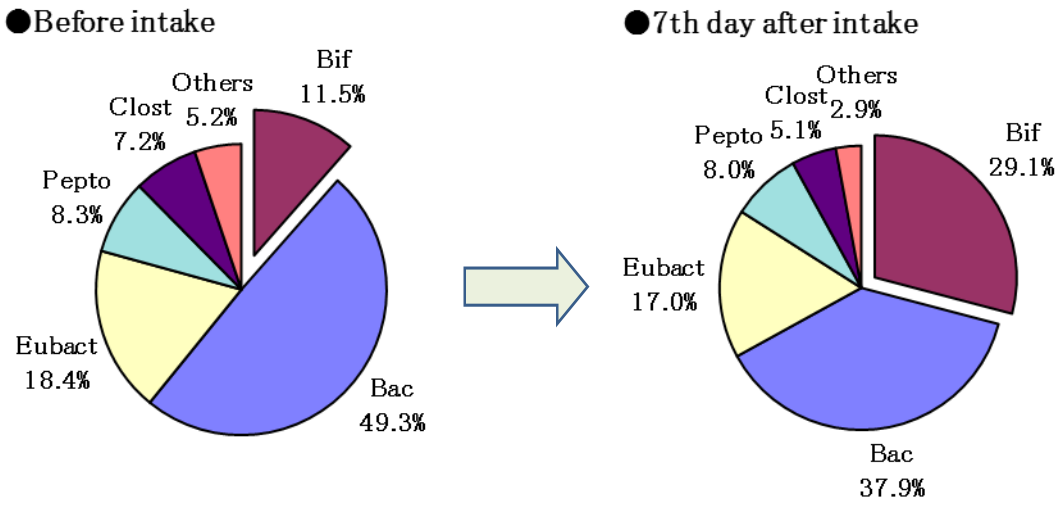
D. Features of galactooligosaccharides(GOS), Main Components of Cup Oligo

It is recognized that GOS, main components of Cup Oligo, have the following features.

1. Growth of bifidus in the intestine

GOS selectively increase bifidus, representative of useful bacteria living in the intestine.

The effects of GOS intake on the human fecal microflora (1g/day-GOS intake)



Fecal microflora	
Bif	*Bifidobacterium*
Bac	Bacteroidaceae
Eubact	*Eubacterium*
Pepto	*Peptostreptococcus*
Clost	*Clostridium*

2. Indigestibility (low calorie)

It has been confirmed that GOS reach the large intestine without being decomposed by digestive enzyme in the small intestine.
For this reason, it can be said that GOS are sugar difficult to be converted into energy.

3. Low cariosity (prevention of carious tooth)

GOS are not utilized for growth of mutans, cause for carious tooth, and it is not recognized that insoluble glucan, cause for bacterial plaque, is produced.

4. Property like dietary fiber

It is well known the GOS have dietary fiber-like property at various points.

5. Safety

4'-galactosyllactose, effective component of Cup Oligo, is confirmed to be safe as a result of various tests including acute toxicity and chronic toxicity tests.

E. Physical Properties of Cup Oligo

1. Sweetness

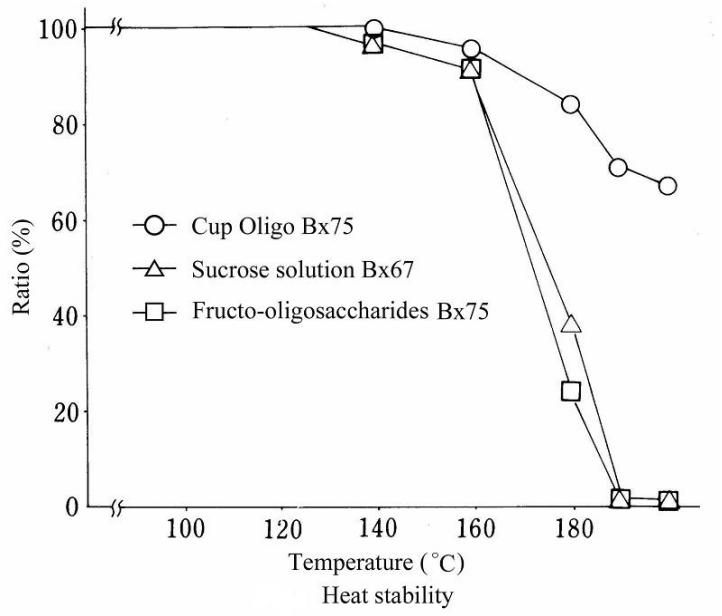
Cup Oligo has high-quality sweetness, and its sweetness is 25 with sucrose as 100. The sweetness is not changed due to temperature. Cup Oligo is low in sweetness and plain in taste, so it reduces the sweetness of the conventional sugariness by replacing part of it, and can be utilized for food not requiring sweetness without adversely affecting the taste.

2. Viscosity

The viscosity of Cup Oligo shows a high value at low temperature in comparison with sucrose, but in normal handling, it can be used in almost the same way as for isomerized sugar.

3. Stability against heating

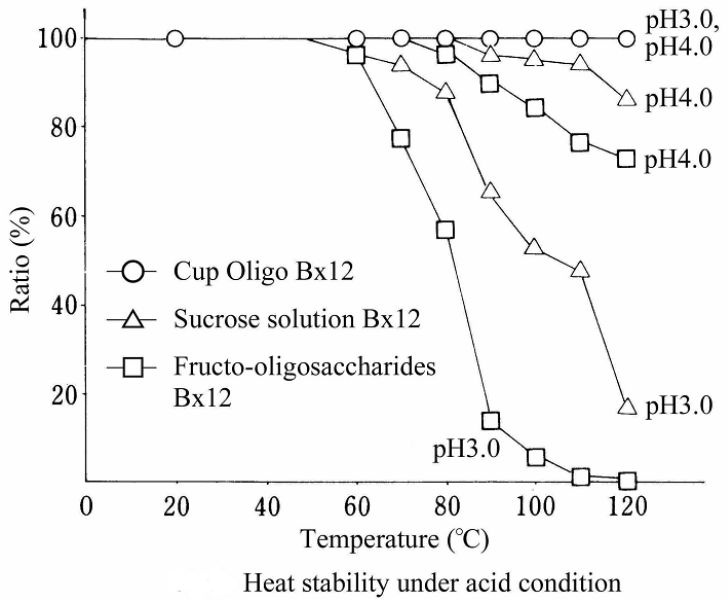
GOS, effective components of Cup Oligo, are very stable in comparison with sucrose, and are hardly decomposed even when heated at 180℃. They are low in tinting.



Heat stability

4. pH stability

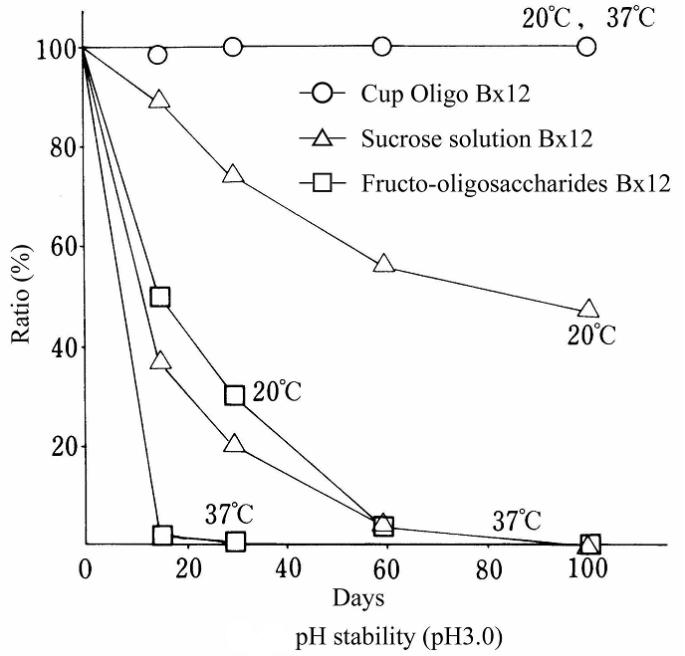
GOS, effective components of Cup Oligo, are hardly decomposed even when heated at pH3, and are stable under the acidic condition. In terms of properties, Cup Oligo is very stable against heat and acid.



Heat stability under acid condition

5. Stability during storage

GOS, effective components of Cup Oligo, are not decomposed for more than 100 days when it is stored at room temperature under the acidic condition (pH3.0). Cup Oligo is superior in storage.



pH stability (pH3.0)

6.Water activity

The water activity of Cup Oligo is low, almost the same as that of sucrose.

7.Moisture absorption/releasing properties

The moisture absorption/releasing properties give favorable effects on the moisture retention and keeping quality of food/cakes.

Moisture retention is enhanced for sponge cake and butter cake, and increase in hardness of products is checked.

F. Specifications of Cup Oligo

Name	Cup Oligo H-70	Cup Oligo P
Appearance	Liquid	Powder
Moisture	25% or lower	3% or lower
Components in solid matter		
GOS	70% or higher	70% or higher
Other saccharides	30% or lower	30% or lower
Style of packaging	18L can Net 25kg	Carton Net 10kg