samyang

LIFE'S INGREDIENTS

Introduction of Fructooligosaccharides

1. Overview of Oligosaccharide

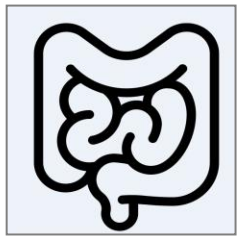
Oligosaccharides are carbohydrates that contain two or more than two monosaccharides (2-10 units of monosaccharides)

▪ 2-10 units of monosaccharides(glucose, fructose, and galactose)

Type	Raw Material	Manufacture method	Composition
Fructooligosaccharide	Sugar	transition in molecule by transferase	Fructose Glucose
Isomaltooligosaccharide	Corn starch	After enzyme liquefaction/saccharification, condensation through transferase	Glucose
Maltooligosaccharide		After enzyme liquefaction, decomposition through enzymic saccharification	Glucose
maltooligosaccharide	Lactose	After hydrolysis, condensation through transferase	Galactose Glucose

1. Overview of Oligosaccharide

1.1 functionalities

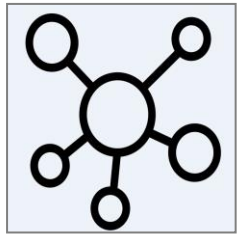


- Intestinal regulation
  - Prebiotics
  - Intestinal Bifidus

- suppress dental caries
  - Not used for the growth of caries causes
  - No glucan(cause of tartar) creation

- Indigestible
  - not digested in intestine
  - Fermented by intestinal bacteria in the large intestine

- suppress rise of blood glucose
  - Nearly no effect on insulin concentration in blood



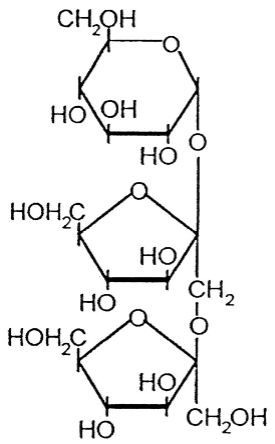
- accelerate mineral absorption
  - Lower intestinal pH
  - Accelerate calcium, magnesium and iron

- Improve blood triglycerides
  - Lower LDL cholesterol

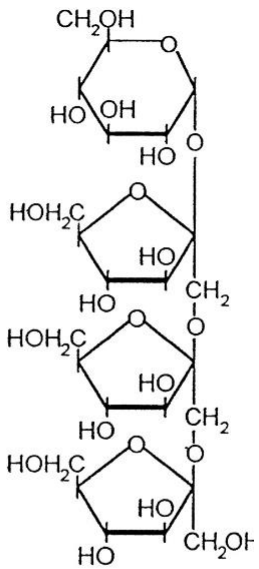
2. Fructooligosaccharide

2.1 Definition and Structure

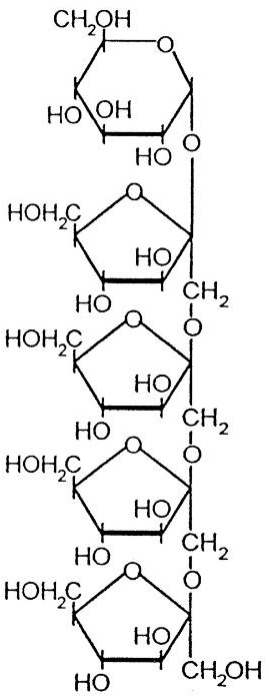
- Manufactured by transferase to sugar
- Oligosaccharide of 1~3 fructose with sugar
- Widely present in natural foods such as onions, burdock, bananas and honey



1-kestose



nystose

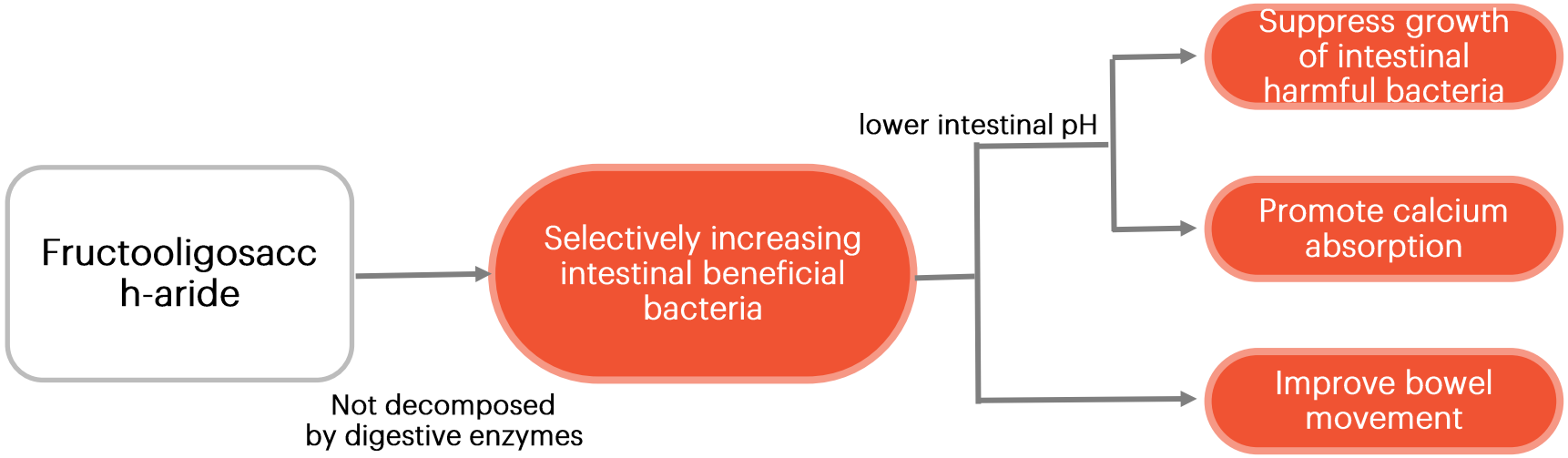


1-β-fructofuranosylnystose

2. Fructooligosaccharide

2.2 functionalities (health functional food)

- Not decomposed by digestive enzymes and arrived at the large intestine, selectively increasing intestinal beneficial bacteria
- Suppress growth of intestinal harmful bacteria and promote calcium absorption by lowering intestinal pH
- Help trigger bowel movement by working as dietary fiber



2.3 Product lists of Fructooligosaccharide

- Samyang has FOS syrup and FOS Powder(FOS-P)

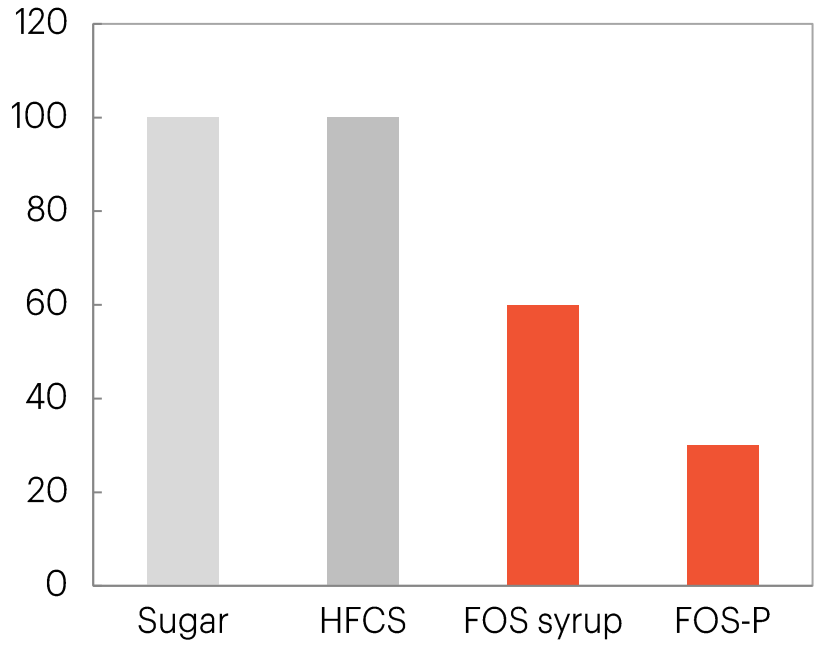
	FOS	FOS-P
[Type]	•Liquid	•Powder
[FOS Content (%)]	• 55 ↑	• 95 ↑
[Sweetness (compared to sugar)]	• 60	• 40
[Sugar Content (%)]	• 35 ↓	• 2 ↓
[Viscosity]	• Mid	• Mid

2. Fructooligosaccharide

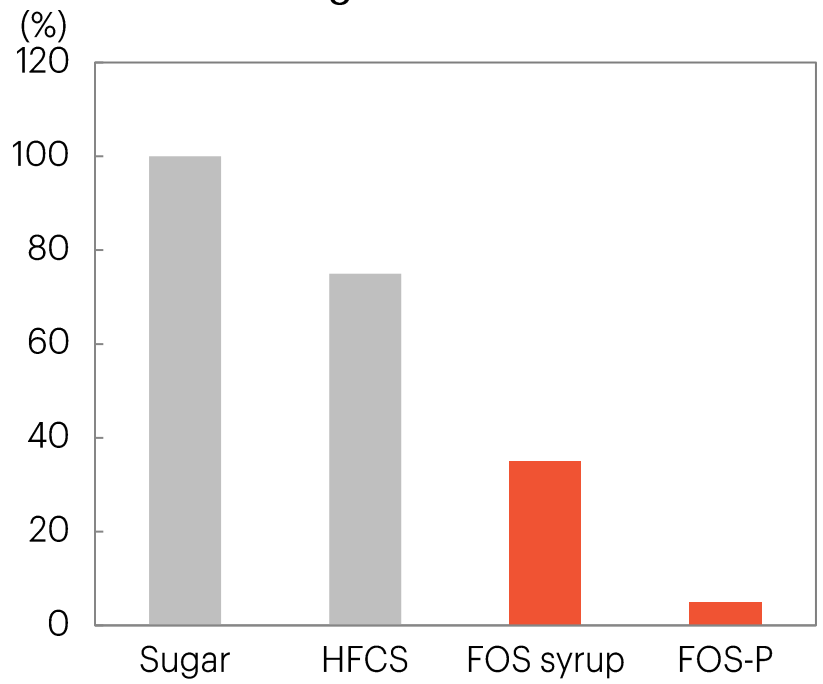
2.4 Relative sweetness and Sugar content

- FOS syrup has 60% of relative sweetness compared to sugar
- Have the lowest sugar content among oligosaccharide and the most similar sweetness with sugar

<Relative sweetness>



< Sugar content >

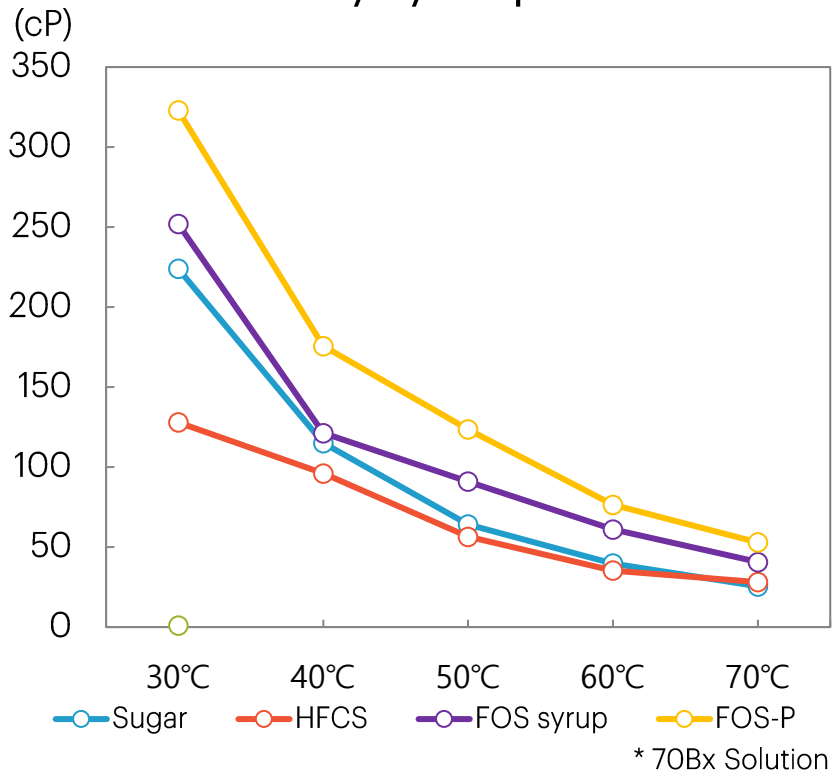


2. Fructooligosaccharide

2.5 Viscosity

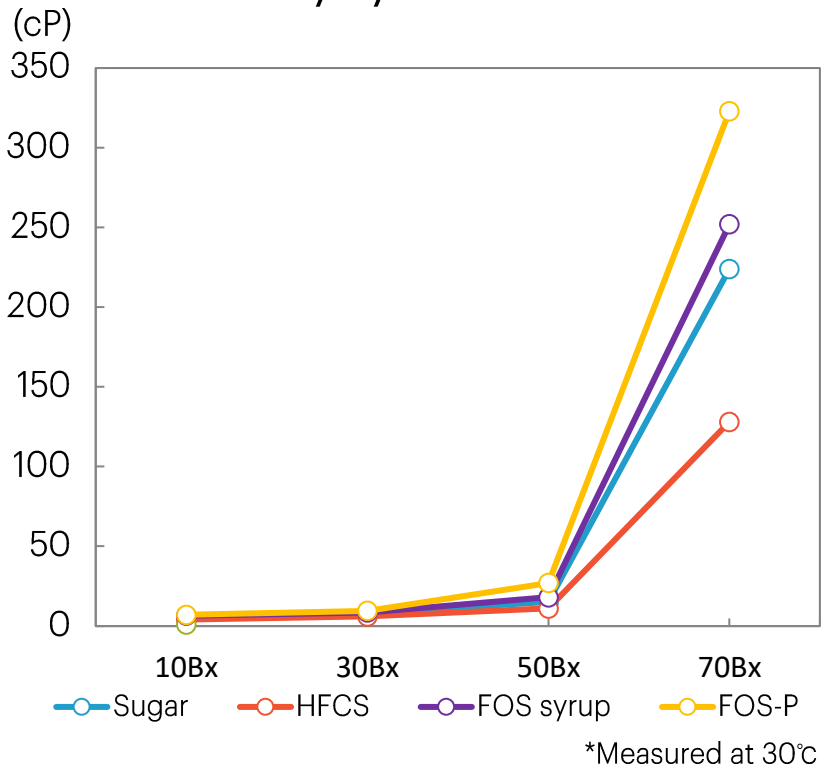
- FOS syrup has higher viscosity than HFCS and similar with sugar
- FOS-P has high viscosity due to relatively large molecular

<Viscosity by temperature>



* 70Bx Solution

<Viscosity by concentration>



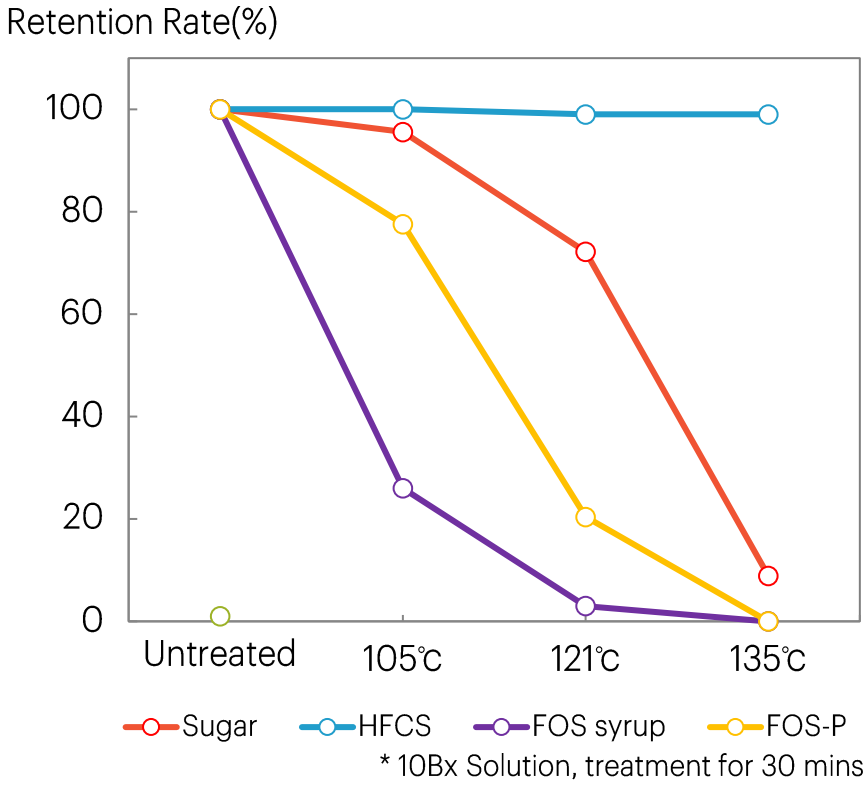
*Measured at 30℃

2. Fructooligosaccharide

2.6 Heat and acid resistance

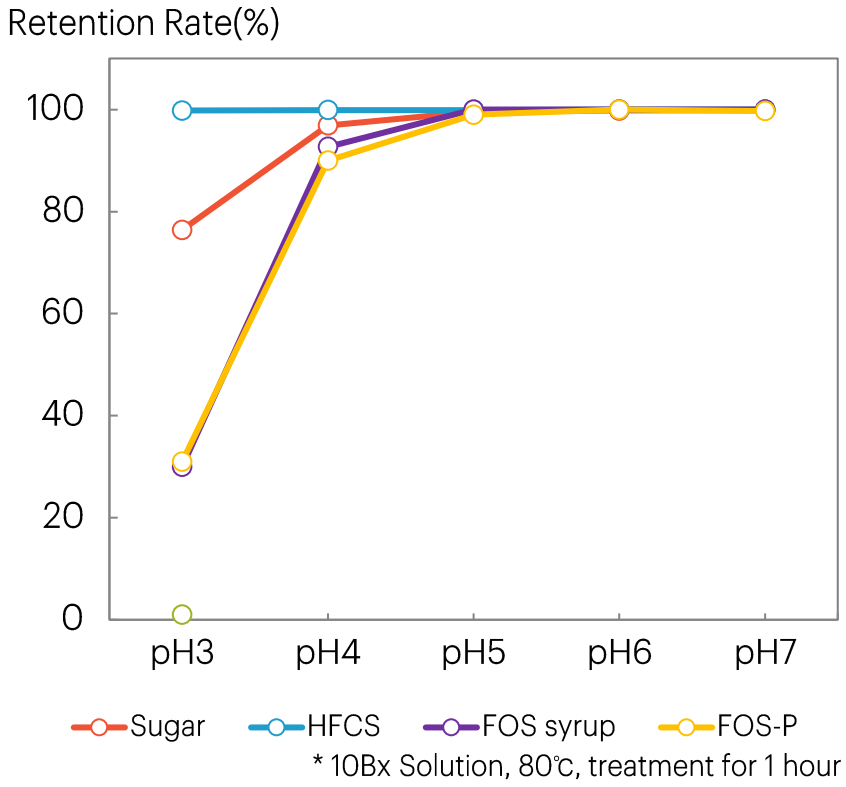
- FOS is sensitive at heat and pH, can be decomposed in some measure in acidic food
- relative stable at pH 4.0~4.5, can be applied to fermented milk and others

<Heat resistance>



* 10Bx Solution, treatment for 30 mins

<Acid resistance>

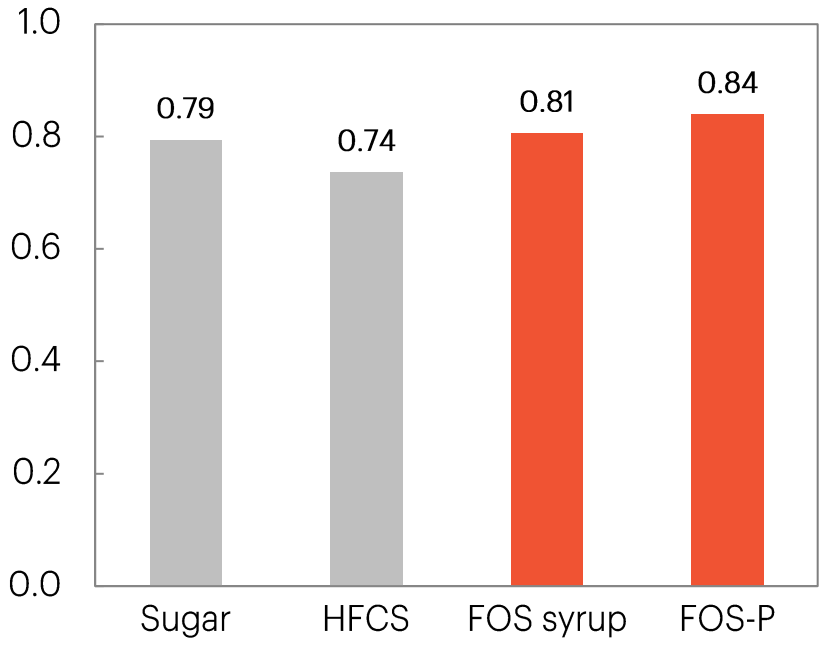


* 10Bx Solution, 80℃, treatment for 1 hour

2.7 Water activity and Freezing point depression

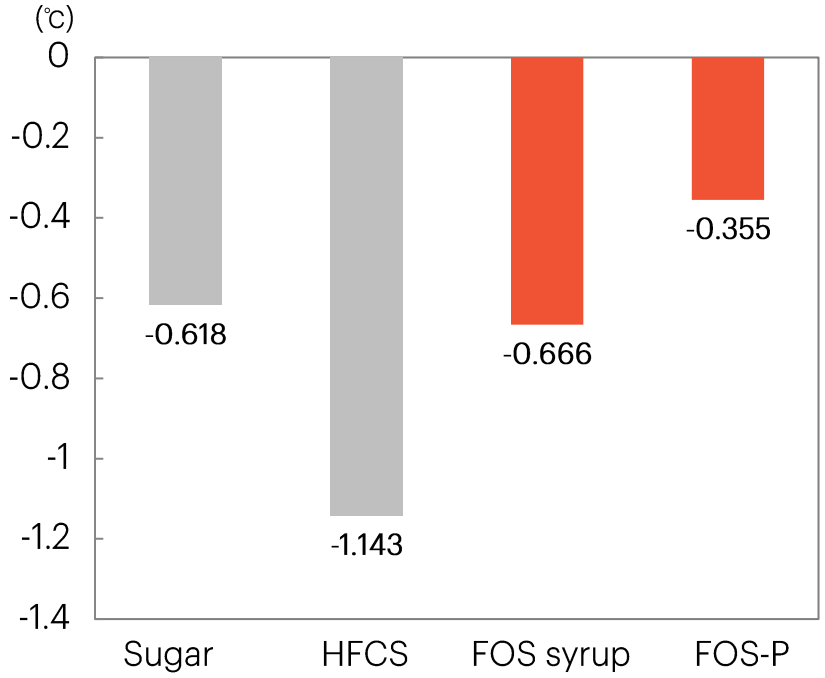
- FOS has similar water activity with other ingredients
- FOS syrup have similar freezing point depression with sugar

<Water activity>



* 70Bx Solution

<Freezing point depression>



* 10Bx Solution