
Fuji FF
(Inulin)

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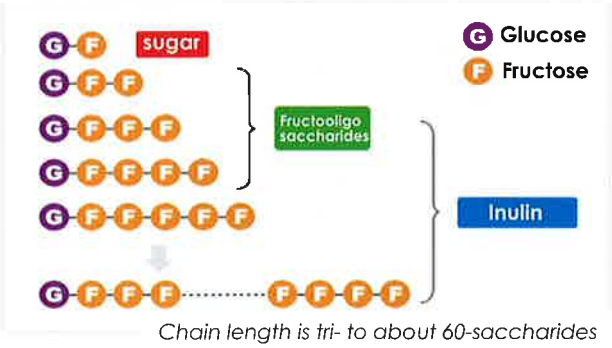
Inulin

Inulin is a type of soluble dietary fiber that exists widely in nature. It is a natural component that can be found in such familiar vegetables as onions, burdock, garlic, and leeks, as well as in chicory and Jerusalem artichokes. Inulin is a general term for oligosaccharides and polysaccharides in which fructose (F) is linked in a straight chain to glucose (G) by β2-1 bonding. The length of the chain (the number of fructose molecules) is not fixed, and various chain lengths exist.



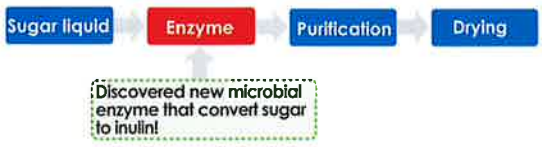
Chain length is tri- to about 60-saccharides

Examples of inulin distribution

Food	*Inulin content*
Jerusalem artichokes	15-20 %
Garlic	9 -16 %
Leek	3 -10 %
Onions	2 - 6 %

Fuji FF

◆Methods for manufacturing Fuji FF

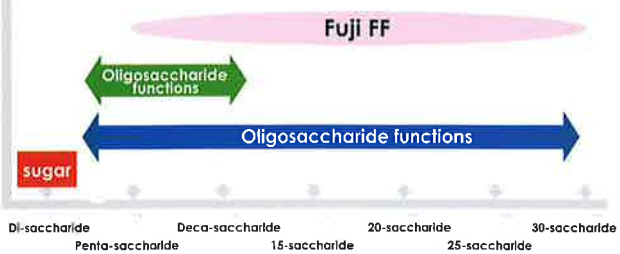


**New enzyme that produces inulin from sugar—Inulin synthase*

Fuji FF is an extremely pure form of inulin manufactured from sugar using enzyme.
Fuji Nihon Seito Corporation acquired the international patent of the enzyme and the production method.

◆Product line-up for Fuji FF

Products with different functions are developed by regulating the chain length.



The chain length is regulated using our unique technology so that a product composed of inulin can have a degree of polymerization ranging from 6 to about 30. Because of this, the inulin we produce is more homogeneous than chicory inulin, and thus we are able to supply inulin of stable quality. Since it was first released into the market, the inulin we manufacture has been used widely in various foods and nutritional health products. We provide products with different degrees of polymerization.

Physiological Functions

Dietary fiber

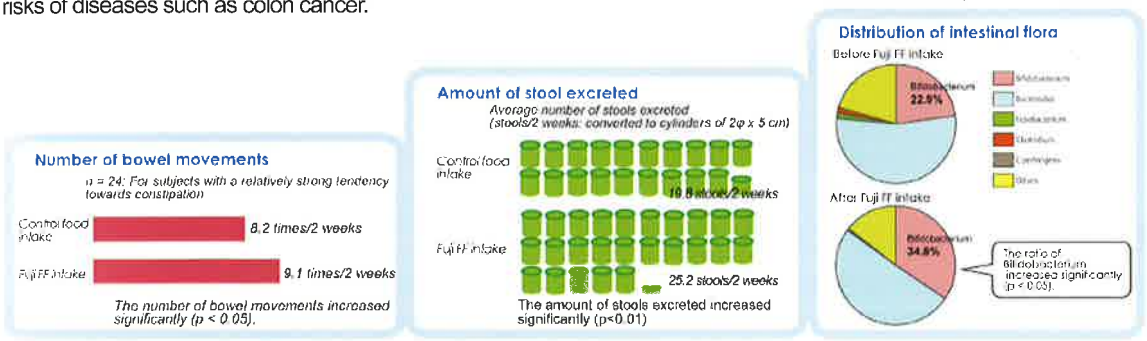
Dietary fiber is one of the important nutrients needed to maintain good health. Deficiency in dietary fiber result in a poor intestinal environment, which can allow the growth of harmful bacteria, thereby increasing the risk of health problems. The main risks include constipation, diabetes, increased blood cholesterol, arteriosclerosis, hypertension, and obesity. The intake of Fuji FF with daily meals contributes to a balanced diet.

Prebiotics with intestinal regulation effect

Taking Fuji FF increases the level of beneficial bacteria, such as Bifidobacterium, and improves intestinal flora. Furthermore, it increases stool excretion and shortens the time that intestinal putrefactive products stay in the body. It is expected that these effects will reduce the risks of diseases such as colon cancer.

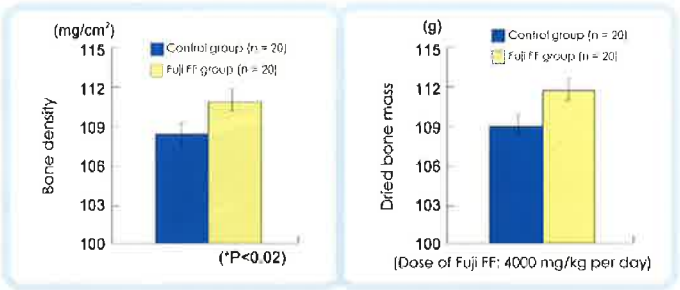
Intestinal regulation and intestinal flora improvement effects of Fuji FF

Human clinical studies (n = 28 – subjects with constipation)
12 g per day (6 g x 2 times) Food intake for 2 weeks continuously



Mineral absorption

Dietary Ca deficiency causes various bone-related problems. In particular, osteoporosis, which appears with increased age, is a major problem. Fuji FF is effective in promoting calcium absorption and increasing bone density.



In a low-calcium diet, the group that was administered Fuji FF for three weeks was found to have higher bone density and dry bone mass compared to the control group.

Suppression of triglyceride

Due to an increased intake of fat, there is an increasing number of people with high lipid levels in the blood. Hyperlipidemia may lead to myocardial infarction or cerebral infarction. According to our studies, Fuji FF was found to be effective in decreasing triglyceride in blood, as well as the cholesterol in the liver.

Suppression of blood sugar increase

Fuji FF is a polymerized fructose and a non-digestible type of sugar, and therefore does not increase the blood sugar level by itself. Also, Fuji FF , when taken with food, is effective in suppressing the increase blood sugar levels after meal.

Fuji FF (Inulin)

Experiences and Examples of Use

Reinforcement of dietary fiber

Fuji FF is high in dietary fiber at 90% or higher (as solid), highly soluble in water, and occurs as a tasteless, odorless white powder. For this reason, it can be used in food in which you wish to reinforce the content of dietary fiber without affecting the natural flavor of the food product. Fuji FF is used widely in areas such as health foods, confectioneries, bread, dairy products, beverages, processed meat and fish, noodles, and rice.

Texture improvements

Adding a small amount of Fuji FF to the food product can improve its crispness and the melt-in-the-mouth feel of baked confectioneries, give a moist texture to bread and cakes, increase the smoothness of mousse and chocolate, add to the firmness of noodles, and improve how processed meat and fish feel in the mouth, as well improving production yield.

Masking

Fuji FF can mask the unpleasant taste or odor of functional materials, help improve the flavor of the food product, and can be used in vegetable, diet, soymilk, and vegetable beverages. It also has the effect of enhancing the flavor of spices.

Areas in which Fuji FF is used

Category	Items	Fiber enrichment	Fat replacement	Mouth feel improvement	Taste improvement
Dairy product	Yogurt	■	■	◿	◿
	Ice cream	■	◿	■	
	Dairy beverages	■	■		
	Spread	■	■		
	Whipped cream	■	■		
Confectioneries and bread	Bread	■	◿	■	
	Cake	■		■	
	Chocolate	■	■	■	◿
	Nutritional bar	■		■	◿
	Jelly	■		■	
Beverages	Coffee	■		■	■
	Soy milk	■			■
	Vegetable juice	■		◿	■
	Functional beverages	■		■	■
Meal dishies	Ham,sausages	■		■	
	Processed raw meat	■	◿	■	
	Rice	■		■	■
	Processed egg	■		■	
	White sauce	■	■		
	Mayonnaise	■	■		
	Dressing	■	■		
Noodles	Chinese noodles	■		■	

■ = Very effective
◿ = effective

Fat Replacement Function

Low fat, low calorie

By using inulin cream instead of fat, we can assist in developing products such as low-fat margarine, low-fat whipped cream, and non-fat mayonnaise.

Non-Fat Margarine-style Spread

Fuji FF	37.3%
Water	44.8%
Meringue	14.9%
Skim Milk	1.5%
Salt	1.1%
Flavoring	0.1%
Coloring	0.3%

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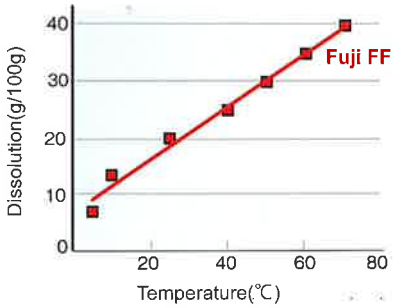
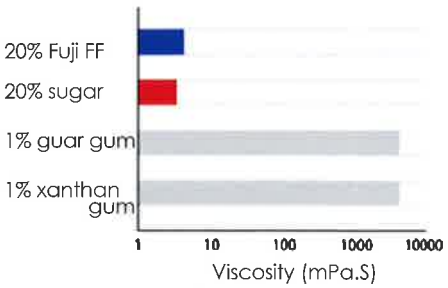
Properties

Solubility



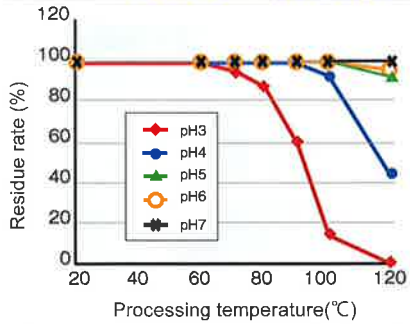
Fuji FF is readily soluble in water, and a 20% solution can be prepared at 25°C and a 40% solution can be prepared at 70°C.

Viscosity



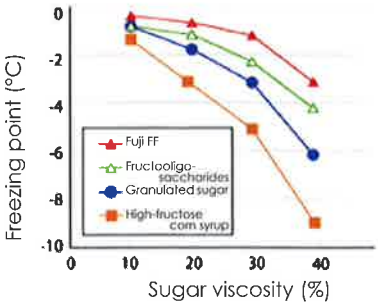
The viscosity of a 20% solution of Fuji FF at 25°C is low, at almost the same level as that of granulated sugar. The viscosity seen in thickening polysaccharides is virtually absent in these products.

Thermal stability at various pH values



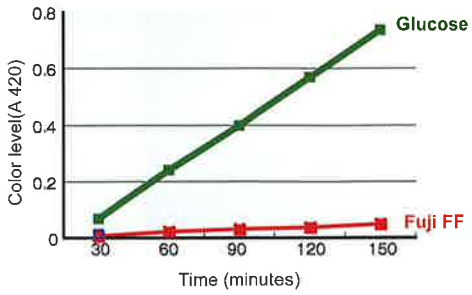
The residue rate was measured for the 10% Fuji FF solution, which was adjusted to various pH then heated for 15 minutes. The product is stable at pH 4 after heating to 100℃.

Freezing point depression



Since the freezing point for Fuji FF is not lowered as it is in granulated sugar and high-fructose corn syrup, it is easily frozen and thaws slowly after freezing.

Maillard reaction



The model solution, which was prepared by adding glycine to a 20% Fuji FF solution, was maintained at 100℃ with a pH 6.0, and the color level was measured against processing time. Since Fuji FF is non-redusing sugars, the Maillard reaction does not cause coloring.

Specifications and Safety

Fuji FF is inulin manufactured from sugar. Inulin is a natural component found in vegetables, and there is a long history of human ingestion of this material. Fuji FF is a safe food material that is non-GMO (not a genetically modified organism) and allergen free (does not contain allergic substances). The safety of Fuji FF has been verified in several safety tests.

Specifications

Test items	Fuji FF	Analytical methods
Descriptions	*White powder*	*Visual inspection*
Solid content	*97±2.0%*	*HPLC*
Inulin content	*≧ 94.7%／dry*	*HPLC*
pH	*5 - 7*	*Glass electrode method*
Arsenic	*≦ 1ppm*	*Atomic absorption Spectrophotometetory*
Heavy metals (as Pb)	*≦ 5ppm*	*Sodium sulfide colorimetric method*
Total viable cell count	*≦ 300cfu／g*	*MF method (standard agar medium)*
Mold and yeast	*≦ 20cfu／g*	*MF method (potato dextrose ager method)*
Coliform bacteria	*Negative*	*BGLB method*

Package Details

Package:20kg Craft Bag

Inner packing material:Polyethylene

Outside packing material:Craft Paper of triple-sheets

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