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# FRUCTANS (Inulin and Fructooligosaccharides)

## Technical Bulletin

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Fructans, also known as polyfructoses, are typically categorized in two subgroups depending upon their molecular size. The larger sized polyfructoses are known as inulin while the smaller ones (chain length of 3 to 10 fructose units) are known as fructooligosaccharides (FOS). When isolated from natural sources, polyfructoses consist of a chain of monosaccharide molecules, starting with a glucose molecule followed by a string of fructose molecules. The length of the fructose chain depends upon the source of the polyfructose. FOS produced from natural sources by hydrolyzing inulin consists of short chains, some having glucose coupled to a varying number of fructose molecules mixed with short chains of coupled fructose molecules only. Synthetic FOS has been produced by enzymatic synthesis from sucrose and fructose and contain a glucose molecule with 2-4 fructose units attached.

Polyfructoses are typically considered a dietary fiber (see Report of the Committee on Definition of Dietary Fiber of the American Association of Cereal Chemists and Dietary Reference Intakes Report of the Institute of Medicine of the National Academies). However, there has been some question about labeling them as such since only about 15% of them are quantitated by the early Official Methods of Analysis (AOAC 985.29 or AOAC 991.43) for the determination of dietary fiber. Polyfructoses have always been a part of the human diet, (see polyfructose content of some common foods below), but knowledge of their chemistry, nutrition, and physiological behavior has only been thoroughly explored in recent years.

### POLYFRUCTOSE CONTENT OF SOME FOODS

FOOD	g/100g	FOOD	g/100g
Artichoke Hearts	2-10	Garlic	9-16
Asparagus Root	1-30	Jerusalem Artichoke	16-20
Banana	0.3-0.7	Leeks	3-16
Barley	0.5-1.5	Onion	2-10
Chicory Root	15-20	Rye	0.5-1
Dandelion Leaves	12-15	Wheat	1-6

### ASSAY PRINCIPAL AND APPLICABILITY

Either one of two AOAC Official Methods of Analysis are typically used to analyze food samples for Polyfructoses. AOAC Official Method 997.08 utilizes a multistage enzymatic digestion of the sample. First, the mono and disaccharides in the sample are measured using High Pressure Liquid Chromatography (HPLC). Second, the sample is digested using an amylase to digest the starch, and the released starch glucose is measured. Finally the polyfructose is enzymatically digested, and the quantities of fructose and glucose released are measured. The polyfructose content is calculated from the amount of glucose and fructose released in the last step. AOAC Official Method 999.03 uses a similar digestion sequence, however the sugars are quantitated using an enzymatic/

For those desiring to accurately know the quantity of traditional dietary fiber in the presence of polyfructoses, a minor adjustment is needed to the traditional dietary fiber methods to assure that polyfructose content is not overestimated.

colorimetric procedure instead of HPLC.

Lower Detection Limit	0.1 g/100g (w/w)
Reporting Units	g/100 g
	Estimate of level
Information required with sample	Indicate if sample contains inulin or fructooligosaccharides.
Special Notes	Indicate if sample contains other dietary fibers

### NUTRITION INFORMATION

Polyfructoses are not digested or absorbed in the human small intestine, and thus pass to the large intestine where they are fermented by the colonic bacteria to yield short chain fatty acids and lower the pH of the colon contents. Most research studies have shown polyfructoses to shift the populations of colonic bacteria toward more beneficial species.

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