

Guideline on Method Selection for Dietary Fiber Analysis

Final approval February 2023

Dietary fiber is considered a nutrient of concern because studies have shown typical consumption falling below recommended daily values. In response, food manufacturing companies continue to seek new ways of incorporating fiber into a variety of products to help bridge this gap. The introduction of new fiber sources along with traditional ingredients raises methodology challenges when measuring fiber levels within food products. This guideline will help identify the proper methods to use, depending on the ingredients in the formulation. Referencing this guideline is a good starting point, but consulting with an expert in this area will lead to the best possible results. It should be noted that Table I only provides guidance on analytical methods. For nutritional labeling purposes, it is recommended that you consult with regulatory authorities of the region or country where a product is marketed. The preparation of this guideline was a collaborative effort by the Cereals & Grains Association Dietary Fiber and Other Carbohydrates Technical Committee.

Guideline on Method Selection for Dietary Fiber Analysis (continued)

TABLE I
General Guidelines on Analytical Method(s) to Use for Dietary Fiber Sources^a

Fiber Source	Type of Fiber	AACC 32-07 and 32-05	(AOAC	AACC 32-45.01		AACC 32-50.01		AACC 32-60.01	(AOAC 2022.01)
		(AOAC 991.43 and 985.29)	2001.03)	(AOAC 2009.01)	TSK-Gel	SugarPak	TSK-Gel	(AOAC 2017.16)	(AOAC 2022.01)
Cellulose	Insoluble	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hemicellulose	Insoluble/soluble	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hydroxypropylmethylcellulose	Soluble	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lignin	Insoluble	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pectin	Insoluble/soluble	Partially	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Beta glucan	Insoluble/soluble	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Carrageenan	Soluble	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Arabinoxylan ^b	Insoluble/soluble	Partially	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Glucomannan ^b	Insoluble/soluble	Partially	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pentosan	Insoluble/soluble	Partially	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Inulin (nonhydrolyzed) ^c	Soluble	Low %	Yes	Partially	Yes	Partially	Yes	Yes	Yes
Inulin (hydrolyzed) ^d	Soluble	Low %	Yes	Partially	Yes	Partially	Yes	Yes	Yes
Fructo-oligosaccharide (FOS) ^e	Soluble	Low %	Yes	Partially	Yes	Partially	Yes	Yes	Yes
Galacto-oligosaccharide (GOS) ^f	Soluble	No	Yes	Partially	Yes	Partially	Yes	Yes	Yes
Polydextrose	Soluble	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resistant maltodextrin/dextrin	Soluble	Low %	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Psyllium ^g	Soluble	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gums (including guar, locust bean, cassia, arabic, and xanthan)	Soluble	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Plant waxes (cutin/suberin)	Insoluble/soluble	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Alginates	Soluble	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Isomalto-oligosaccharides	Soluble	Partially	Partially	Partially	Partially	Partially	Partially	Partially	Partially
Resistant starch RS1		No	No	No	No	No	No	No	No
Resistant starch RS2	Insoluble	Partially	Partially	Yes	Yes	Yes	Yes	Yes	Yes
Resistant starch RS3	Insoluble/soluble	Insoluble portion captured	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Resistant starch RS4 (cross-linked phosphorylated RS4) ^h	Insoluble/soluble	Yes	Yes	Partially	Partially	Partially	Partially	Higher partially	Higher partially
Resistant starch RS5 ⁱ	TBD	Definition in progress ^j							

^a “Yes” indicates the method is accurate for analysis of this source of fiber. “No” indicates this class of resistant starch cannot be detected by gravimetric in vitro methods. “Partially” indicates this source of dietary fiber is not completely recovered by the method.

^b This fiber source is generally captured more accurately using AOAC method 2001.03 and sequential onward methods, but there may be issues in the DP3 area of the chromatography.

^c Recovery of this fiber source is dependent on the final amount of DP3 inulin and the final amount/type of DP2 carbohydrates.

^d Recovery of this fiber source is dependent on the degree of hydrolysis, amount of DP3 inulin, and the final amount/type of DP2 carbohydrates.

^e Recovery of this fiber source is dependent on chain lengths, amount of DP3 FOS, and the final amount/type of DP2 carbohydrates.

^f Recovery of this fiber source is dependent on the amount of DP3 GOS and the final amount/type of DP2 carbohydrates.

^g According to the Code of Federal Regulations, the U.S. FDA recommends a modified version of AOAC method 991.43. The modified version includes a sonication step that helps provide more accurate measurements within finished products.

^h The percent captured largely depends on the degree of phosphorylation of this fiber source. Check with the supplier to ensure best accuracy.

ⁱ At the time of this publication, there is not enough data to support which method should be used to capture the correct level of dietary fiber.

^j Consult with expert to determine appropriate analytical method.