

Fructan Intolerance

What are fructans?

Naturally occurring carbohydrates in the form of linear or branched fructose polymers¹. These fructose polymers come in 2-9 units length, which are called oligofructose, as well as > 10 units length, which are called inulins².

What types of foods are fructans found in?

Foods that are high in fructans may include wheat products—such as bread and pasta—onions, shallots, garlic, barley, cabbage, broccoli, pistachio, artichoke, chicory root, and asparagus^{1,2}. Each food containing fructan will have different amounts per serving, as seen in Table 1 attached³.

How much fructan is consumed in the United States?

Wheat and onions contribute about 95% of fructans in the American diet⁴. Besides wheat and onions, fructans are commonly found in several foods and can be difficult to avoid, as the United States Department of Agriculture's (USDA) 1994-1996 Continuing Survey of Food Intakes by Individuals revealed that an average of 2.6 grams of inulin and 2.5 grams of oligofructose are consumed daily in the United States, and these amounts will vary in regards to an individual's diet, age, gender, and race as well as the time of the year⁴. Moreover, this daily average for US citizens may be increasing as wheat-based products have become more popular.

What is the difference between fructan intolerance and non-celiac gluten sensitivity?

Non-celiac gluten sensitivity (NCGS) is seen in individuals who do not have celiac disease but have relieved gastrointestinal symptoms when following a gluten-free diet⁵. Gluten is a protein found in grains, including wheat, barley, and rye. Therefore, when an individual follows a gluten-free diet, they are eliminating about 70% of the major source of fructans in the American diet: wheat⁴. Although it is difficult to determine if an individual has either NCGS or fructan intolerance, NCGS may fall under the umbrella of fructan intolerance, as individuals eliminate one of the main components that may cause gastrointestinal symptoms with fructan intolerance.

What causes fructan intolerance?

The body is not perfect at breaking down all parts of food, and not all humans have enough of the essential enzyme necessary to break apart the linkages that connect the fructose polymers. As a result, these long chains of fructose polymers are only broken down and absorbed about 5-15% in the small bowel². The remaining fructans continue on to the large bowel, where they are fermented with the

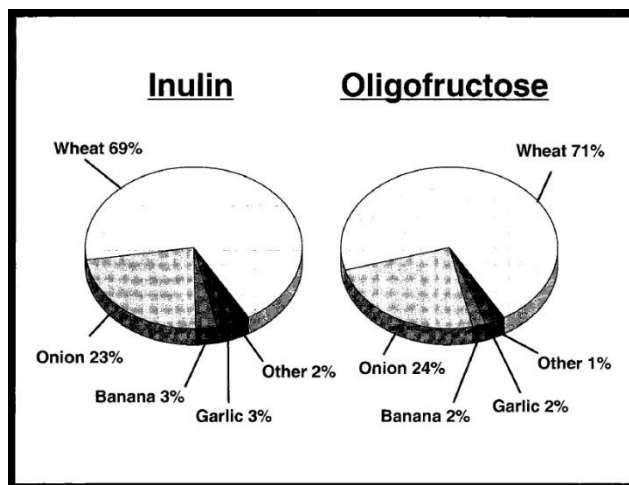


FIGURE 1 Contribution of food sources to inulin and oligofructose in American diets. Data presented in this figure are from the 1994–1996 Continuing Survey of Food Intakes by Individuals using the specialized database for inulin and oligofructose.

Fructan Intolerance

naturally occurring bacteria flora. As they ferment, the fructans may also pull in large amounts of water into the colon, which can cause bloating and diarrhea.

How does fructan intolerance relate to irritable bowel syndrome (IBS)?

IBS is a disorder that affects the large intestine, and has similar symptoms as fructan intolerance. The cause of IBS is unknown, but may be triggered by food allergies or intolerance, stress, hormonal changes, or other illnesses affecting the gastrointestinal tract⁶. Patients who have food intolerance IBS may experience difficulty tolerating fructans as well as other fermentable short-chain carbohydrates³. Although some individuals with IBS can eat various foods containing fructans, it is important to understand that the two conditions may be related in some people.

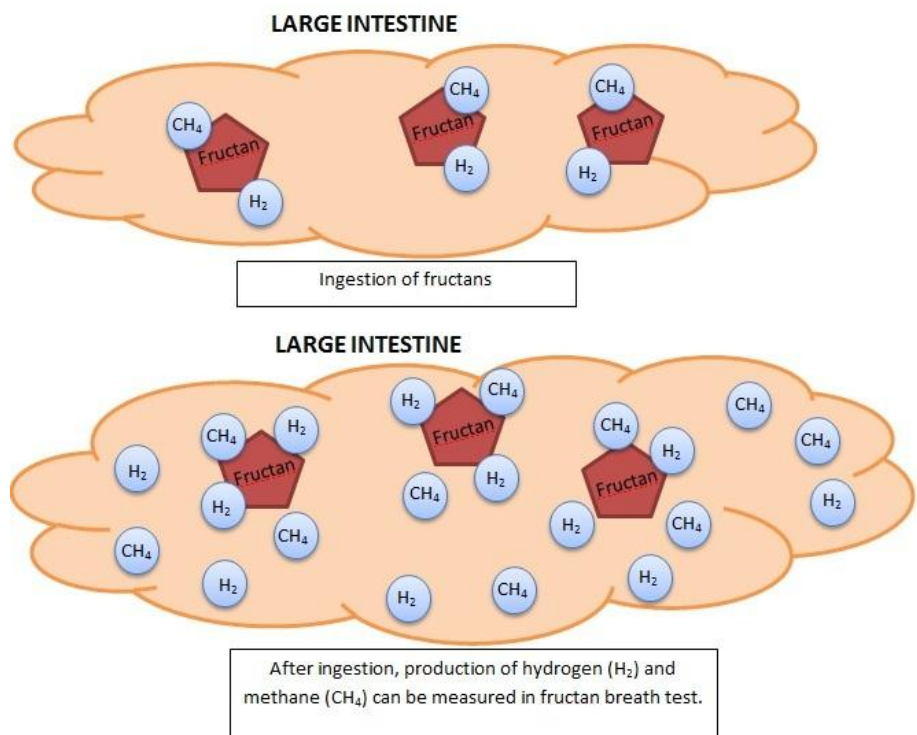
How can fructan intolerance be tested?

To determine if an individual has an intolerance of sugars or sugar alcohols, breath tests may be administered to measure the content of certain gases that may be produced if high amounts of the offending sugars are fermented in the small intestine. This may be done with fructans, although this is not considered a standardized test for diagnosing fructan intolerance due to limited available studies. The test involves providing a certain dose of fructans for consumption and checking

hydrogen and methane levels produced at different time intervals². Moreover, abdominal symptoms that may occur during testing are also used to determine intolerance. Patients should discuss with their physicians to see if a fructan breath test is necessary to determine whether he or she has a fructan intolerance.

How much fructan consumption is considered “too much” for someone with fructan intolerance?

When trying to make dietary changes to help relieve symptoms of fructan intolerance, any amount greater than 0.2 grams per serving has been seen to cause symptoms for most, although this level may vary for each person¹.

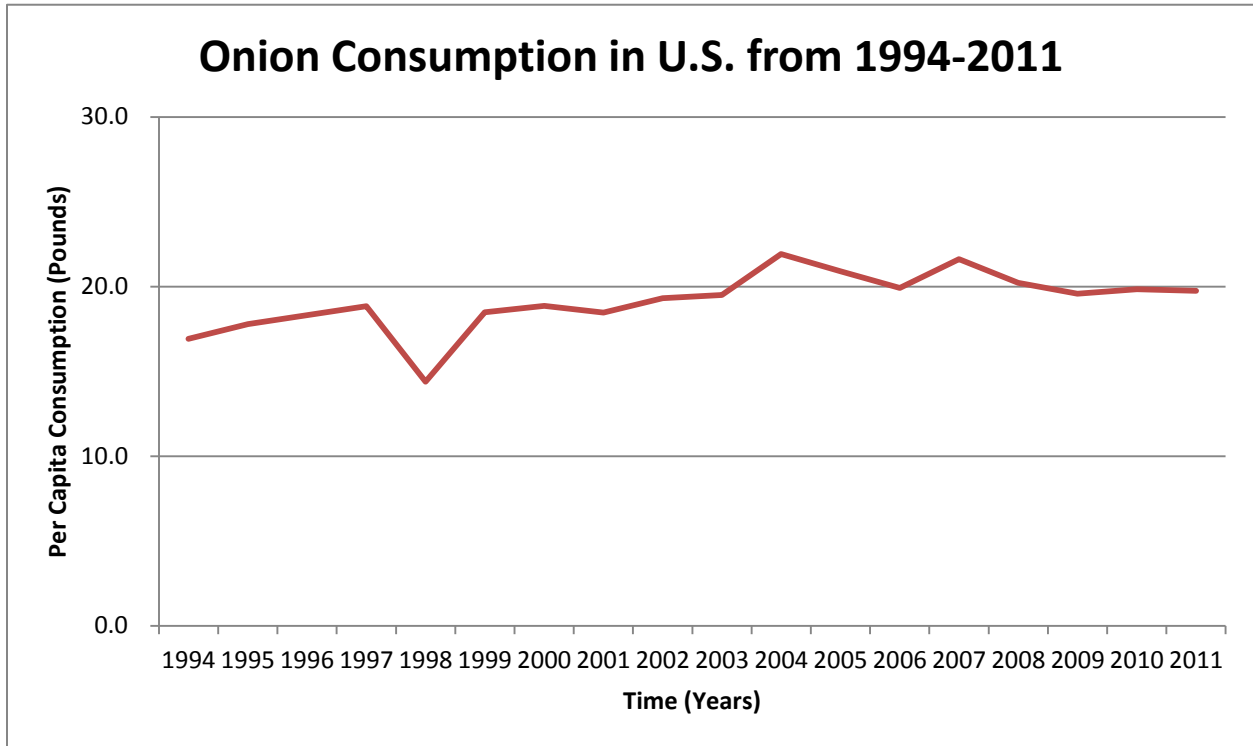


Fructan Intolerance

Resources:

1. Gibson PR, Shepherd SJ. Evidence-based dietary management of functional gastrointestinal symptoms: The FODMAP approach. *J Gastroenterol Hepatol*. 2010;25:252-258.
2. Fedewa A, Satish SCR. Dietary fructose intolerance, fructan intolerance and FODMAPS. *Curr Gastroenterol Rep*. 2014;16:370-378.
3. Shepherd SJ, Gibson PR. Fructose malabsorption and symptoms of irritable bowel syndrome: guidelines for effective dietary management. *J Am Diet Assoc*. 2006;106:1631-1639.
4. Moshfegh AJ, Friday JE, Goldman JP, Chug Ahuja JK. Presence of inulin and oligofructose in the diets of Americans. *J Nutr*. 1999;129:1407S-1411S.
5. Biesiekierski JR, Peters SL, Newnham ED, Rosella O, Muir JG, Gibson PR. No effects of gluten in patients with self-reported non-celiac gluten sensitivity after dietary reduction of fermentable, poorly absorbed, short-chain carbohydrates. *Gastroenterology*. 2013;145(2):320-328.
6. Irritable bowel syndrome. The National Digestive Diseases Information Clearinghouse. 2014. Available at: <http://www.digestive.niddk.nih.gov/ddiseases/pubs/ibs/>. Accessed February 23, 2015.

Fructan Intolerance



Source: Computed by USDA, Economic Research Service. U.S. Onion Statistics (94013).
<http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1396>

