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Fructose Intolerance (fructose malabsorption)

What is fructose?

Fructose is a sugar found in fruit and is a basic component of table sugar called sucrose. If you have fructose intolerance you should avoid foods that contain fructose and sucrose. Sorbitol, a sugar-alcohol converted to fructose during digestion, should be avoided as well.

It is important to understand that there are two types of fructose intolerance. Hereditary fructose intolerance is a rare genetic disorder in which a person does not have the enzyme to break down fructose in the digestive system. This is a more serious disorder and can lead to liver and kidney disease.

A second, less serious disorder is fructose malabsorption or dietary fructose intolerance. People with fructose malabsorption have difficulty digesting fructose. This disorder does not cause liver and kidney damage but can result in a variety of symptoms.

What are the symptoms of fructose malabsorption?

Symptoms vary from person to person in severity but in general include bloating, abdominal pain, diarrhea, headache, weight loss and fatigue.

How is fructose malabsorption diagnosed?

Fructose intolerance is diagnosed with a simple breath test. After some fasting requirements, medication, and dietary restrictions the patient is given a substance to drink. Occasionally, patients may be intolerant to more than one substance so your doctor may order more than one test. The substance used to test for small bowel bacterial overgrowth is glucose; lactose is used to test for intolerance of milk products; and fructose for fructose intolerance. Glucose, lactose and fructose are all sugars and intolerance to any can result in the same type of symptoms.

What causes fructose intolerance?

Unfortunately there are only theories as to why people are intolerant to fructose. Some ideas are abnormalities in GLUT5, a fructose transporter; bacteria in the bowel; celiac disease; chemotherapy; familial tendency; injury to the intestinal lining; overuse of high fructose corn syrup; radiation; or motility problems.



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Dietary Guidelines

What sweeteners should I avoid?

- Agave syrup
- Brown sugar (made with molasses)
- Caramel
- Fructose
- High Fructose Corn Syrup (HFCS)
- Honey
- Karo® corn syrup
- Molasses
- Maple syrup
- Palm sugar
- Sorbitol
- Splenda® (sucralose)

What sweeteners are OK to use?

Always read labels to be sure the companies aren't adding additional sweeteners, like high fructose corn syrup.

- Sucrose (table sugar—made from beet or sugar cane)
- Raw sugar or Turbinado sugar
- Corn syrup or corn syrup solids (be sure it's not High Fructose containing)
- Dextrin
- Glucose or glucose syrups
- Lactose
- Maltose, Isomaltose
- Barley Malt Syrup (contains about 2% fructose, so may not be as well tolerated)
- Brown Rice Syrup (check label to make sure HFCS wasn't added)
- Sugar substitutes: Aspartame (Nutrasweet® or Equal®), Sugar Twin®, Sweet One®
- Dextrose—available in specialty stores and online (binds free fructose in gut to absorb as sucrose)

Breads/Starches to Avoid

Commercial cookies, cakes, or breads and products with dried fruits, fruits, honey or added sugars are not allowed. Avoid instant flavored cereals and granola. Limit whole wheat breads, whole grain products and graham crackers.

Fruits to Avoid

All fruit drinks, juices, jams, and jellies. Avoid most fruits for the first 1-2 weeks and then gradually add 1-2 fruits weekly. Choose fruits that have a low fructose content (see table 1). If you start to have side effects return, decrease the amount of fruit in your diet.

Vegetables to Avoid

Beets	Corn	Onions	Sweet potatoes
Carrots	Eggplant	Peas	Tomatoes
Tomato based sauces	Turnips	Winter squash	



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These gas-forming vegetables may need to be limited or avoided (but can be eaten if tolerated)

- Broccoli
- Brussels sprouts
- Peppers (raw)
- Cucumbers (raw)
- Cabbage (raw)
- Radishes (raw)
- Cauliflower
- Leeks & Scallions

Recommended vegetables

Note: Cooked vegetables have less fructose.

- Celery
- Kohlrabi
- Lettuce greens (endive, dandelion greens, mustard, turnip, Swiss chard)
- Spinach
- Summer squash
- Zucchini
- Water chestnuts
- Snap beans
- Shallots
- Chives
- Asparagus
- Potatoes: baked, mashed, fried

Dairy Products to Avoid

- Flavored or sweetened milks (chocolate and others)
- Sweetened yogurts
- Sweetened condensed milk

Beverages to Avoid

- Milkshakes & malts
- Fruit & vegetable juices
- Carbonated sweetened beverages, like sodas
- Lemonade and other sweetened drinks made from dry mix or frozen concentrate.

Other foods to Avoid

- Candy sweetened with fructose containing sweeteners.
- Chewing gum (both sugar and sugar-free).
- Chocolate and most other desserts.
- Condiments sweetened with fructose containing sweeteners and soy sauce.

Helpful Hints

- Eat foods with fructose in small amounts and spread them over the day.
- Your body may be able to digest foods with fructose when eaten with other foods. Check medicines and vitamin for hidden fructose.
- Dextrose can be used for sucrose in some recipes.

Some people who limit the amount of fructose that they eat, will find relief of their symptoms quickly, while others may need to stay on this diet for up to a month. After your symptoms have improved you will be able to add foods back into your diet. You will want to add only one food at a time and then wait a few days before trying another new food.



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Fructose Content of Common Fruits **(fructose per 100 grams of food)**

Dates	32	Plums	3
Raisins	30	Honeydew	3
Figs	23	Grapefruit	3
Prunes	12	Strawberry	3
Grapes	8	Blackberry	2
Pears	6	Raspberry	2
Cherries	6	Orange	2
Apples	6	Pineapple	2
Blueberries	5	Cantaloupe	2
Banana	5	Peach	2
Kiwi	4	Nectarine	1.5
Watermelon	3	Apricot	1