

## Fructose-Restricted Diet

### Fructose

Fructose is a natural sugar found in many foods like fruits and honey. Fructose is also found in 'table sugar.' Long chains of fructose are called fructans and are found in certain vegetables, wheat, and other foods. Fructose is very sweet and is often made into high fructose corn syrup, used in soft drinks and processed foods.

### Why do I need to restrict (limit) fructose in my diet?

- **Fructose malabsorption** is when your body does not digest or absorb fructose well. This can cause bloating, abdominal pain, nausea, gas, and diarrhea.
- **Hereditary fructose intolerance** is a very rare genetic disorder. This is when the liver is not able to help the body break down fructose. Symptoms can be more serious. This disorder requires more than just limiting fructose.

### Following a Low Fructose Diet

People can tolerate different amounts of fructose. Most people have trouble with large amounts of fructose like in high fructose corn syrup and honey rather than smaller amounts of fructose in fruit. You will need to read food labels and learn which foods are high in fructose.

### How long do I have to follow a low fructose diet?

Some people will feel better quickly while others need more time. Once you have felt better for 4-6 weeks, you can slowly add foods back to your diet. Try to add only one food back to your diet at a time and wait 3-4 days in between to see how you feel.

### Foods and Food Groups to Avoid

- Avoid foods and drinks with high fructose corn syrup (candy, sodas, sweetened juice).
- Avoid packaged baked goods. Most of these contain high fructose corn syrup.
- Avoid sorbitol (a sugar alcohol). Fructose combined with sorbitol can make your symptoms worse. Sugar free candy and cough drops often contain sorbitol.
- Limit fruit portions to ½ cup at a meal or snack.
- Limit sweets to small servings. Enjoy sweets with a meal, not as a snack.

In healthy adults, less than 25-50 grams of fructose can cause GI symptoms. For example, a 16-ounce bottle of apple juice may have more than 30 grams of fructose and a 20-ounce bottle of soda can have up to 40 grams.

## Sweeteners

Limit or avoid:	Choose these:
<ul style="list-style-type: none"> <li>• Agave syrup</li> <li>• Caramel</li> <li>• Fructose</li> <li>• High fructose corn syrup</li> <li>• Honey</li> <li>• Invert sugar</li> <li>• Licorice</li> <li>• Molasses</li> <li>• Pancake syrup</li> <li>• Palm sugar</li> <li>• Sugar alcohols: mannitol, sorbitol, xylitol (for some people)</li> <li>• Sorghum</li> </ul> <p>Always read ingredient labels to see if other sweeteners, like high fructose corn syrup, are added.</p>	<ul style="list-style-type: none"> <li>• Barley malt syrup (about 2% fructose)</li> <li>• Brown rice syrup</li> <li>• Brown sugar</li> <li>• Dextrin</li> <li>• Dextrose—can find in specialty stores and online (binds free fructose in gut to absorb), can be used in recipes</li> <li>• Glucose or glucose syrups</li> <li>• Lactose</li> <li>• Maltose, isomaltose</li> <li>• Polycose</li> <li>• Raw sugar or turbinado sugar</li> <li>• Real maple syrup (limit to 1 Tbsp)</li> <li>• Sucrose (table sugar/cane sugar)</li> <li>• Sugar substitutes: aspartame* (NutraSweet® or Equal®), Sugar Twin®, Sweet One®, Stevia®, sucralose (Splenda®)*</li> </ul>

\*Certain artificial sweeteners like sucralose or aspartame can upset your stomach.

Although some sweeteners are okay to use, some people may not handle large amounts at one time.

### Fruits

Eat small portions of fruit as part of a meal. Do not eat fruit separately as a snack. Avoid fruit drinks, juices, jams, jellies, and chutneys.

### Fructose Content of Common Fruits

Fructose is absorbed in the small intestine in a couple of ways. If glucose is present in

equal amounts with fructose, the body absorbs fructose better. Free fructose without matching glucose is absorbed more slowly, which may cause upset stomach.

Start with small portions of easier to tolerate fruits at meals (see first table on next page). They have a lower number of grams of fructose and are lower in “excess fructose” so they will cause less gas and other symptoms.

**Lower Fructose - Easier to Tolerate Fruits**

<b>Fruit</b>	<b>Serving Size</b>	<b>Fructose (grams)</b>
<b>Apricot</b>	1 fruit	.33
<b>Cantaloupe</b>	1/2 cup diced	1.5
<b>Raspberries</b>	½ cup	1.5
<b>Plum</b>	1 fruit	2
<b>Peach</b>	1 medium	2
<b>Nectarine</b>	1 medium	2
<b>Blackberries</b>	1/2 cup	2
<b>Grapefruit</b>	½ fruit	2
<b>Pineapple</b>	½ cup chunks	2
<b>Strawberries</b>	1/2 cup sliced	2
<b>Honeydew</b>	1/2 cup diced	2.5
<b>Orange</b>	1 fruit	3
<b>Cherries</b>	½ cup	4
<b>Blueberries</b>	½ cup	4

**Higher Fructose - Harder to Tolerate Fruits**

<b>Fruit</b>	<b>Serving Size</b>	<b>Fructose (grams)</b>
<b>Kiwi</b>	1 fruit	4
<b>Raisins</b>	1 miniature box (1 oz or 30 raisins)	4
<b>Watermelon</b>	1 cup diced	5
<b>Banana</b>	1 medium	6
<b>Grapes</b>	½ cup	6
<b>Mango</b>	1 whole	6
<b>Orange juice</b>	1 cup	6.4
<b>Persimmon</b>	1 whole 2 ½ inch diameter	9.3
<b>Apple</b>	1 medium	10
<b>Prunes</b>	½ cup	11
<b>Pear</b>	1 medium	11
<b>Apple juice</b>	1 cup	14
<b>Dates</b>	½ cup	14
<b>Figs, dry</b>	½ cup	17

Adapted from USDA National Nutrient Database for Standard Reference, Release 28.

Avoid these harder to tolerate fruits until you are feeling better (see table above). Once you are symptom free, you may be

able to slowly add 1 to 2 new fruits weekly. If side effects return, decrease the amount of fruit in your diet (still avoid juices).

## Tomatoes

Many people have problems eating tomato products. Sweetener is often added to spaghetti sauce. Store-bought spaghetti sauce has 11 grams of sugars. This is twice the amount of sugar that is in plain tomato sauce. After you are symptom free, if you want spaghetti sauce, try to make your own sauce. Use the simple recipe below, or you can also purchase “no sugar added” tomato sauce. You will still need to limit your portion.

When the “Grams Excess Fructose” column says “Glucose,” the food has a good balance of glucose and fructose to help the body digest the fructose.

When the “Grams Excess Fructose” column lists the grams of excess fructose, this means there is no balance of glucose to help absorb the fructose in this food.

<b>Fruit</b>	<b>Serving Size</b>	<b>Fructose (grams)</b>	<b>Grams Excess Fructose</b>
<b>Fresh Tomato</b>	1 whole	1.7 grams	0.15
<b>Tomato Sauce</b>	½ cup	2.03 grams	Glucose*
<b>Canned Tomatoes</b>	½ cup	1.52 grams	0.2
<b>Tomato Paste</b>	1 Tablespoon	0.48 grams	0.01

\*Note: “Glucose” means this fruit has more glucose than fructose.

## Spaghetti with Meat Sauce

½ pound hamburger, browned and drained  
2 cloves fresh garlic, minced  
16 ounces tomato sauce

1 teaspoon oregano, or to taste  
1 teaspoon basil, or to taste  
salt and pepper to taste

After meat is browned and drained, add garlic, oregano, and basil. Add tomato sauce, salt and pepper to taste and simmer for about 20-30 minutes while pasta is cooking. Do not eat more than ½ cup serving. Try having the sauce with gluten-free noodles. You may also add other herbs or spices.

## Vegetables

Some vegetables contain fructose but are well balanced with glucose. Half cup portions should not be a problem. Vegetables can be cooked or uncooked. Eat vegetables as part of a meal. If you have diarrhea, avoid whole kernel corn as it is hard to digest.

<b>Vegetables that May Cause Problems</b>	<b>Serving Size</b>	<b>Fructan (Grams)</b>	<b>Notes</b>
<b>Asparagus</b>	6 spears	2.6	
<b>Leeks</b>	½ cup	5.6	
<b>Onions</b>	2 Tbsp	2.1	
<b>Jerusalem artichoke</b>	½ cup	15	
<b>Garlic</b>	1 Tbsp	0.5	
<b>Globe artichoke</b>	1 globe	5.5	
<b>Dandelion greens</b>	½ cup	3.1	
<b>Chicory roots</b>	½ cup	15	Common additive in high fiber products

### **Vegetables to Avoid**

- Beets
- Broccoli
- Brussels sprouts
- Cabbage
- Cauliflower

### **Avoid these if you have gas:**

- Legumes/baked beans
- Green peppers
- Mushrooms
- Sugar snap peas

### **Dairy Products to Avoid**

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

### **Allowed Drinks**

- Water, carbonated water
- Milk
- Glucose-sweetened energy and sports drinks
- Powdered drink, sugar-free (or with allowed sweetener)
- Coffee or tea
- Alcoholic drinks (limit to 1 ounce): gin, rum, vodka (from grain or potato), whiskey, dry white wine, or red wine

### **Drinks to Avoid**

- Carbonated sweetened drinks
- Fruit and vegetable juices, lemonade, and other sweetened juice drinks
- Milkshakes and malts
- Beer, sherry, port and other fortified wines

**Other Foods to Avoid or Limit**

- Avoid chewing gum (both sugar and sugar-free).
- Avoid chocolate and most other desserts. Cocoa powder with allowed sweeteners is okay.
- Avoid condiments sweetened with fructose. For example: ketchup and soy sauce.
- Avoid coconut, coconut milk and coconut cream. These are high in sugars.
- For sandwiches and salads, chop up dill pickles instead of using sweet pickle relish.

- Check medicines and vitamins for hidden fructose and/or sorbitol.

**Breads and Starches**

If your symptoms do not improve after removing high fructose corn syrup and limiting the fruit you eat, you may need to watch your intake of fructans in breads and starches. Wheat-based foods contain fructans or high fructose corn syrup. These can increase symptoms. You may just need to avoid breads with honey or high fructose corn syrup. You may then eat other breads as desired.

<b>Avoid:</b>	<b>Choose these:</b>
<ul style="list-style-type: none"> <li>• Whole wheat bread</li> <li>• Whole grain cereals</li> <li>• Graham crackers</li> <li>• Wheat pasta</li> <li>• Store bought cakes, cookies or muffins</li> <li>• Wheat flour</li> <li>• Products with dried fruits, fruits, honey, coconut or added sugar</li> <li>• Instant flavored cereals &amp; granola</li> </ul>	<ul style="list-style-type: none"> <li>• Rye bread, gluten-free breads</li> <li>• Gluten-free cereals</li> <li>• Rye, corn or rice crispbreads</li> <li>• Rice noodles, gluten-free pasta, brown rice (for fiber) or white rice</li> <li>• Gluten-free cookies and cakes</li> <li>• Rice flour, spelt flour, other gluten-free flours</li> </ul>

**Constipation**

If you are constipated, talk to your doctor. When you are constipated, your gut has more time to feed and ferment on the sugars in the gut from the foods you eat. As the sugars feed those bacteria, the bacteria grow, which causes gas and stomach pain.

Nutrition clinics for UW Hospital and Clinics (UWHC) and American Family Children’s Hospital (AFCH)  
**(608) 890-5500**

**Who to Call**

If you are a UW Health patient and have more questions, please contact UW Health at one of the phone numbers listed.

Nutrition clinics for UW Medical Foundation (UWMF)  
**(608) 287-2770**

You can also visit our website at:  
[www.uwhealth.org/nutrition](http://www.uwhealth.org/nutrition).