

Low FODMAP (Fermentable Oligo-, Di- and Monosaccharides and Polyols) Diet

What are FODMAPs?

FODMAPs are a type of carbohydrate (or “sugar”) found in certain foods. Some people may have trouble digesting FODMAPS, especially patients with irritable bowel syndrome, a slow moving gut, or other bowel disorders. This is because FODMAPS are not easily absorbed by the bowel. Symptoms include: abdominal discomfort, distention, bloating, fullness, nausea and/or pain after eating foods containing FODMAPS.

The table below lists the names of the carbohydrates that are considered FODMAPs.

<u>Fructans and Galactins</u>	<u>Polyols</u>
<ul style="list-style-type: none">• Fructose• Lactose• Fructooligosaccharides• Galactooligosaccharides	<ul style="list-style-type: none">• Sorbitol• Mannitol• Xylitol• Maltitol

Fructose* and Glucose

Fructose is a naturally occurring sugar found in fruit, vegetables, and honey. Fructose intolerance can occur in people with irritable bowel syndrome and other bowel disorders. Fruits and fruit juices with higher levels of fructose may cause gas, bloating, abdominal cramping, and diarrhea.

Glucose is also a naturally occurring sugar. Fruits and juices with more glucose (and less fructose) may be more “intestine friendly”. The tables in the following section list which fruits, juices and other foods may be better choices for patients with FODMAP intolerance.

High Fructose Corn Syrup (HFCS) *

HFCS is an ingredient in many processed foods. HFCS is made up of almost half glucose and half fructose. HFCS may be easily digested by some patients. Therefore, items with HFCS, such as soft drinks, may be tolerated well if they are limited to 12 oz per day and are taken with a meal.

** In some patients, even a small amount of processed fruit juice or HFCS may cause intestinal discomfort and/or malabsorption.*

Sorbitol

Sorbitol (or sorbose) is a sugar alcohol that is found naturally in fruits and fruit juices. It is used as an artificial sweetener. It can also be found in many “diet foods” or “diabetic” foods (such as diet soft drinks, sugarless gum, sugar-free jelly/jam, and other sugar-free foods). It may also be found in liquid medications. Sorbitol often creates similar symptoms as fructose – especially when fructose and sorbitol are ingested together.

General Guidelines

- Eliminate products with ingredients that list fructose, crystalline fructose (not HFCS), honey, and sorbitol on the label.
- Avoid sugar alcohols. These include sorbitol, isomalt, lactitol, maltitol, mannitol, xylitol, erythrytol, and lactatol. These are often found in “diet” or “diabetic foods” such as diet drinks, ice cream, candy, processed goods, etc.
- Limit drinks with HFCS. If used, drink less than the recommended serving size--less than 12 oz of soda (may help to drink with a meal).
- Check your medications for fructose and sorbitol. They are not always listed on the label, so check with your pharmacist or the manufacturer.
- Keep in mind the amount of fructose found in 2 apples (or 2 oz of honey) is the same as the amount of fructose in 1 can of soda (note: apples have other nutritional benefits).
- Follow guidelines below to choose fruits, vegetables, and other foods that are friendlier to your intestines!

Fruits:

- Serving size is ½ cup
- Limit to 1 to 2 servings per day.
- Fresh or fresh frozen fruit may be better tolerated than canned fruit.
- Keep in mind tolerance may depend on the amount you eat at one time.
- Limit concentrated sources of fruit--such as dried fruit and fruit juices
- Avoid eating large amounts of any fruit.

The foods listed as “Foods to Avoid” should not be eaten because of their high FODMAP content. These are otherwise healthy foods.

Intestine Friendly	Foods to Avoid if FODMAP Intolerant	Questionable Foods/Foods to Limit
Bananas*, blackberries, blueberry, grape, grapefruit, honeydew, kiwifruit, lemons, limes, mandarin orange, melons, oranges, papaya, passionfruit, pineapples, raspberries, rhubarb, strawberries, tangelos	Apples, apple cider, apple juice, applesauce, apricots, cherries, dates, grapes, lychee, mango, peaches, pears, pear juice, plums, prunes, watermelon	Other fruit juices or drinks, sugar-free jam/jelly, dried fruit, canned fruit in heavy syrup, other fruits

Vegetables:

- Serving size is ½ cup (most vegetables) or 1 cup of leafy green vegetables
- Limit to 1 ½ to 3 servings per day.
- Cooked vegetables may be tolerated best as cooking causes a loss of free sugars.
- Keep in mind tolerance may depend on the amount you eat at one time.

Intestine Friendly	Foods to Avoid if FODMAP Intolerant	Questionable Foods/Foods to Limit
Bamboo shoots, bok choy, carrots, cauliflower*, celery, cucumber*, eggplant*, green beans*, green peppers*, leafy greens, parsnip, pumpkin, spinach, sweet potatoes, white potatoes, other root vegetables	Artichokes, asparagus, some beans (baked beans, chickpeas, kidney beans, lentils) beetroot, broccoli, Brussels sprouts, cabbage, cauliflower, fennel, garlic, sugar snap peas, leeks, soy products, okra, onions, peas, shallots	Avocado, corn, mushrooms, tomatoes, other beans

Other Foods and Food Additives:

Intestine Friendly	Foods to Avoid if FODMAP Intolerant	Questionable Foods/Foods to Limit
<ul style="list-style-type: none"> • All meats • All fats • Yogurt and hard cheeses • All eggs • Aspartame (Equal® and Nutrasweet®) • Saccharin (Sweet 'n Low®) • Sucrose (table sugar) • Glucose • Maple syrup 	<ul style="list-style-type: none"> • Honey • Flavorings with fructose or sorbitol • Desserts (ice cream, candy, cookies, bars, popsicles) sweetened with fructose or sorbitol • Cereal or other processed foods with sorbitol or fructose on the label • Sherry and port wine • Sweeteners such as sorbitol, mannitol, xylitol, maltitol, and isomalt used in sugar-free gum, candies and mints 	<ul style="list-style-type: none"> • Limit products with HFCS if symptoms still continue • If you experience symptoms with lactose, try limiting milk, cottage cheese, and other lactose-containing foods (see Lactose Intolerance handout)

*** Possible gas forming foods may need to be avoided**

Medications:




Many liquid medications and some personal care items may contain lactose or the sugar alcohols (sorbitol, mannitol, xylitol, maltitol, isomalt). Examples include: liquid pain relievers (including liquid gel caps), cough medicines, and cough drops. If possible, choose a tablet or caplet form instead of liquid medication. If you have eliminated FODMAPs from your diet and are still having symptoms, talk to your pharmacist to see if any of your medications contain lactose or sugar alcohols.

Additional Resources:





Visit: www.GInutrition.virginia.edu

- Go to Nutritional Issues in Practical Gastroenterology
- Scroll down to the 2007 articles: "Clinical Ramifications of Malabsorption of Fructose and Other Short-chain Carbohydrates"

Foods suitable on a low-fodmap diet

fruit	vegetables	grain foods	milk products	other
<p>fruit banana, blueberry, boysenberry, canteloupe, cranberry, durian, grape, grapefruit, honeydew melon, kiwifruit, lemon, lime, mandarin, orange, passionfruit, pawpaw, raspberry, rhubarb, rockmelon, star anise, strawberry, tangelo</p> <p>Note: if fruit is dried, eat in small quantities</p> 	<p>vegetables alfalfa, artichoke, bamboo shoots, bean shoots, bok choy, carrot, celery, choko, choy sum, endive, ginger, green beans, lettuce, olives, parsnip, potato, pumpkin, red capsicum (bell pepper), silver beet, spinach, summer squash (yellow), swede, sweet potato, taro, tomato, turnip, yam, zucchini</p> <p>herbs basil, chili, coriander, ginger, lemongrass, marjoram, mint, oregano, parsley, rosemary, thyme</p>	<p>cereals gluten-free bread or cereal products</p> <p>bread 100% spelt bread</p> <p>rice</p> <p>oats</p> <p>polenta</p> <p>other arrowroot, millet, psyllium, quinoa, sorgum, tapioca</p> 	<p>milk lactose-free milk, oat milk*, rice milk, soy milk* *check for additives</p> <p>cheeses hard cheeses, and brie and camembert</p> <p>yoghurt lactose-free varieties</p> <p>ice-cream substitutes gelati, sorbet</p> <p>butter substitutes olive oil</p>	<p>sweeteners sugar* (sucrose), glucose, artificial sweeteners not ending in '-ol'</p> <p>honey substitutes golden syrup*, maple syrup*, molasses, treacle *small quantities</p> 

Eliminate foods containing fodmaps

excess fructose	lactose	fructans	galactans	polyols
<p>fruit apple, mango, nashi, pear, tinned fruit in natural juice, watermelon</p> <p>sweeteners fructose, high fructose corn syrup</p> <p>large total fructose dose concentrated fruit sources, large serves of fruit, dried fruit, fruit juice</p> <p>honey corn syrup, fruisana</p> 	<p>milk milk from cows, goats or sheep, custard, ice cream, yoghurt</p> <p>cheeses soft unripened cheeses eg. cottage, cream, mascarpone, ricotta</p> 	<p>vegetables asparagus, beetroot, broccoli, brussels sprouts, cabbage, eggplant, fennel, garlic, leek, okra, onion (all), shallots, spring onion</p> <p>cereals wheat and rye, in large amounts eg. bread, crackers, cookies, couscous, pasta</p> <p>fruit custard apple, persimmon, watermelon</p> <p>miscellaneous chicory, dandelion, inulin</p>	<p>legumes baked beans, chickpeas, kidney beans, lentils</p> 	<p>fruit apple, apricot, avocado, blackberry, cherry, lychee, nashi, nectarine, peach, pear, plum, prune, watermelon</p> <p>vegetables cauliflower, green capsicum (bell pepper), mushroom, sweet corn</p> <p>sweeteners sorbitol (420) mannitol (421) isomalt (953) maltitol (965) xylitol (967)</p> 

The Low FODMAPs Diet

Symptoms of abdominal pain, gas, bloating, flatulence, burping, constipation and/or diarrhea are commonly present in various gastrointestinal disorders but are hard to treat and minimize symptoms. Often these symptoms are called Irritable Bowel Syndrome (IBS). If you have IBS or a constellation of chronic GI complaints for which no other disease or condition has been identified, consider a diet low in fermentable oligo-, di-, and monosaccharides and polyols (FODMAPs). This is a diet that limits, but does not eliminate, foods that contain:

- Lactose
- Fructose
- Fructans
- Galactans
- Sugar alcohols (polyols)

These compounds in food are poorly absorbed, highly osmotic and rapidly fermented by GI bacteria, leading to increased water and gas in the GI tract, which then leads to GI tract distention that causes changes in GI motility, bloating, discomfort and flatulence.

To assess your tolerance for these compounds, eliminate foods high in FODMAPs for 6-8 weeks and then gradually reintroduce foods to identify bothersome foods. Reintroduce one food every four days with a 2-week break between bothersome foods. The goal is to identify the threshold at which you are able to consume FODMAP containing foods without causing bothersome GI symptoms.

Lactose

Lactose is the carbohydrate found in cow's, sheep's, and goat's milk. Lactose intolerance is caused by partial or complete lack of the enzyme lactase which digests lactose. When lactose is not completely digested, it contributes to abdominal bloating, pain, gas, and diarrhea, often occurring 30 minutes to two hours following the consumption of milk and milk products.

Limit foods high in lactose such as yogurt, ice cream, milk, and ricotta and cottage cheeses. See *FODMAPs in Food* table.

Fructose

Fructose is a carbohydrate found in fruit, honey, high-fructose corn syrup (HFCS), and agave syrup, but not all fructose containing foods need to be limited on a low FODMAPs diet. Fructose malabsorption is similar to lactose intolerance, in that fructose is not completely digested in the GI tract due to the lack of an enzyme, but unlike lactose intolerance the absorption of fructose is dependent on another carbohydrate, glucose. Therefore, fructose-containing foods with a 1:1 ratio of fructose to glucose are generally well tolerated on the FODMAPs diet and conversely, foods with excess fructose compared with glucose, such as apples, pears, and mangos, will likely trigger abdominal symptoms.

Limit foods with excess free fructose, see *FODMAPs in Food* table.

Fructans

Fructans are carbohydrates that are completely malabsorbed because the intestine lacks an enzyme to break their fructose- fructose bond. For this reason, fructans can contribute to bloating, gas, and pain. Wheat accounts for the majority of people's fructan intake.

Limit wheat, onions and garlic along with other vegetables high in fructans, see *FODMAPs in Food* table.

The Low FODMAPs Diet



Galactans

Galactans are carbohydrates that are malabsorbed for the same reason as fructans; the intestine does not have the enzyme needed to break down galactans. Consequently, galactans can contribute to gas and GI distress.

Limit beans and lentils. See *FODMAPs in Food* table.

Polyols

Polyols are also known as sugar alcohols. They are found naturally in some fruits and vegetables and added as sweeteners to sugar-free gums, mints, cough drops, and medications. Sugar alcohols have varying effects on the bowel.

Limit sugar alcohols, sorbitol, xylitol, mannitol and maltitol. See *FODMAPs in Food* table.

FODMAPs Elimination and Challenge

Use the table below to guide your choices. Eliminate foods high in FODMAPs for 6-8 weeks. You should notice an improvement in your GI complaints within one week of following a low FODMAP diet. Follow a low FODMAP diet for a full 6-8 weeks before assessing its effectiveness and reintroducing foods high in FODMAPs. At that time you will work with your Nutrition Counselor to reintroduce one test food every four days; if you react to a food, do not test another food for two weeks.

Foods that are high in FODMAPs may aggravate your GI complaints but they are not causing an allergic reaction or an autoimmune reaction in your body. The foods high in FODMAPs that elicit GI symptoms are causing functional discomfort in your gut that result in gas, bloating, distention etc.

These are the test foods for each category:

- Lactose: ½-1 cup milk
- Fructose: ½ mango or 1-2 teaspoons honey
- Fructans: 2 slices wheat bread, 1 garlic clove or 1 cup pasta
- Galactans: ½ cup lentils or chickpeas
- Sugar alcohols (polyols): Sorbitol, 2-4 dried apricots; Mannitol, ½ cup mushrooms

You will work with your Nutrition Counselor to determine the order of challenge and which foods to use.

The Low FODMAPs Diet

FODMAPs in Food

Type of food	High in FODMAPs	Low in FODMAPs
Milk	Milk: Cow, Sheep, Goat, Soy Creamy soups made with milk Evaporated milk Sweetened condensed milk	Milk: Almond, Coconut, Hazelnut, Hemp, Rice Lactose free cow's milk Lactose free keifer Lactose free ice cream (non-dairy alternatives) Purchase lactase enzyme to make your own evaporated or condensed milk if needed
Yogurt	Cow's milk yogurt (Greek yogurt is lowest in FODMAPs) Soy yogurt	Coconut milk yogurt
Cheese	Cottage cheese Ricotta cheese Marscapone cheese	Hard cheeses including cheddar, Swiss, brie, blue cheese, mozzarella, parmesan, and feta No more than 2 tablespoons ricotta or cottage cheese Lactose free cottage cheese
Dairy-based condiments	Sour cream Whipping cream	Butter Half and half Cream cheese
Dairy-based desserts	Ice cream Frozen yogurt Sherbet	Sorbet from FODMAPs friendly fruit
Fruit	Apples, Pears Cherries, Raspberries, Blackberries Watermelon Nectarines, White peaches, Apricots, Plums, Peaches Prunes Mango, Papaya Persimmon Orange juice Canned fruit Large portions of any fruit	Banana Blueberries, Strawberries Cantaloupe, Honeydew Grapefruit, Lemon, Lime Grapes Kiwi Pineapple Rhubarb Tangelos <1/4 avocado <1 tablespoon dried fruit <i>Limit consumption to one low FODMAPs fruit per meal Consume ripe fruit; firm, less-ripe fruit contains more fructose</i>

The Low FODMAPs Diet

Vegetables	Artichokes Asparagus Sugar snap peas Cabbage Onions Shallot Leek Onion and garlic salt powders Garlic Cauliflower Mushrooms Pumpkin Green peppers	Bok choy, Bean sprouts Red bell pepper Lettuce, Spinach Carrots Chives, Spring onion (green part only) Cucumber Eggplant Green beans Tomato Potatoes Garlic infused oil; purchase flavored oil or sauté onion and garlic in oil and then discard onion and garlic Water chestnuts <1 stick celery <1/2 cup sweet potato, broccoli, Brussels sprouts, butternut squash, fennel <1/3 cup green peas <10 snow peas
Grains	Wheat Rye Barley-large quantities Spelt	Brown rice Oats, oat bran Quinoa Corn Gluten-free bread, cereals, pastas and crackers without honey, apple/pear juice, agave or HFCS Namaste Food Perfect Flour Blend or King Arthur Gluten Free Multi-Purpose Flour
Legumes	Chickpeas, Hummus Kidney beans, Baked beans Edamame Lentils Soy milk	Tofu Peanuts
Nuts and Seeds	Pistachios	10-15 max or 1-2 tablespoons Almonds, Macadamia, Pecans, Pine nuts, Walnuts Pumpkin seed, Sesame seeds, Sunflower seeds
Sweeteners	Honey Agave High fructose corn syrup Sorbitol, Mannitol, Xylitol, Maltitol Splenda (may alter friendly gut flora)	Sugar Glucose, Sucrose Pure maple syrup Aspartame
Additives	Inulin, found in yogurt, keifer, cereals and other foods with added fiber FOS (fructo-oligosaccharides) Sugar alcohols (see sweeteners) Chicory root	
Alcohol	Rum	Wine, Beer Vodka, Gin Limit to one serving as all alcohol is a gastric irritant
Protein-rich food		Fish, Chicken, Turkey, Eggs, Meat
Fat-rich food		Olive and canola oil Olives <1/4 avocado

The Low FODMAPs Diet

Low FODMAP Menu options

Breakfast

- Erewhon Corn Flakes or oats, with rice or almond milk, banana and 1 tablespoon sliced almonds
- McDonald's or Starbucks oatmeal with 1 tablespoon dried fruit and nuts
- Quinoa flakes with rice or almond milk, ¼ cup strawberries and 1 tablespoon pecans

Lunch

- Udi's white bread sandwich with sliced turkey, lettuce or spinach leaves, tomato, sliced cheddar cheese and Green Valley lactose-free vanilla yogurt, ½ cup blueberries and baby carrots
- Stir fry with brown rice or rice noodles, chicken, shrimp or beef, peppers and bok choy, ask for no onion or garlic and the sauce on the side
- Fruit salad with 1 cup (total) low FODMAP fruits, kiwi, strawberries and blueberries, spinach salad with lemon dressing and cherry tomatoes, and brown rice cakes with natural almond butter

Snack

- Glutino pretzels or Blue Diamond Almond Nut thins and mozzarella string cheese
- Hard boiled egg and cherry tomatoes
- Pumpkin seeds
- Brown rice cakes with natural peanut butter
- Banana and handful almonds
- 1 stick celery with natural almond butter or,
- Carrots and red pepper dipped in tahini

Dinner

- Grilled chicken or salmon with baked sweet potato with olive oil or butter, sautéed spinach and red peppers seasoned with green parts of onion, salt, pepper, handful of pine nuts and olive oil, and a kiwi
- Wendy's baked potato and a side salad with chicken, bring your own homemade salad dressing that does not contain garlic or onion
- Sushi

Menu ideas adapted from *Today's Dietitian*, March 2012

Online Resources for More Information

www.katescarlata.com

www.ibsfree.net

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