

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.

#### *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: 1/2 cup milk

Fructose: 1/2 mango or 1-2 teaspoons honey

Fructans: 2 slices wheat bread, 1 garlic clove or 1 cup pasta

Galactans: 1/2 cup lentils or chickpeas

Sugar alcohols (polyols): Sorbitol, 2-4 dried apricots; Mannitol, 1/2 cup mushroom

FODMAPs in Food		
Type of food	High in FODMAPs	Low in FODMAPs
<b>Milk</b>	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>
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FODMAPs in Food		
Type of food	High in FODMAPs	Low in <b>FODMAPs</b>
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; 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 <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, Soy milk Lentils	Tofu Peanuts <1/3 cup green peas
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 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

### 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, 1/2 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, 1/2 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
- Hardboiled 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