



## Understanding **FODMAPs**

### What are FODMAPs?

FODMAPs are a group of small carbohydrate (sugar) molecules found in everyday foods. Carbohydrates are made up of carbon, hydrogen and oxygen and provide an important source of energy for the body. FODMAPs are carbohydrates that may be poorly absorbed in the small intestine of some people. FODMAPs move through the digestive tract to the large intestine (colon), where they can draw water into the colon and are rapidly fermented

(digested) by naturally-occurring gut bacteria. The fermentation of FODMAPs produces gas and other by-products.

While some people are able to consume FODMAPs without experiencing gastrointestinal side effects, many people with digestive disorders, such as Irritable Bowel Syndrome (IBS), find that FODMAPs triggers symptoms including abdominal pain, cramping, bloating, excess gas, constipation and/or diarrhea.

### What does FODMAP mean?

FODMAP is an acronym for Fermentable – Oligosaccharides – Disaccharides – Monosaccharides – And – Polyols. Each of these is explained below:

<b>F</b>	<b>Fermentable:</b> Fermentable carbohydrates are sugars that are broken down and digested by bacteria in our intestines, producing gas and other by-products.
<b>O</b>	<b>Oligosaccharides:</b> Oligosaccharides are short chains of carbohydrate molecules linked together. <ul style="list-style-type: none"> <li>• Fructans (a chain of fructose molecules) and galacto-oligosaccharides (a chain of galactose molecules) are oligosaccharides that humans cannot break down and properly absorb in the small intestine.</li> </ul>
<b>D</b>	<b>Disaccharides:</b> Disaccharides are two carbohydrate molecules linked together. <ul style="list-style-type: none"> <li>• Lactose, the sugar found in milk and dairy products, is a disaccharide composed of glucose and galactose. Lactose must be broken down by the digestive enzyme lactase before it can be absorbed in the small intestine. In people with lactose intolerance, the level of lactase enzyme is insufficient to properly digest lactose and lactose travels to the colon where fermentation occurs.</li> </ul>
<b>M</b>	<b>Monosaccharides:</b> Monosaccharides are single carbohydrate molecules. <ul style="list-style-type: none"> <li>• Fructose, the sugar found in many fruits and some vegetables, is a monosaccharide and does not require any digestion before it is absorbed. When foods containing equal amounts of fructose and glucose are eaten, glucose helps fructose to be completely absorbed. However, when fructose is present in greater quantities than glucose, fructose absorption depends upon the activity of sugar transporters located in the intestinal wall. The ability to absorb excess fructose varies from person to person. In people with fructose malabsorption, the capacity of sugar transporters is limited and excess fructose travels to the colon where fermentation occurs.</li> </ul>
<b>A</b>	<b>And</b>
<b>P</b>	<b>Polyols:</b> Polyols, or sugar alcohols, are a type of carbohydrate that humans can only partially digest and absorb in the small intestine. <ul style="list-style-type: none"> <li>• Polyols, such as sorbitol, mannitol, xylitol, maltitol and isomalt, mimic the sweetness of sucrose (table sugar), however, because their absorption is much slower, only a small amount of what is eaten is actually absorbed. Polyols are often used as low-calorie sweeteners in sugar-free and diet products.</li> </ul>

## FODMAPs

### How do FODMAPs affect people with digestive disorders?

Although FODMAPs are not the cause of digestive disorders such as IBS, they can trigger gastrointestinal symptoms. When FODMAPs reach the colon, they draw fluid into the bowel and bacteria ferment the FODMAP molecules to produce hydrogen and methane gases. The liquid and gas distend (stretch) the intestine and signal nerves surrounding the digestive organs.

For many people with IBS, the nerves of the gut are unusually sensitive and even a small change in the intestinal volume can cause the nerve network to overreact and trigger IBS symptoms.

### What foods contain FODMAPs?

FODMAPs are found in a wide variety of everyday foods including fruits, vegetables, legumes, milk products and sweetening agents. Each person has an individual threshold for tolerating FODMAPs and some foods may pose more of a problem than others. A diet that reduces the intake of high FODMAP foods (shown in Table 1) and manages the total FODMAP load at each meal, may help to improve gastrointestinal symptoms for some people.

**Table 1: HIGH FODMAP FOODS**

FRUCTANS	GALACTO- OLIGO- SACCHARIDES	LACTOSE	EXCESS FRUCTOSE	POLYOLS
<b>Vegetables</b> artichokes, asparagus, beetroot, chicory, dandelion leaves, garlic, leek, onions, onion and garlic salt or powders, radicchio lettuce, spring onions (white part)	<b>Legumes</b> baked beans, bortolotti beans, kidney beans, chickpeas, lentils, soybeans, soy flour and some soy milk	<b>Milk Products</b> milk (cow, goat or sheep), custard, condensed and evaporated milk, dairy desserts, ice cream, margarine, powdered milk, yogurt	<b>Fruits</b> apples, boysenberries, figs, mangoes, pears, watermelon  <b>Sweeteners</b> agave, corn syrup solids, high-fructose corn syrup, honey	<b>Fruits</b> apples, apricots, blackberries, cherries, longons, lychees, nectarines, peaches, pears, plums, prunes  <b>Vegetables</b> avocados, cauliflower, green pepper, mushrooms, pumpkin, snow peas  <b>Sweeteners</b> sorbitol (420), mannitol (421), isomalt (953), maltitol (965), xylitol (967)
<b>Grains</b> barley, rye or wheat (in large amounts), fructo-oligosaccharides, inulin		<b>Cheese</b> soft and unripened cheese (ricotta, cottage, cream, mascarpone)	<b>Alcohol</b> Rum	
<b>Nuts</b> cashews, pistachios				

Adapted from sources: Dr. Sue Shepherd, 2012 Shepherd Works <http://shepherdworks.com.au>  
 Kate Scarlata, Registered Dietitian <http://blog.katescarlata.com/fodmaps-basics/fodmaps-checklist/>

High FODMAP foods can be replaced with choices from the low FODMAP foods list (shown in Table 2) to help maintain a nutritious and well-balanced diet.

**Table 2: LOW FODMAP FOODS**

FRUCTANS	GALACTO-OLIGO- SACCHARIDES	LACTOSE	EXCESS FRUCTOSE	POLYOLS
<b>Vegetables</b> bok choy, bean sprouts, bell peppers, butter lettuce, carrots, celery, chives, corn, eggplant, green beans, tomatoes, potatoes, spinach  Garlic or onion-infused oil  Gluten-free* breads/cereals, rice and corn pasta, rice cakes, potato chips, tortilla chips	<b>Legumes</b> firm tofu	<b>Milk Products</b> lactose-free milk and lactose-free milk products including cottage cheese, ice cream and sorbet  <b>Cheese</b> certain cheeses such as cheddar, parmesan, swiss, mozzarella	<b>Fruits</b> ripe bananas, blueberries, grapefruit, grapes, honeydew, lemons, limes, passion fruit, raspberries, strawberries, tangelos  <b>Sweeteners</b> table sugar, maple syrup	<b>Fruits</b> bananas, blueberries, grapefruit, grapes, honeydew, kiwi, lemons, limes, oranges, passion fruit, raspberries  <b>Sweeteners</b> table sugar, glucose, aspartame

\* Examine ingredients on gluten-free breads and cereals to ensure other FODMAPs such as honey and agave are not present.  
 Adapted from source: Kate Scarlata, Registered Dietitian <http://blog.katescarlata.com/fodmaps-basics/fodmaps-checklist/>