Chem 227 / Dr. Rusay

*Flatulence** Carbohydrates, Digestion & Enzymes

The downside of eating high fiber, healthy foods (vegetables, grains. nuts, cereals) gastrointestinal distress.

* Also known as passing gas, farting, flatus or breaking wind. Fart derives from the Latin word for "wind." "Flatulent" refers to being "liable to, or prolific in, windy blasts,"

> http://www.etenet.com/Apps/Library/ http://www.tipsofallsorts.com/flatus.html

Most people produce about O.5 liters to 1.5 liters of gas a day and everyone passes gas about 14 times a day on average. It is a natural, but usually unspeakable phenomenon that can occur at any time even when our bodies are relaxed while in bed or in the bathtub. How loud the sound of expelling gas is directly proportional to the volume and pressure of the gas. Some are silent.

It has been reported that it is unwise to withhold the urge to release gas since gas is absorbed into the blood stream and the liver can be overtaxed with recycled gas. However, many people think that they should not have any gas or what they do have needs to be reabsorbed and that any gas is too much.

Gas is made primarily of odorless vapors - carbon dioxide, nitrogen, hydrogen, and methane. The unpleasant odor of flatulence comes from anaerobic fermentation by bacteria in the colon. That "one-of-a-kind smell" comes from trace gases such as hydrogen sulfide, ammonia, indole, skatole putrecine and cadaverine that are produced by the person's unique gastrointestinal biota.

Although having gas is common, for most of us it is uncomfortable and embarrassing. The most common ways to reduce the discomfort of gas are changing diet, taking medicines, and reducing the amount of air one swallows.

Diet. A diet that is lactose-free may improve the condition as well as eliminating or reducing certain common gas-producing foods. (See the following table.) Doctors may also suggest limiting high-fat foods to reduce bloating and discomfort. This helps the stomach to empty faster, allowing gas to move into the small intestine.

Nonprescription medicines. Many nonprescription, over-the-counter medicines are available to help reduce symptoms, including antacids with simethicone and activated charcoal. The effectiveness of these medications is unclear. Digestive enzymes, such as lactase supplements, actually help digest carbohydrates and may allow people to eat foods that normally cause gas. *Beano* reduces gas production associated with baked beans and other types of foods which are rich in certain oligosaccharides (complex sugars called RFOs, the Raffinose Family of Oligosaccharides that are not digested in the human gastrointestinal tract. The product contains an enzyme which hydrolyzes the sugars into simpler forms, glucose and fructose, that are absorbed into the bloodstream which avoids their fermentation.

BEANS THROUGHOUT THE AGES

The next time you go to enjoy your favorite bean dish, know that there's a bushel of history behind it: Beans have been elevating mankind not just nutritionally but spiritually for thousands of years. Among the first crops ever cultivated, beans have helped people survive famines, had prominent families named after them, nourished centuries of sailors, and even had temples built in their honor as the symbols of life itself. Here's a closer look at some of the highlights in the long and glorious history of this noble nutritional mainstay.

- * When our hunting-and-gathering prehistoric ancestors finally decided to stay in one place long enough to cultivate crops, beans were among the first to be grown.
- * In the first Roman cookbook, written over 2,000 years ago, beans got an entire chapter
- * The four most prominent families in ancient Rome named themselves after beans-the Lentulus (after lentils), the Fabius (after favas), the Ciceros (after chickpeas), and the Pisos (after peas).
- * Beans were used as "ballots" by the ancient Greeks and Romans casting votes in political elections and legal trials.
- * Christopher Columbus took chickpea seeds with him on his voyage to the Caribbean in the 15th century.
- * In the 16th century, dried peas helped the peasant population of England survive a devastating famine.
- * In the 17th century, beans were believed to be a cure for baldness.
- * In the early 1900s, nutritious beans were declared by President Theodore Roosevelt as the reason for the US victory in the Battle of San Juan Hill.
- * During World War II, the US Army floated waterproof bags of beans from ships to beachheads to help nourish American troops.



Use 1 BEANO tablet or five drops of BEANO liquid per serving of problem food (one serving = 1/2 cup) with the first bite of food. A typical meal consists of two or three servings. For best results, you may have to adjust the number of tablets or drops according to your food portions. Too much heat can inactivate the enzyme, so don't cook with BEANO.

Vegetables	Legumes	Grains/Cereals/See ds/Nuts	Others
Beets Broccoli Brussel sprouts Cabbage Carrots Cauliflower Corn Cucumbers Leeks Lettuce Onions	Black-eyed peas Bog beans Broad beans Chickpeas Chickpeas Eield beans Lentils Lima beans Lima beans Mung beans Peanuts Peas Peas Pinto beans Red kidney beans Soybeans	Barley Breakfast cereals Granola Oat bran Oat flour Pistachios Rice bran Rye Sesame flour Sorghum, grain Sunflower flour Wheat bran	Bagels Baked beans Bean salads Chili Lentil soup Pasta Peanut butter Soy milk Split-pea soup Stir-fried vegetables Stuffed cabbage Tofu Whole grain
			breads

Foods Associated with Flatulence

The RFOs are fairly widespread in the plant kingdom, being found in many different families. RFOs rank second only to sucrose in abundance as water-soluble carbohydrates. A relatively high abundance of raffinose, stachyose and verbascose are found in the foods listed in the Table: *Foods Associated with Flatulence*.



The following enzymatic chart illustrates the RFO biochemical pathway.

