

Polyols--Digestive Issues

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Polyols (also known as *sugar alcohols*) are often used to replace sugar in foods. They replace some of the bulk normally provided by sugar, and they can also perform some of the other functions that sugar does. They can provide varying amounts of sweetness, they can bind varying amounts of moisture, and they can interact with other components of foods such as fats and proteins.

In my previous essay I discussed the sweetness and calories provided by different polyols. Here, I want to describe some of the effects of polyols on the human digestive system.

Polyols provide fewer calories per gram than carbohydrates because they are not efficiently absorbed and metabolized by humans. When polyols are consumed in large quantity, the unabsorbed and unmetabolized materials can have a variety of effects when they reach the large intestine. Symptoms may range from borborygms [interesting word that describes gastric rumbling sounds!] to flatulence, abdominal pain, and diarrhea.

First, many of the polyols can have an *osmotic* effect--they attract and bind water. When a large quantity of osmotically bound water is present, the result may be diarrhea. Laxatives such as polyethylene glycol (MiraLAX®) and magnesium sulfate (milk of magnesia) work in just this way.

Second, the undigested polyols may be metabolized by the microorganisms that inhabit the large intestine. When this happens, one of the products may be gas, so flatulence is a common result. Microbial metabolism can also produce short chain fatty acids; these can also have osmotic effects.

There is a lot of individual variation. Some people suffer a lot, and some not at all. Some people do well with one polyol and not with another. It depends on the quantity consumed, it depends on your body and your personal collection of intestinal bacteria, and it depends on how often you use the products. People can develop a tolerance to the polyols, as their bodies and bacterial populations adapt.

There have been clinical studies performed to determine the "laxative threshold values" (LTV) for many of the polyols. The LTV is the amount that may cause a laxative effect if consumed in a single meal by a normal, unadapted adult. The table below lists some representative results--there is some variation in the values, because different studies use different ways to measure the effect.

| Polyol | Laxative Threshold Value |
|---------------|---------------------------------|
| Maltitol | 60 g |
| Erythritol | 40 |
| Isomalt | 29 |
| Lactitol | 24–50 |
| Sorbitol | 23 |
| Xylitol | 20 |
| Mannitol | 10–20 |

Adapted from Levin et al. (1995)¹

When you consume polyols, read labels carefully, and pay attention to quantities consumed. Your results may vary, for the reasons discussed above!

References:

1. Levin, G.V.; Zehner, L.R.; Saunders, J.P. Sugar substitutes: their energy values, bulk characteristics, and potential health benefits. *Am. J. Clin. Nutr.* 62(suppl):1161S–1168S (1995).