

Polyols and Calories

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Sugar is important for more than just sweetness in many foods. For example, if you remove the sugar from a cake and replace the sweetness with a high potency sweetener, the cake will be flat and dense and dry--sugar normally provides bulk and holds moisture. *Polyols* (also known as *sugar alcohols*) are often referred to as "bulk sweeteners," because they can replace some of the bulk that's missing when sugar is removed from a product.

Polyols provide varying amounts of sweetness: xylitol is about as sweet as sucrose, maltitol is about 70% as sweet, sorbitol and erythritol are about 60% as sweet, lactitol is about 40% as sweet, and isomalt is about 25% as sweet^[1]. Polyols have been used for many years to sweeten products for diabetics. While sugars are actively absorbed into the body, polyols are absorbed more slowly. This is important for diabetics--they avoid the rapid rise in blood sugar that would occur with sugar-sweetened foods. Once they are absorbed, many of the polyols can be converted to sugars by the body, providing calories. How many calories? The answer is, "it depends."

First, it depends on how much of the polyol is absorbed. And that can vary from person to person, and from day to day. If you eat a very small portion of a polyol, you may be able to absorb almost all of it. If you eat a large quantity, it may not all be absorbed by the time it reaches the large intestine. Once it reaches the large intestine, it's fair game for the bacteria that live there--if they consume the calories, you don't! But if they consume it, other things happen. That's the subject of next week's essay.

Second, the calorie content depends on how efficiently your body can convert the polyol to sugars. Sorbitol and xylitol are converted to sugars quite efficiently, while mannitol is not^[2].

So the calories listed on the label are based on results of scientific studies, mainly in experimental animals. At best, they are a rough estimate of the number of calories you can expect to get from the product. The table below lists the values currently accepted by the FDA for commonly used polyols.

Polyol	Calories per gram
Sorbitol	2.6
Xylitol	2.4
Maltitol	2.1
Isomalt	2.0
Lactitol	2.0
Mannitol	1.6
Erythritol	0.2

References:

1. DuBois, G.E.; Walters, D.E.; Schiffman, S.S.; Warwick, Z.S.; Booth, B.J.; Pecore, S.D.; Gibes, K.; Carr, B.T.; Brands, L.M. Concentration–response relationships of sweeteners. A systematic study. In *Sweeteners: Discovery, Molecular Design, and Chemoreception*, Walters, D.E.; Orthoefer, F.T.; DuBois, G.E., Eds. American Chemical Society: Washington, DC, pp 261–276 167:1131–1132 (1991).
2. Dills, W.L., Jr. Sugar alcohols as bulk sweeteners. *Ann. Rev. Nutr.* 9:161–186 (1989).