



Key Facts on Sugar Substitutes

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Introduction

Artificial sweeteners can help consumers cut down on calories and control weight, help to manage chronic conditions such as diabetes, and potentially prevent cavities. The most commonly used sweeteners approved by the Food and Drug Administration (FDA) for use in foods and beverages in the United States include: aspartame, saccharin, advantame, acesulfame-K, neotame, Luo Han Guo fruit extracts, stevia, and sucralose¹. The agency regulates artificial sweeteners, which must be approved as safe before they can be marketed. The FDA evaluates a sweetener's composition and properties, how much is likely to be consumed, and various types of safety studies. For each of the sweeteners, the typical amount used by an individual is well within levels that can be consumed safely². The following are key facts about the safety of sugar substitutes, as well as an individual look at each one.

Real Facts on Sugar-Substitutes

At the time of this publication, the National Institute of Health stated that low calorie sweeteners do not increase the risk of cancer³. Although this has been a point of debate for some previously approved low calorie sweeteners, numerous studies have shown that the sweeteners currently approved for use do not initiate or promote cancers, even among high intake users.

Sugar Substitutes do not increase the risk of other diseases⁴. In fact, when consumed instead of sugary foods and beverages, sugar substitutes can be potentially helpful in reducing calorie intake and thus, help promote weight loss and management⁵.

All approved sweeteners are safe for pregnant and nursing mothers⁴. However, the advice of a physician or dietitian is recommended to make sure the dietary plan containing sugar substitutes meets the desired goals for calories and nutrients.

Approved Sweeteners

Aspartame (NutraSweet®, Equal®, Sugar Twin®)

Aspartame was first approved in 1981¹. It is 200 times sweeter than sugar, with a caloric value similar to sugar (4 kcal/gram). However, since small amounts are used in foods it is considered essentially free of calories. In the mid-1990's, a researcher raised concerns that a rise in brain cancer incidence was linked to aspartame use³. However, after intense testing both in animals and humans, there has been no link to aspartame and cancer. There has also been no evidence to support any other side effects connected to the sweetener.

One safety exception is for people who have phenylketonuria (PKU), a rare genetic condition in which the body cannot metabolize the amino acid phenylalanine (a component of aspartame)¹. Those with PKU should avoid the sweetener altogether.

Saccharin (Sweet'N Low®, SugarTwin®, Sweet Twin®, Necta Sweet®)

Saccharin was discovered in 1879, and was considered safe until 1977, when the FDA proposed a ban on the substance due to concerns about rats that developed bladder cancer after receiving high doses^{1,2}. This prompted the agency to put a ban on the sweetener, as well as a warning on labels. Further studies have since shown that the bladder tumors found in the rats were related to a mechanism in rats not found in humans. Due to these findings, it is no longer listed as a potential cancer-causing agent, and the requirement for the warning label has been removed. Saccharin is 200-700 times sweeter than sugar, and does not contain any calories.

Acesulfame-K (Sunnet®, Sweet One®)

Acesulfame-K, also known as acesulfame potassium or Ace-K, is 200 times sweeter than sugar, with no calories^{1,3}. It was first approved by the FDA in 1988 for specific uses including as a tabletop sweetener. In 1998, it was then

approved for use in beverages. In December 2003, it was approved for general uses in foods, but not in meat or poultry. After more than 15 years of extensive studies, no health problems, including cancer, have been associated with use of acesulfame-K. It is not broken down by the body and is eliminated unchanged by the kidneys².

Neotame (Newtame®)

Neotame was approved by the FDA in 2002 as a general purpose sweetener. It is approximately 7,000-13,000 times sweeter than sugar². Neotame is heat stable and can be used in baking. However, it is not a sweetener that is used very often. Prior to its approval, Neotame was subjected to well over 100 scientific studies. These studies found no link to disease associated with use of the product¹.

Sucralose (Splenda®)

Sucralose is the only non-calorie sweetener made from real sugar⁴. To produce the substance, scientists alter the structure of the sugar molecule, making it much sweeter than sugar. Unlike sugar, the body does not recognize it as a carbohydrate, so it cannot be digested, absorbed or metabolized for energy, nor affect blood glucose levels. It also does not cause dental caries. Sucralose can also be used safely by people with PKU. In reviewing studies over the past 20 years, it has not been shown to cause cancer, reproductive, or neurological risks to humans⁴.

Stevia (Truvia®, PureVia®, Sun Crystals®)

A natural alternative sweetener, Stevia is an herb that is much sweeter than sugar and calorie-free⁵. Stevia sweeteners are composed of highly purified parts of the Stevia plant. Since it is 200-400 times sweeter than sugar, small amounts are needed to achieve a sweet taste^{1,2}. Until 2008, Stevia was only available as a dietary supplement; however, after much research, the FDA concluded that stevia was generally recognized as safe (GRAS) and it is now found in many foods and beverages⁵.

Luo Han Guo

Also commonly known as monk fruit or swindle fruit extract, luo han guo is approximately 150-300 times sweeter than sugar^{1,2}. It is often used with other sweeteners and is found in many food products. The FDA currently recognizes luo han guo as GRAS for specific uses.

Polyols/Sugar Alcohols

Polyols, also known as sugar alcohols, are sweet substances found primarily in plants that have been chemically altered². The most common polyols listed on labels are: erythritol, lactitol, mannitol, sorbitol and xylitol. Polyols offer many benefits. They taste like sugar but generally have fewer calories than sugar, approximately 1-3 calories per gram depending on the polyol. They do not promote tooth decay and produce a low glycemic response. Thus, consumers, especially those with diabetes, may choose to use them.

It is important to consume foods that contain polyols in moderation because they may cause a laxative effect similar to prunes or other high fiber foods².

Advantame

Advantame is the newest sweetener approved for use, and is approximately 20,000 times sweeter than sugar^{1,4}. The FDA reviewed results from studies involving both humans and animals, and found advantame to be safe for use in foods and beverages. Although it does contain phenylalanine, the small amount used to sweeten foods means no warning label is required to warn those with PKU.

Take on Sugar Substitutes

No artificial sweetener should play a major role in a healthful diet. While non-nutritive sweeteners contain few or no calories, and can help reduce the overall calories a person consumes, there are other issues to consider. For example, foods that contain these sweeteners are often highly processed and contain little to no nutrients. Not only can these empty calories from other sources in the food item like fat and alcohol add up, but they are often consumed in place of healthier options for weight loss and health maintenance, such as lean meats, fresh fruits, vegetables and legumes. Additionally, some recent research has shown that consuming sweet foods and beverages on a regular basis can lead to a preference and craving for sweets that can contribute to overeating⁶. Thus, it is important to use caution and good judgment when incorporating any type of sweetener into one's diet.

Consider these points when deciding to use a sugar substitute:

- Read labels; sugar substitutes are now found in hundreds of products. It is also important to note that many foods containing these substitutes may also still contain sugar, or added calories from other sources⁵.
- Vary your choices or use products containing more than one sweetener². Since some sweeteners enhance each other's sweetness, blends often use less of each, reducing exposure to any one sweetener.

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