

# Sugar Substitutes : Are They Safe?

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## Abstract

Sweetness is the taste that is strongly identified with affection and reward. Indulgence in sweets has been described as a “universal human weakness”, as evidenced by the ubiquity of sugar bowls, candy counters, automatic candy machines, bakery and pastry shops, and the soda fountain. Fruits, berries, and honey were the earliest sweet foods known.

## Introduction

Most of us enjoy eating sweet-tasting foods, and some might almost have a psychological need for them. 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 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 safely.

## Real Facts About Sugar-substitutes

Sugar Substitutes can be a potentially useful tool in the management of calorie and carbohydrate intake, promoting overall health management as it contain almost no calories and no carbohydrates, and do not raise blood sugar.

The FDA approves these food additives after rigorous testing. There are five no-calorie sweeteners. All approved sweeteners are safe for pregnant and nursing mothers. However, the advice of a physician or dietician is recommended to make sure the dietary plan containing sugar substitutes meets the desired goals for calories and nutrients.<sup>2</sup>

Low calorie sweeteners do not increase the risk of cancer. Even though this has been a point of debate, studies have shown that these sweeteners do not initiate or promote cancers, even among high intake users.<sup>3</sup>

## Approved Sweeteners

**Aspartame : L-aspartyl L-phenylalanine Methyl Ester :** It is 200 times sweeter than sugar, with a caloric value similar to sugar (4 kcal/gram). (small amounts are used in foods it is considered essentially free of calories).

For this reason the Food and Drug Administration requires the product label to state that aspartame should not be used in cooking for baking.

**Saccharin:** Discovered accidentally by Remsen and Fahlberg in 1879, the sweetest substance known. Saccharin is pharmacologically inert and untoward effects are very rare. Cases of photosensitization and

allergic reactions such as urticaria have been reported.

The consumption of saccharin has increased dramatically in many countries. About 70% of the total amount used in the United States and Canada has been used in “diet” soft drinks; 13% in dietetic foods (eg, canned fruits, gelatin desserts, jams, ice cream); 12% in products sold at retail for table use; and the remaining 5% in miscellaneous products such as mouthwashes, cosmetics, and medicinal preparations.

In 1972, the FDA set limits on the use of saccharin (1g /day for a 155 lb person), citing the evidence that rats develop bladder tumors when fed extremely high levels of it.

## Dental Aspects

Saccharin (0.5%), when used as a supplement to a cariogenic diet (56% sucrose), significantly reduced both fissure and smooth surface caries in rats, apparently by interfering with the growth of S mutants.

## Acesulfame-K

In 1967, in the laboratories of Hoechst AG, it was found by chance that compounds with the dihydro-oxathiazinone dioxide ring-system had a sweet taste. Acesulfame-K is 200 times sweeter than sugar, with no calories. 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. There have not been any health problems, including cancer, associated with the substance despite more than 15 years of extensive studies. It is not broken down by the body and is eliminated unchanged by the kidneys. Therefore diabetic patients may safely use the product without it affecting their blood glucose levels.

## Sucralose

Sucralose is the only non-calorie sweetener made from real sugar. Unlike sugar the body does not recognize it as a carbohydrate, so it does not cause dental caries. Also, sucralose cannot be digested, absorbed or metabolized for energy, nor affecting blood glucose levels, thus making it safe for diabetics. It can also be used safely by people with phenylketonuria. In reviewing studies over the past 20 years, it has not been shown to cause cancer, reproductive, or neurological risks to humans.

## Polyols

Polyols (also known as sugar alcohols) are often used to replace sugar in foods. The most common polyols listed on labels are: erythritol, lactitol, mannitol, sorbitol and xylitol. They taste like sugar but have fewer

calories than sugar. They don't promote tooth decay and produce a low glycemic response. Thus, consumers, especially those with diabetes, may choose to use them. But, consume those foods that contain them in moderation because they may cause a laxative effect similar to prunes or other high fibre foods.

## Neotame and Tagatose

The newest of the low-calorie sweeteners, it was approved by the FDA in 2002 as a general purpose sweetener. It is approximately 7000 times sweeter than sugar. It is a low calorie sweetener derived from lactose, a carbohydrate found in many dairy products. Neotame is used in commercially cooked and baked foods; however, it is not currently marketed to consumers in packet or bulk form. Neotame is 7,000 to 13,000 times sweeter than table sugar. It is rapidly metabolized and completely eliminated in the body wastes; therefore, it does not accumulate in the body and has zero calories. The ADI for neotame is 18 mg per person per day. Neotame does not affect blood glucose levels and can be used in a diabetes meal plan. Neotame is described as a clean, sweet taste without a bitter metallic after-taste. It is used “in a range of products including carbonated and non-carbonated soft drinks, as well as beverage mixes, dairy beverages, non-dairy desserts, ice creams and sorbets, yogurts, confectionery, chewing gum, fruit preparations, and salad dressings

## Conclusion

Sugar substitutes and non caloric sweetening agents offer a potential for providing safe, non cariogenic diets and drinks. They must be tested more extensively in human studies before they are introduced into the market for use by the community.

## References

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