

SWEET SECRETS

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BACKGROUND FACTS

Saccharin (brand 'Sweet N Low') is one of the first sugar substitutes to receive U.S. Food and Drug Administration (FDA) approval and it continues to be popular despite initial concerns over its carcinogenic effect and safety. It works well in cooking and baking as it is heat-stable.

Aspartame (brand Equal or Nutrasweet) was approved by FDA since 1981. There is no evidence of any harmful effects from its use. However, aspartame does contain phenylalanine and individuals with the metabolic disorder 'phenylketonuria' (known as PKU, an inherited disease in which the body cannot dispose of excess phenylalanine) should consult their physicians before using this sweetener. It is not recommended for use in baking as it is not heat-stable and loses its sweetness when heated. It should also be added to recipes only after heating the ingredients to avoid a bitter taste.

Sucralose (brand Splenda) is exceptionally stable and will not be affected by heat and generally retains its sweetness. Thus, it is suitable for use in cooking or baking. Furthermore, sucralose received FDA approval in April 1998 for use in 15 food and beverage categories, the broadest initial approval ever given to a calorie-free sweetener.

Acesulfame Potassium or Acesulfame K is a calorie-free sweetener used in more than 5,000 food, beverage and pharmaceutical products in over 100 countries around the world. In the past 30 to 40 years, it has been consistently shown in over a hundred studies that it is safe and suitable for human consumption.

These days, artificial sweeteners (also known as intense sweeteners) and other sugar substitutes are pretty prevalent and can be found in a wide range of food and beverages including soft drinks, chewing gum, fruit juice, ice cream and yoghurt. These are often marketed as "sugar-free" or "diet".

Many patients with diabetes use artificial sweeteners as sugar substitutes as they provide sweetening effects without affecting blood sugar levels. Another reason people use artificial sweeteners is to cut calories, mainly to prevent weight gain. Artificial sweeteners are many times sweeter than sucrose (table sugar) and only minute amounts are necessary for food or drink to taste sweet (refer to table below for sweetening powder compared to sucrose).

However, people may rely so much on artificial sweeteners that they end up craving for more sugary foods that

contain carbohydrates, thus raising the blood sugar level when they overeat.

Be warned that artificial sweeteners are not magic bullets for diabetes or weight management and should be used only in moderation. If you eat too many sugar-free foods, you can still gain weight if they consist of other ingredients that contain calories. While the use of sugar need not be outlawed for people who have diabetes, keeping sugar intake low is certainly recommended. A balanced diet and healthy eating are still key in diabetes management.

The term 'sweetener' does not mean that it is artificial or sugar-free. So, what is the difference between sugars and artificial sweeteners? Basically, there are two types of sweeteners—those which have calories (nutritive) and those that are calorie-free (non-nutritive). Refer to the table below:

Types of Sweeteners	Nutritive Sweeteners	Non-nutritive Sweeteners
	<ul style="list-style-type: none"> Includes sugars and sugar alcohols. Contribute carbohydrates and calories to the diet. Contains few vitamins and minerals, hence they are often referred to as sugar with 'empty' calories. 	<ul style="list-style-type: none"> Known as artificial sweeteners. Key ingredient in 'diet' products as they provide a significant sweetening effect without adding carbohydrates or calories. Many times sweeter than sucrose.
Examples	<ul style="list-style-type: none"> Sugars: Sucrose, Fructose, Dextrose, Corn sugar, High fructose corn syrup, Maltose, Honey, etc. Sugar alcohols: Malitol, Xylitol, Isomalt, Sorbitol, Mannitol, etc. 	<p>Sweetening power compared to sucrose:</p> <ul style="list-style-type: none"> Saccharin: 200-700 times Aspartame: 160-220 times Acesulfame K: 200 times Sucralose: 600 times

The FDA has established Acceptable Daily Intake (ADI) levels for artificial sweetener intake. The acceptable amount of milligrams (mg) you should consume is based on kilogram of body weight per day (mg/kg bw/day). See table below:

Sweetener	Acceptable Daily Intake	ADI Equivalent in Packets of Table Sweetener Per Day (based on a 68kg body weight)
Saccharin	5mg/kg bw	9
Aspartame	50mg/kg bw	97
Acesulfame-K	15mg/kg bw	20
Sucralose	5mg/kg bw	68

Monitoring the amount of artificial sweeteners that are being consumed is especially important for small children as children have smaller body size and their ADI should be lower in relation to adults. Artificial sweeteners are generally safe for human consumption and it is rare that the ADI will be exceeded. To help you make an informed decision, always read the food labels of the item you are considering to calculate the amount of artificial sweeteners.

Novel sweeteners

Some sweeteners do not quite fit into any particular category because of what they are made from and how they are made.

Stevia is one of them. This South American shrub, whose leaves have been used as a sweetener for centuries by native people in Paraguay and Brazil, has been gaining popularity in Singapore. Stevioside, the main ingredient, is virtually calorie-free and hundreds of times sweeter than table sugar. FDA has approved highly refined stevia preparations as a novel sweetener but not for whole-leaf stevia or crude stevia extracts. There are concerns about the effects whole-leaf or crude stevia have on blood sugar control, the kidneys, and the cardiovascular and reproductive systems.

References:

- Position of the Academy of Nutrition and Dietetics: Use of nutritive and non-nutritive sweeteners. Journal of the Academy of Nutrition and Dietetics. 2012;112:739
- Is stevia an FDA-approved sweetener? U.S. Food and Drug Administration. <http://www.fda.gov/AboutFDA/Transparency/Basics/ucm214864.htm>. Accessed June 01, 2013.

