



John McDougall, MD

Artificial Sweeteners Are Unnecessary and Unwise

Life on earth for us begins with breast milk, a food that is half sugar—and sugar in the forms of simple and complex carbohydrates, found in starches, vegetables, and fruits, ideally makes up the bulk of our diet for the next 83 years (after weening). The food industry is well aware of our inborn love affair with sweet-taste. These profiteers lace our food supply with concentrated and purified sugars, such as fructose and sucrose (white table sugar)—totaling up to 158 pounds per person annually. Along with the ever increasing popularity of sugar, problems of obesity, diabetes, heart disease, and tooth decay have become more common in Western societies over the past century. The belief that sugar plays the major role in the fattening of people has led to the development of intensely sweet-tasting, lower- or no-calorie substitutes. Up to 90% of people living in the USA now consume beverages

and foods containing sugar substitutes.

Artificial sweeteners, as they are commonly called, come in two general categories: *sugar alcohols* which are on average 2 calories per gram (compared to 4 calories per gram for purified sugars) and *nonnutritive sweeteners* (at 0 calories/gram). According to the American Dietetic Association, “Nonnutritive sweeteners are safe for use within the approved regulations. They can increase the palatability of fruits, vegetables, and whole-grain breads/cereals and thus have the potential to increase the nutrient density of the diet while promoting lower energy intakes.”¹ This statement may be true if refined sugars are replaced, rather than what people commonly do, which is to add artificial sweeteners to their already sugar-laden diet.



to

No Substitute for Real Sugar

Sugar provides more sweetness—it adds moisture, bulk, a lighter and fluffier texture to baked goods, and it browns—artificial sweeteners don't have these cooking qualities. These manmade sweeteners are described as being too sweet, having a chemical or bitter taste, and having strong aftertastes—they also seem to block other flavors of the foods they are used with. Since none of these sweeteners provides the same clean taste, mouth-feel, and cooking benefits as real sugar, new artificial sweeteners continue to be developed—but so far not one has become an acceptable sugar substitute for particular chefs and consumers.

A Brief History of Artificial Sweeteners

The first artificial sweetener, saccharin, was synthesized in 1879. It became popular because of its low cost of production at the time of sugar shortages during World Wars I and II. After these wars, when sugar once more became available and inexpensive, the reasons for using saccharin shifted from economics to health (calorie reduction primarily). In the 1950s cyclamate was introduced, and Sweet 'N Low became a popular mixture of a blend of saccharin and cyclamate. The artificial sweetener market was shaken in the 1970s when the FDA (Food and Drug Administration) banned cyclamate from all dietary foods in the USA because of a cancer risk found in experimental animals (other countries still allow cyclamate). In 1981 the next artificial sweetener, aspartame, marketed as Nutra-Sweet, became popular. Since then several new nonnutritive sweeteners have been introduced with a promise to be more like real sugar with few calories.

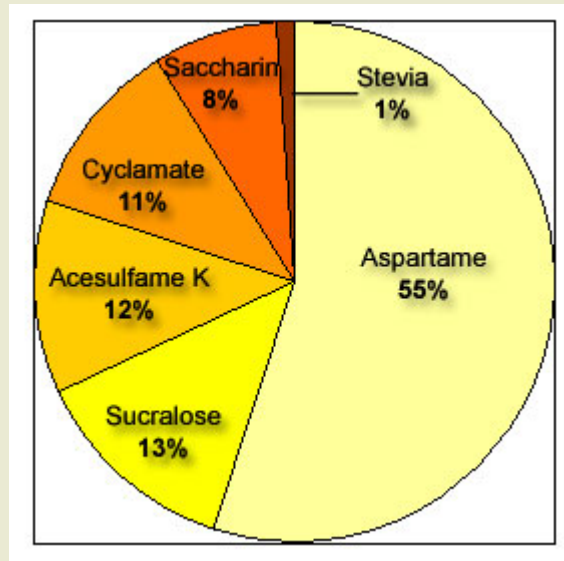
Sugar Substitutes

Sugar Alcohols

Sorbitol
Mannitol
Xylitol
Erythritol
Tagatose
Isomalt
Lactitol
Maltitol
Trehalose
HSH 3

Sugar alcohols are incompletely absorbed from the gut; as a result, they can cause a smaller rise in blood sugar, decrease dental caries, and supply undigested sugars to the bowel bacteria for their food, but they may also lead to intestinal gas, cramps, and diarrhea.

Nonnutritive Sweeteners



From Forbes 2005
www.forbes.com/business/global/2005/0110/020.html

Artificial Sweeteners Help Few Dieters

The benefit of artificial sweeteners for weight loss is questioned for several reasons. First, as stated in the position paper of the American Dietetic Association, "Existing evidence does not support the claim that diets high in nutritive sweeteners (real sugars) *by themselves* have caused an increase in obesity rates or other chronic conditions (e.g. hyperlipidemia, diabetes, dental caries, behavioral disorders)."¹ Sugar appears to be, at most, a minor player as the cause of obesity and related health problems; therefore, replacement with an artificial sugar would be expected to result in few benefits.

Other components of the diet such as fats, oils, meats, and dairy products are the major health burdens, not sugar.

Think about the last time you saw an obese person standing in line at the counter of your favorite fast food restaurant. Did he/she order a diet soda? Of course! If the act of ordering (always) that kind of artificially sweetened drink made any real difference then the customer would not have been so big. The soda is the penance for the real sin—the supersized meal, washed down by the diet soda.

Only a few studies have been done to test the value of replacing sugar with artificial sweeteners and they were done under highly controlled experimental situations. Even then they show minimal benefits—a long-term weight loss of only 6 to 10 pounds in a year.² However, controlled experiments do not represent real life. Obesity throughout the world has increased at the same time as has the consumption of nonnutritive sweeteners—in part because most people simply add these nonnutritive sweeteners without improving their overall diet and lifestyle.

Sweeteners Cause Us to Eat More

Benefits from the use of artificial sweeteners are limited, in part, because they do not deliver the same hunger-satisfying capacity as white sugar. As a result, we are left seeking rewarding food—and we follow our diet soda with our favorite candy bar (made of the real thing). There is also some evidence that artificial sweeteners can increase the appetite.^{3,4}

Prolonged and intense gustatory stimulation causes *taste adaptation*—a gradual decline of taste intensity from the stimulation, whereby the taste buds and the brain become less sensitive to the next dose of sweet substance. In a short time, one 300 calorie high-fructose corn syrup soda no longer provides us with a decent “sugar high.” Now, in order to get equal pleasure, two bottles of soda are required, then three... Because artificial sweeteners are 200 to 13,000 times sweeter than sugar their intense stimulation can quickly and profoundly desensitize the mechanisms of appetite satisfaction.

Fourteen female students in one recent study were fed three different beverages—water, sugar-containing lemonade (an extra 330 extra calories) and a similar lemonade made with aspartame—and their daily food and calorie intake was measured.⁵ Regardless of the beverage they drank on that day, they consumed the same number of calories. The body adjusted—no harm was found from the added sugar and no advantage was seen with the no-calorie, aspartame sweetener. What was most revealing was what happened the following day. After consuming the lemonade with the aspartame, women ate significantly greater amounts of energy (calories) compared to the day following water or sugar-containing lemonade. The artificial sweetener stimulated their appetite—and they ate more the next day.

Do Artificial Sweeteners Cause Health Problems?

Artificial sweeteners have been accused of causing cancer, hair loss, depression, dementia, headaches, autoimmune diseases, and behavioral disturbances. However, the scientific consensus is that they are acceptable in the diet and safe. (One notable exception is for the use of aspartame for people with a rare condition called phenylketonuria—PKU.) A level of skepticism about their safety should be maintained because there are a few people who do react adversely to these chemicals, research on their safety is far from complete, and financial vested interests have undoubtedly tainted the truth. Furthermore, by combining many different sweeteners in a food, manufacturers can assure their products do not exceed potentially toxic levels of a single sweetener. Whether or not these chemicals potentiate each other's toxic and cancer-causing effects has not been adequately studied.

Beginning in the 1970s, animal studies found an excess of bladder cancer risk in rodents treated with extremely high doses of saccharin. After three and a half decades of research, the overall conclusion is that the use of artificial sweeteners in very large amounts (greater than 1.7 grams a day) is associated with a small increased risk for bladder cancer in humans (relative risk of 1.3).^{6,7} Daily intakes are on the order of only a few milligrams for consumers. Newer sweeteners (acesulfame-K, sucralose, alitame and neotame) have not been on the market long enough to determine whether or not they cause more cancer or other health problems.

Stevia—A Natural, Safe, and Powerful Sweetener

From the leaves of a perennial shrub found in Paraguay and Brazil comes a substance that is 200 to 300 times sweeter than table sugar. This stable sweetener is essentially calorie-free, time-tested, and non-toxic—and therefore may be the best choice if you must use a sugar-substitute. Stevia, and its pure white active ingredient, stevioside, are safe when used as a sweetener and no allergic reactions to it have been reported.⁸ This natural sugar substitute has been used for centuries in South America and Asia. The governments of Brazil, Korea, and Japan approve of the use of Stevia leaves, and highly purified extracts, as non-caloric sweeteners.⁸



Animal and human studies have demonstrated anti-hypertensive and anti-diabetic properties of Stevia.⁸⁻¹¹ For example, in one study patients took capsules containing 500 mg stevioside powder or placebo 3 times daily for 2 years. After 2 years, the stevioside group showed a decrease in blood pressure from 150/95 mmHg to 140/89 mmHg compared with placebo.⁹ In another study, 1 gram of stevioside daily reduced blood sugar levels after eating by 18% in type-2 diabetic patients.¹¹

Stevia is cheap and easy to grow. This sweetener is used as dried leaves, a white purified extract, and as a liquid. In the US, Stevia is sold as a “dietary supplement,” rather than as a replacement for sugar for legal reasons. Stevia is not approved by the FDA, nor is it endorsed by the American Dietetic Association as a nonnutritive sweetener. The lack of official support has been attributed to pressures from the sugar and artificial sweetener industries. The American Dietetic Association receives their funding from many industries, including those that manufacture artificial sweeteners and foods made with these sugar-substitutes and natural sugars.¹²

Substitute Good Food for Artificial Taste

Sweet-tasting substances gratify one of our most powerful and seductive desires. The low-calorie sugar substitutes are supposed to offer an easy way out—a means to partially circumvent damage to our teeth, elevation of our blood fats (triglycerides), and fattening our waistlines—and still allow us to enjoy the pleasures of sweetness. However, these chemicals fall short on taste and the promises for better health and weight loss. The right way to deal with our innate desire for sugars is to get them from whole foods—from starches, vegetables, and fruits.

One big problem with the Western diet is it is deficient in healthy sugars—leaving us wanting. People chew through platefuls of sugar (carbohydrate)-deficient red meat, poultry, fish, and cheese without becoming satisfied. Then at the end of the meal they find a sugar-filled dessert—a calorie-bomb of pleasure—in pie, ice cream, and cake. The reward is like a fix to an addict.

Our love for sugar is inborn, but it is adaptable—we can learn in a short time to enjoy more flavorful foods with less intense sweetness—thus eliminating our need to resort to artificial sweeteners. Try this experiment: Eat for several days meals that provide healthy sugars—those found on the McDougall Diet. My experience, and the experience of others who have followed the McDougall Diet, has been that after consuming a plentiful supply of these sugars throughout the meal your palate will be fully satisfied and those sugary desserts—the ones you have felt addicted to—will lose their power over you.

References:

- 1) American Dietetic Association. Position of the American Dietetic Association: use of nutritive and nonnutritive sweeteners. *J Am Diet Assoc.* 2004 Feb;104(2):255-75.
- 2) Vermunt SH, Pasma WJ, Schaafsma G, Kardinaal AF. Effects of sugar intake on body weight: a review. *Obes Rev.* 2003 May;4(2):91-9.
- 3) Tordoff MG, Alleva AM. Oral stimulation with aspartame increases hunger. *Physiol Behav.* 1990 Mar;47(3):555-9.

- 4) Rogers PJ, Blundell JE. Separating the actions of sweetness and calories: effects of saccharin and carbohydrates on hunger and food intake in human subjects. *Physiol Behav.* 1989 Jun;45(6):1093-9.
- 5) Lavin JH, French SJ, Read NW. The effect of sucrose- and aspartame-sweetened drinks on energy intake, hunger and food choice of female, moderately restrained eaters. *Int J Obes Relat Metab Disord.* 1997 Jan;21(1):37-42.
- 6) Weihrauch MR, Diehl V. Artificial sweeteners--do they bear a carcinogenic risk? *Ann Oncol.* 2004 Oct;15(10):1460-5.
- 7) Lean ME, Hankey CR. Aspartame and its effects on health. *BMJ.* 2004 Oct 2;329(7469):755-6.
- 8) Geuns JM. Stevioside. *Phytochemistry.* 2003 Nov;64(5):913-21
- 9) Hsieh MH, Chan P, Sue YM, Liu JC, Liang TH, Huang TY, Tomlinson B, Chow MS, Kao PF, Chen YJ. Efficacy and tolerability of oral stevioside in patients with mild essential hypertension: a two-year, randomized, placebo-controlled study. *Clin Ther.* 2003 Nov;25(11):2797-808.
- 10) Chan P, Tomlinson B, Chen YJ, Liu JC, Hsieh MH, Cheng JT. A double-blind placebo-controlled study of the effectiveness and tolerability of oral stevioside in human hypertension. *Br J Clin Pharmacol.* 2000 Sep;50(3):215-20.
- 11) Gregersen S, Jeppesen PB, Holst JJ, Hermansen K. Antihyperglycemic effects of stevioside in type 2 diabetic subjects. *Metabolism.* 2004 Jan;53(1):73-6.
- 12) http://www.cspinet.org/integrity/nonprofits/american_dietetic_association.html