

Alternatives sweeteners



What is Wrong with White Sugar?

- Refined white sugar has been linked to dental cavities, increased cholesterol levels, heart disease, hypoglycemia, diabetes, obesity, osteoporosis and nutritional deficiencies.
- Can create dramatic fluctuations in blood sugar which, over time, can wear down both the pancreas and the adrenal glands.
- Because it provides no nutrition, most dietitians agree that white sugar has no appropriate place in a healthy diet.

Manufacturing of Table Sugar



- Modern sugar cane farming, chemical fertilizers and pesticides are used to grow the sugar cane plants.
- The mature sugar cane is harvested and sent to refining factories, where the cane's vitamins, minerals and other nutrients are separated from the sucrose.
- After further refining, the cane juice is dried, processed into crystals and bleached to remove its naturally dark color.

Sugar and Dental Caries

Does sugar contribute to dental caries?

The evidence says yes. Any carbohydrate-containing food, including bread, bananas, or milk, as well as sugar, can support bacterial growth in the mouth.

The bacteria produce the acid that eats away tooth enamel. Of major importance is the length of time the food stays in the mouth. This, in turn, depends on the composition of the food, how sticky the food is, how often a person eats the food, and especially whether the teeth are brushed afterward. **Total sugar intake still plays a major role in** caries incidence; populations whose diets provide no more than 10 percent of kcalories from sugar have a low prevalence of dental caries.

Sugar and Obesity

Over the past several decades, as obesity rates increased sharply, **consumption of added sugars** reached an all-time high—much of it because **high-fructose corn syrup use**, especially in beverages, candies, baked goods , and hundreds of other foods.

High-fructose corn syrup is composed of fructose and glucose in a ratio of about 50:50. Compared with sucrose, high-fructose corn syrup is less expensive, easier to use, and more stable.

The use of high-fructose corn syrup sweetener parallels unprecedented increases in the incidence of obesity, but does this mean that the increasing sugar intakes are responsible for the increase in body fat and its associated health problems?

Excess sugar in the diet may be associated with more fat on the body. When eaten in excess of need, energy from added sugars contributes to body fat stores, just as excess energy from other sources does.

When total energy intake is controlled, however, *moderate amounts of sugar do not cause obesity.*

Example of an alternative sweetener

- *Aspartame* is a low-calorie sweetening ingredient that provides the sweet taste of sugar without the calories. Aspartame has been used in numerous foods and beverages for more than 20 years and is enjoyed by millions every day.

Where Can Aspartame be Found?

- Aspartame is used to sweeten products such as low-calorie tabletop sweeteners, carbonated soft drinks, powdered soft drinks, puddings, gelatins, frozen desserts, yogurt, hot cocoa mixes, teas, breath mints, chewing gum and other foods, as well as some vitamin and cold preparations.



Acceptable Levels of Aspartame

- 50 mg / kg of body weight
- **Average aspartame Contents of Selected foods**

FOOD	Aspartame (mg)
12 oz. diet soft drink	170
8 oz. powder drink	100
8 oz. sugar-free fruit yogurt	124
4 oz. gelatin-dessert	80
1 package of sweetner	35

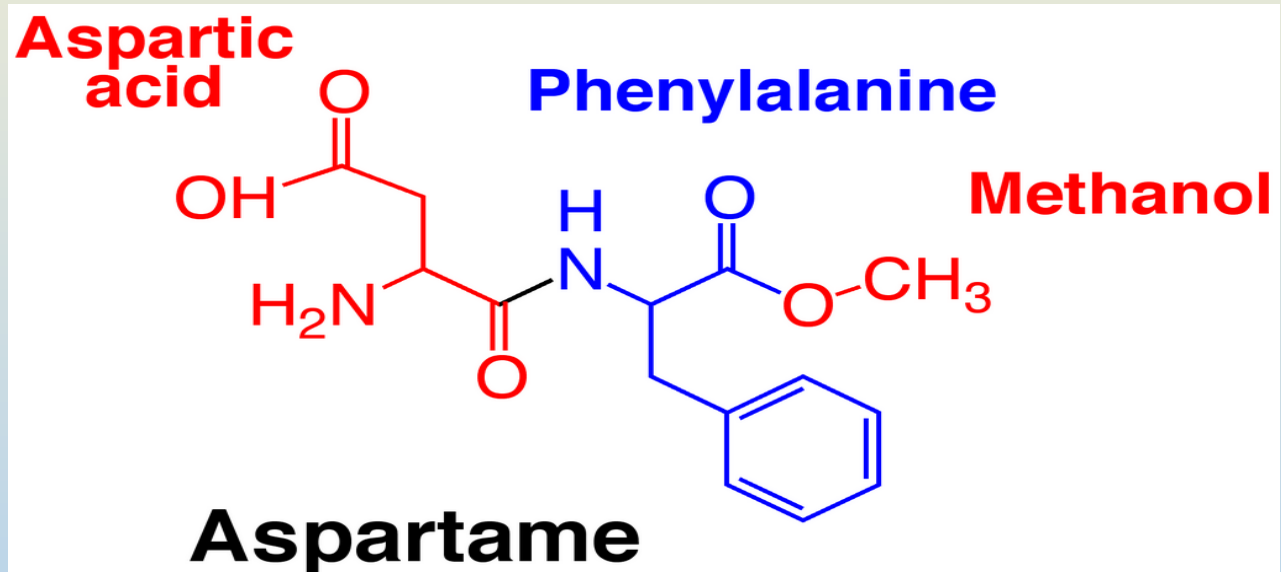
History of Aspartame

- Aspartame was discovered in 1965 by a researcher, Mr. James Schlatter, at G.D. Searle & Company.
- Schlatter was a scientist doing research with amino acids, working to develop a treatment for ulcers. In 1965, while creating a bioassay, an intermediate chemical was synthesized -- aspartylphenylalanine-methyl-ester (aspartame). In December of 1965, while James Schlatter was recrystallizing aspartame from ethanol, the mixture spilled onto the outside of the flask. Some of the powder got onto his fingers. Later, when he licked his fingers to pick up a piece of paper, he noticed a very strong sweet taste.
- Since that time aspartame has become one of the most highly valued and widely used sweeteners in the world, known for its clean taste and amazing sweetness (180-200 times sweeter than sucrose). Aspartame also quickly became a highly valued ingredient among people with diabetes because it literally changed their lives, allowing them to enjoy foods that are sweet and tasty without ingesting sugar.

How is Aspartame Handled by the Body?

- Aspartame is broken down in the body to the amino acids aspartic acid and phenylalanine as well as a small amount of methanol. It is a mixture of 40 percent aspartic acid, 50 percent of phenylalanine, and 10 percent of methanol.

The Molecular Structure of Aspartame



Methanol and its Break Down in our Body

- Methanol (methyl alcohol or wood alcohol) is a colorless, poisonous, and flammable liquid. It is used for making lots of things including formaldehyde, acetic acid, paint strippers, car engine cleansers and others. This poison can be inhaled from vapors, absorbed through the skin, and ingested.
- In aspartame, methanol poisoning and poisoning from methanol's breakdown components (formaldehyde and formic acid) can have widespread and devastating effects. This occurs in even small amounts, and is especially damaging when introduced with toxic, free-form amino acids, called excitotoxins.
- Methanol is quickly absorbed through the stomach and small intestine mucosa. The methanol is converted into formaldehyde (a known carcinogen). Then, via aldehyde hydrogenase, the formaldehyde is converted to formic acid. These two metabolites of methanol are toxic and cumulative.

Phenylalanine and its Breakdown in our Body

- Phenylalanine is an amino acid. Well, amino acids are good for us, right? Don't they keep us healthy? The answer is yes, amino acids are necessary for good health, EXCEPT when you separate the individual amino acid from its protein chain, and use it as an "isolate" or by itself.

Aspartic Acid and its Breakdown in our Body

- The Aspartic acid, in aspartame, is also an excitotoxin. An excitotoxin, is a deleterious (harm) substance that excites or over-stimulates nerve cells. This occurs in the brain, as well as the peripheral nerves, because aspartic acid, in free form, is an absorption accelerant & easily crosses the blood-brain barrier.

Studies and Experimental Data

- G.D. Searle approached Dr. Harry Waisman, Biochemist, Professor of Pediatrics, Director of the University of Wisconsin's Joseph P. Kennedy Jr. Memorial Laboratory of Mental Retardation Research and a respected expert in phenylalanine toxicity, to conduct a study of the effects of aspartame on primates. The study was initiated on January 15, 1970 and was terminated on or about April 25, 1971.
- Seven infant monkeys were given aspartame with milk. One died after 300 days. Five others (out of seven total) had grand mal seizures. The actual results were hidden from the FDA when G.D. Searle submitted its initial applications.
- Neuroscientist and researcher John W. Olney found that oral intake of glutamate, aspartate and cysteine, all excitotoxic amino acids, cause brain damage in mice (Olney 1970). Dr. John W. Olney informed G.D. Searle that aspartic acid caused holes in the brains of mice.
- Ann Reynolds, a researcher who was hired by G.D. Searle and who has done research for the Glutamate (MSG) Association, and was asked to confirm Dr. Olney's tests. Dr. Reynolds confirmed aspartame's neurotoxicity in infant mice.
- Excitotoxic compounds like MSG, aspartate, cysteine seem to create hypothalamic lesions, particularly in young animals. The reason for the latter is likely the fact that the blood brain barrier closes most slowly (if ever completely) around structures like hypothalamus. The outcome for such animals (rats) was obesity, severe behavioral changes, etc.

Aspartame Versus Table Sugar

- A can of soft drink sweetened with sugar contains about 150 Calories, compared to only one or two Calories in a can of soft drink sweetened with aspartame.
- since it is sugar-free, aspartame can make an important contribution to good dental health.
- For people on the Atkins Diet, aspartame is ideal as it does not contain any carbohydrates
- When aspartame-containing beverages are left at high storage temperatures, the aspartame can degrade and form small amounts of methanol.
- Diketopiperazine (DKP) is another breakdown product of aspartame.
- One small study (which has not been repeated) did find some worsening of depression when depressed patients took large doses of aspartame
- It has not been shown to be dangerous to diabetics in any way, whereas sugar has.

Aspartame Versus Table Sugar

- Aspartame products have been shown to not satisfy cravings as well as regular sugar products
- Overweight subjects who consumed fairly large amounts of sucrose (28% of energy) mostly as beverages, had increased energy intake, body weight, fat mass and blood pressure after 10 wk. These effects were not observed in a similar group of subjects who consumed artificial sweeteners.

Sugar alcohol

- The sugar alcohols are carbohydrates, but they yield **slightly less energy** (2 to 3 **kcalories** per gram) than sucrose (4 **kcalories** per gram) because they are not absorbed Completely. The sugar alcohols are sometimes called **nutritive sweeteners** because they do yield some energy.

- The sugar alcohols occur naturally in fruits and vegetables;
- Unlike sucrose ,sugar alcohols are fermented in the large intestine by intestinal bacteria. Consequently, side effects such as gas, abdominal discomfort, and diarrhea make the sugar alcohols less attractive than the artificial sweeteners.
- The advantage of using sugar alcohols is that they do not contribute to dental caries.

TABLE
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Sugar Alcohols	Relative Sweetness*	Energy (kcal/g)	Approved Uses
Erythritol	0.7	0.2	Bulk sweetener in low-kcalorie foods
Isomalt	0.5	2.0	Candies, chewing gum, ice cream, jams and jellies, frostings, beverages, baked goods
Lactitol	0.4	2.0	Candies, chewing gum, frozen dairy desserts, jams and jellies, frostings, baked goods
Maltitol	0.9	2.1	Particularly good for candy coating
Mannitol	0.7	1.6	Bulking agent, chewing gum
Sorbitol	0.5	2.6	Special dietary foods, candies, gums, frozen desserts, baked goods
Xylitol	1.0	2.4	Chewing gum, candies, pharmaceutical and oral health products

Relative sweetness of sweeteners

“Sugars”	
Sucrose	1
Fructose	1.7
Glucose	0.7
Lactose	0.16
Maltose	0.32
Galactose	0.32

Artificial Sweeteners	
Cyclamate	Banned in U.S “Delaney Clause”
Saccharin	500
Aspartame	100
Sucralose	600
Acesulfame K	200

Sugar alcohols*	
Sorbitol	0.5
Mannitol	1
Xylitol	1

*bind water, laxative effect,
gassy (caloric)

Reading food labels

To help you make healthy food choices, many foods have a “Nutrition Facts” label that contains helpful information such as:

serving size

calories per serving

fat/sodium/protein content

types and relative amounts of nutrients (vitamin C, iron, etc.)

What do claims on food labels mean?

Organic - Made from foods grown without pesticides, man-made fertilizers, or genetic engineering

Healthy - Low in fat and saturated fat, contains no more than 360mg of sodium and cholesterol per serving

Light - Contains at least one-third fewer calories or at least 50% less fat or sodium

Fresh - Raw food products that contain no preservatives and have never been frozen, heated, or processed in any way

Most food products will include a list of ingredients that are listed in order from the highest to the lowest in amount used

FIGURE
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Sugar Alternatives on Food Labels

Products containing sugar replacers may claim to "not promote tooth decay" if they meet FDA criteria for dental plaque activity.



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INGREDIENTS: SORBITOL, MALTITOL, GUM BASE, MANNITOL, ARTIFICIAL AND NATURAL FLAVORING, ACACIA, SOFTENERS, TITANIUM DIOXIDE (COLOR), ASPARTAME, ACESULFAME POTASSIUM AND CANDELILLA WAX.
PHENYLKETONURICS: CONTAINS PHENYLALANINE.

This ingredient list includes both sugar alcohols and artificial sweeteners.

Products containing aspartame must carry a warning for people with phenylketonuria.

Nutrition Facts

Serving Size 2 pieces (3g)
Servings 6
Calories 5

Amount per serving	% DV*
Total Fat 0g	0%
Sodium 0mg	0%
Total Carb. 2g	1%
Sugars 0g	
Sugar Alcohol 2g	
Protein 0g	

*Percent Daily Values (DV) are based on a 2,000 calorie diet.
Not a significant source of other nutrients.

35% FEWER CALORIES THAN SUGARED GUM.

Products containing less than 0.5 g of sugar per serving can claim to be "sugarless" or "sugar-free."

Products that claim to be "reduced calories" must provide at least 25% fewer calories per serving than the comparison item.

THANK YOU