

Food Industrial Exploitation of Artificial Sweeteners as a Food Additive

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Abstract

Sugar in the foods gives sweetness and adds calories in body which if you eat more than you need, you will gain weight. Weight gain increases risk of getting heart disease, diabetes and high blood pressure. Health-conscious people of today's fastest growing world find out the new sweetness provider called "artificial sweeteners". These sweeteners have many health benefits like weight management, prevention of dental caries and control of blood glucose for diabetics. All these sweeteners are "generally recognized as safe" (GRAS) sweeteners have undergone extensive safety testing and have been carefully reviewed by the Food and Drug Administration (FDA). Therefore, due to use of artificial sweeteners most of the people enjoy sweets with low or zero calories.

What are artificial sweeteners?

"Artificial Sweeteners" are low calorie substances used as sweeteners to replace sugar (sucrose) and other caloric sweeteners. These are helpful in controlling weight and insulin levels. The sensation of sweetness caused by these compounds is sometimes notably different from sucrose, so they are often used in complex mixtures that achieve the most natural sweet sensation. Some sugar substitutes are natural and some are synthetic. Sweeteners from plant or animal sources are called as natural sweeteners. Those are not from natural sources are called as **synthetic sweeteners**

Artificial sweeteners are attractive alternatives to sugar because they add virtually no calories to your diet. In addition, they are widely used in processed products, including baked goods, soft drinks, powdered drink mixes, candy, puddings, canned foods, jams, jellies and dairy products. Artificial sweeteners are also popular for home use.

Reasons for the use of artificial sweeteners

- **Weight Control** - One of the most appealing aspects of artificial sweeteners is that they have virtually no calories. In contrast, each gram of regular table sugar contains 4 calories. Some people choose to limit their food energy intake by replacing high energy

sugar with other sweeteners having little or no food energy. This allows them to eat the same foods with low calories.

Table 1: list of natural sugar substitutes

Sweeteners	Sweeteness (as compare to sucrose)
Brazzein	Protein in nature, 800 × sweetness (by weight)
Mannitol	0.5 × sweetness (by weight)
Monellin	Protein in nature, 3,000 × sweetness (by weight)
Sorbitol	0.6 × sweetness (by weight)
Stevia	250 × sweetness (by weight)
Thaumatococcus	Protein in nature, 2,000 × sweetness (by weight)
Xylitol	1.0 × sweetness (by weight)

Table 2: list of synthetics sugar substitutes

Sweeteners	Sweeteness (as compare to sucrose)
Acesulfame potassium	200 × sweetness (by weight), FDA Approved 1988
Aspartame	160 – 200 × sweetness (by weight), FDA Approved 1981
Salt of aspartame-acesulfame	350 × sweetness (by weight)
Cyclamate	30 × sweetness (by weight), FDA Banned 1969
Neotame	8,000 × sweetness (by weight), FDA Approved 2002
Saccharin	300 × sweetness (by weight), FDA Approved 1958
Sucralose	600 × sweetness (by weight), FDA Approved 1998

- **Beneficial against Diabetes Mellitus** - People with diabetes have difficulty to regulating their blood sugar levels. By limiting their sugar intake with artificial sweeteners, they can enjoy a varied diet while closely controlling their sugar intake.
- **Dental Care** - Sugar substitutes are tooth friendly, as they are not fermented by the micro flora of dental plaque. The sugars consumed usually adhere to the tooth enamel. Bacteria can feed upon this food allowing them to quickly multiply.

As the bacteria feed upon the sugar, they convert it to acid waste that in turn decays the tooth structure. An example of a sweetener that can benefit to dental health is xylitol. Xylitol prevent bacteria from adhering to the tooth surface and avoid plaque formation and decay.

- **Cost** - Many sugar substitutes are cheaper than sugar. Alternative sweeteners are often low in cost because of their long shelf life.

Food industry usage of artificial sweeteners

The food and beverage industries are increasingly replacing sugar with artificial sweeteners in a range of products traditionally containing sugar. According to market analysts, a total of 3,920 products containing artificial sweeteners were launched in the U.S. between 2000 and 2005. Some commonly consumed foods with alternative sweeteners are diet sodas, cereals, sugar-free desserts such as ice cream. Alternative sweeteners are found in many products due to their low or non-caloric characteristics. This can be used as a method of advertisement for dieters or those conscious of their sugar intake.

Common food products containing artificial sweeteners

1. **Light or diet beverages:** This category is where we find the most products with artificial sweeteners (mostly sucralose, sometimes in combination with acesulfame potassium or ace-K).
2. **Breakfast cereal:** For example, Fiber One product from General Mills contains aspartame.
3. **Popcorn:** Many popcorn products come coated with trans fat. Now, there are certain products that use artificial sweeteners, such as Go Lightly Sugar-Free popcorn.
4. **Yogurt:** This product uses sucralose in combination with acesulfame potassium or ace-K.

5. **Snack bars:** E.g. Sucralose in Quaker's Chewy snack product.

Health aspects related with artificial sweeteners

It is very important to consider the possible health effects of sweeteners while they are used in consumable foods. Artificial sweeteners are regulated by the FDA as food additives. They must be reviewed and approved by the FDA before being made available for sale. In some cases, the FDA declares a substance "Generally Recognized As Safe" (GRAS). The FDA has also established an acceptable daily intake (ADI) for each artificial sweetener.

Future scope for use of artificial sweeteners

The popularity of artificial sweeteners and other sugar substitutes is on the rise as manufacturers and consumers seek lower calorie alternatives to regular white sugar without sacrificing sweetness. Today, artificial sweeteners and other sugar substitutes are found in a variety of food and beverages marketed as "sugar free" or "diet," including soft drinks, chewing gum, jellies, baked goods, candy, fruit juice and ice cream.

References

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