Sugar vs. Sugar(s)
The Sugar Association
August 15, 2003

What constitutes a natural sugar?
The Sugar Association is bringing to the attention of the Food and Drug Administration the unintended deception arising from the concept that "sugars are sugars are sugars." Dictionary definitions of "sugar" are limited to the naturally occurring "water-soluble crystalline carbohydrates," with glucose, fructose, galactose, sucrose, lactose and maltose being identified as the major constituents. A definition is a word or phrase expressing the essential nature of a thing. Thus, the term "sugars" is an invented label that has no real meaning.

The current classification of "sugars" as mono- and disaccharides is a gross oversimplification of today's shifting sweetener industry [CFR 21 101.9(c)(6)(ii)]. To combine all current sweetening ingredients under one designation "sugars" is technically incorrect when many formulated sweeteners also contain a varying array of oligosaccharides [Attachment pg.1-3]. The definition of "what is a sugar" has been and continues to be expanded beyond its factual meaning and essential nature to accommodate the extensive array of formulated sweeteners.

Natural sugar vs. formulated sweeteners
Market research shows that consumers are looking for more natural food products. Consumers have the right to know when they choose a food product whether it contains a natural sugar or a formulated sweetener that has been generated by molecular manipulation. Consumers' understanding of natural is something existing in or created by nature, not a patented, man-made process to manipulate the molecules of one substance to create another - which is the case in the various formulated sweeteners.

The historic practice of classifying natural sugars and formulated sweeteners simply as "sugars" is not only inaccurate but confusing and misleading. A high-profile public debate has begun because of the concerns voiced in the academic and medical communities about corn-derived sweeteners like high fructose corn syrup (HFCS). Several important factors distinguish sucrose from HFCS.

Sucrose is a naturally occurring sugar present in almost every fruit and vegetable [Attachments pgs. 4-11]. Isolating sucrose from either sugar cane or sugar beets simply involves extracting the sucrose in its natural, native form from the surrounding plant material. Sugar is not chemically manipulated or bleached. Table sugar is pure natural sucrose.

While fructose occurs naturally in fruit, the fructose in HFCS is not naturally occurring. Unlike sugar (sucrose), HFCS is not found anywhere in nature. Instead, HFCS as well as crystalline fructose are manufactured by the isomerization of dextrose, which itself is manufactured from cornstarch. The corn-derived, fructose-enriched formulated

sweeteners were not part of the US food supply until the late 1960s [http://jan.mannlib.cornell.edu/data-sets/specialty/94002/].

Another fundamental difference between sucrose and HFCS is their molecular structure. Sucrose is one molecule of glucose and one molecule of fructose linked together in a single molecule. Whereas, HFCS is a manipulated mixture of "free" glucose and "free" fructose that are not molecularly attached. The relative proportions of glucose or fructose in HFCS are controlled by the manufacturer.

Unknown health implications

Highly respected organizations such as the American Dietetic Association and the American Diabetes Association make distinctions between sucrose and free fructose in their position papers. One major difference, according the Dietetic Association, is that fructose is better absorbed when consumed in sucrose than in HFCS, where the amount of free fructose exceeds the amount of glucose. This has implications for gastrointestinal health [Attachment pgs. 12-26].

The American Diabetes Association states unequivocally that the "intake of sucrose and sucrose-containing foods by people with diabetes does not need to be restricted because of concern about aggravating hyperglycemia." The Diabetes Association advises that, while fructose produces a lower postprandial glycemic response in diabetics, this "benefit is tempered by the concern that fructose may adversely effect plasma lipids. Therefore, the use of added fructose as a sweetening agent is not recommended …" The Diabetes Association further differentiated between the fructose of formulated sweeteners and naturally occurring fructose [Attachment pgs. 27-37].

This same point was voiced in the recent Institute of Medicine report by the statement, "With the introduction of high fructose corn sweeteners in 1967, the amount of "free" fructose in the American diet has increased considerably." Food and Nutrition Board, Institute of Medicine, National Academy of Sciences [Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids. The National Academic Press. Pgs. 6-23, 2002].

With the ever-increasing number of formulated sweeteners being constructed today, it is flawed to characterize these man-made sweeteners as a sugar/sugar(s).

The changing nature of the sweetener industry

For hundreds of years, people have consumed natural sugar in a variety of foods as well as having added the natural sugar, sucrose, to foods. Sugar serves many functional properties in food beyond enhancing flavor and taste making it a very important food ingredient. Today's food products may contain sucrose along with multiple different formulated sweeteners [Attachment pgs. 38-39]. This dramatic change has occurred for two principal reasons: (1) Economics – the food manufacturing industry is taking advantage of cheaper sweetening products; and (2) Labeling Regulation – by requiring the primary ingredient to be listed first in the ingredient statement, the practice of using

several sweetening products was adopted to eliminate a sweetener's position as the primary ingredient.

The development of cheaper sources of free dextrose, which is not as sweet as sugar, and free fructose, which is as sweet or sweeter than sucrose depending on relative concentration, allows food and beverage companies to use sweetener blends to formulate products that taste similar to products that traditionally contained sugar. This custom distributes sweeteners across the ingredient statement. In the past, product sweetness was achieved with just sugar; now the American public is consuming a multitude of different sweeteners, each of which has its unique metabolic responses.

Expanding sweetener choices and accurate labeling

The practice of sweetener blending is being extended beyond nutritive carbohydrate sweeteners to include high-intensity sweeteners [Attachment pgs. 40-41]. This broadening of sweetener ingredients makes food intensely sweet and has unforeseen consequences for future generations that will not find the traditional sweet taste, sweet enough.

As with the creation of trans-fats, the health consequences were not immediately apparent, as may be the case with formulated sweetener and sweetener blends. Consumers will be better educated and able to make informed choices only when the Nutrition Facts Panel (NFP) gives them completely accurate information.

Consumer confusion

The "sugars" designation in the NFP confuses the majority of consumers [Attachment pgs. 42-46]. Consumers tend to interpret the NFP "sugars" as only sugar (sucrose) and believe that the labeled "sugars" grams in a food product is due solely to sugar (sucrose). Confusion about the definition of sugar(s) is not only a problem for the consumer but extends to academia, government agencies and the media [Attachment pgs. 47-49]. The average journalist/editors is unaware of the distinction between "sugar" and "sugars" and considers the coined term "sugars" to be a typographical error and therefore uses the singular term "sugar." The FDA ruling that "sugar" is restricted to sucrose in a food ingredient statement [21 C.F.R. 101.4(b)(22)] is further jumbled by the fact that the term "sugar(s)" applies to all caloric sweeteners when nutrient content claims are made. It is no wonder that vast majority of consumers think of sugar (sucrose) whether they see the term "sugar" or "sugars." With the ever-increasing number of formulated sweeteners in today's food supply, the consumer remains ignorant regarding choice.

Recommendation

The Sugar Association recommends that the Nutrition Facts Panel "sugars" designation be revised to reflect the **"natural sugar"** and the **"formulated sweetener"** contents present in foods and beverages. These changes would make the food label and nutrient content claim accurate, would educate the consumer by providing truly meaningful information about the sugar and sweetener contents of a food or beverage, and reduce the current confusion created by the existing "sugars" designations.