

Sugars, Non-Caloric Sweeteners & Safety

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Definitions

Sweeteners

- Nutritive --supply calories (energy) and bulk as sugars and sugar alcohols
- Non-Nutritive -- sugar substitutes (no calories) and non-bulking. FDA approved - sucralose, aspartame, acesulfame-K, neotame, saccharin, lo han guo, and stevia products as rebaudioside A (reb A) and others

Sugars

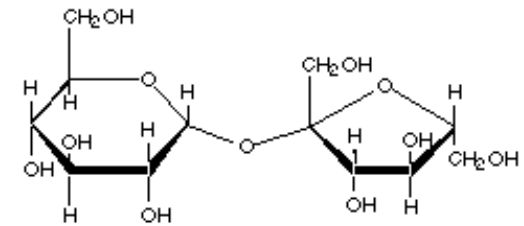
- Aldehyde or ketone-derivatives of straight-chain polyhydroxy alcohols containing at least 3 carbon atoms (monosaccharides) $(CH_2O)_n$



Background Information

- Sugar use:
 - ~80% soft drink industry
 - ~10% table top sweeteners
 - ~10% food stuffs, chewing gums, sauces and dressings
- Sucrose is the “gold standard of sweeteners”
- An increasing demand for health and wellness products with zero or low calorie sweetener options

80%



Sucrose
(glucose (α1->2) fructose)

Comparison of Different Sweeteners

Sweetener/ Brand Name	Caloric Value/Serving	Relative Sweetness ¹	Molecular Structure
Sucrose	4/g	1.0	Disaccharide (glucose + fructose, α1,2)
Glucose	4/g	0.7-0.8	Monosaccharide
Fructose	4/g	1.4	Monosaccharide
Lactose	4/g	0.2	Disaccharide (galactose + glucose, β 1,4))
Maltitol	3.2/g	0.8-0.9	Disaccharide (maltose + maltose) alcohol
Erythritol	0.2/g	0.6-0.8	4 carbon sugar alcohol
Xylitol	2.4/g	0.8-1	Monosaccharide alcohol
Lactitol	2.3/g	0.35	Disaccharide alcohol (galactose + sorbitol)



Comparison of Different Sweeteners

Sweetener/Brand Name	Caloric Value/Serving	Relative Sweetness ¹	Molecular Structure
Sorbitol	2.4/g	0.6/g	Monosaccharide alcohol
Mannitol	1.9/g	0.5-0.6	Monosaccharide alcohol
Lo Han Kuo Extract	0	250-300	Terpene glycosides
Aspartame/Nutra- Sweet	0	200	Amino acid methyl ester (L-aspartyl-L-phenylalanine)
Saccharin	0	200-700	Saccharin (o-sulfobenzimide)
Acesulfame-K	0	130-200	Acesulfame potassium
Stevia--Rebaudioside A (Reb A), stevia95 and others	0	200-400	Steviol glycosides
Sucralose/Splenda	0	600	Chlorinated sucrose



Sweetener Considerations

- Color
- Odor
- Caloric value
- Glycemic properties
- Solubility
- Relative sweetness
- Non-browning
- Cooling effects
- Stability
- Laxative properties
- Safety
- Regulatory status
- Consumer reaction
- Availability
- Natural
- Is it a sugar?
- Allergenicity
- Cost



Available Sweeteners

- Aspartame
- Ace K
- Sucralose
- Neotame
- Inulin
- Dextrin
- Erythritol
- Maltol
- Ethylmaltol
- Fructose
- Glucose
- Sucrose
- Lactitol
- Maltitol
- Mannitol
- Maltodextrin



- Raffinose
- Rebaudioside A (Reb A)
- Saccharin
- Saccharin sodium
- Sorbitol
- Trehalose
- Tagitol
- Xylitol
- Tagitose
- Isomaltulose
- Honey
- Corn Syrup
- Rice Syrup
- High Fructose Corn Syrup
- Combination Products



Sweeteners Used In AdvoCare Products

- Acesulfame potassium
- Corn syrup
- Dextrose (glucose)
- Polydextrose
- Fructose
- High fructose corn syrup
- Honey
- Inulin/FOS
- Lactitol
- Lactose
- Maltitol/Maltitol syrup
- High maltose corn syrup
- Maltodextrin
- Rice syrup
- Sucralose
- Sorbitol
- Sugar (sucrose)
- Xylitol



How Much Added Sugar Does The Average Person Consume?

- Over 90 grams/day \approx 360 kcal \approx 22+ tsp as soft drinks, fruit drinks, desserts, processed foods, candies, cereals, etc.
- This equates to about 72 lbs / year!!
- American Heart Assoc. recommends women consume no more than 25 grams (100 kcal) and men no more than 37.5 grams (150 kcal) of added sugars per day.



Health Issues Associated With High Sugar Consumption

- Obesity
- Cardiovascular diseases
- Insulin resistance and diabetes
- Hyperlipidemias
- Hypertension
- Suppressed immune system
- Hormonal issues
- Considered by many to be addictive for some individuals
- Greatly increased risk of premature and preventable deaths—over 400,000 each year



Sugar and the Cardiovascular System

“Sugar generates an insulin spike, and when insulin spikes continuously, it starts to ravage the fragile, but ultra-important epithelial lining of blood vessels.”

“This repeated sugar-insulin reaction is more damaging than saturated fats, trans fats, radiation, microbes or pharmaceutical drugs” to the cardiovascular system.”



Glucose

- Derived from Greek word meaning “sweet”
- The prime energy source for most organisms including humans.
- Brain can not function without it.
- As a primary energy source--in aerobic respiration, one glucose molecule yields 32 ATP molecules
- Precursor for lipids, protein, vitamin C, glycogen, starches, cellulose, glucuronides which are involved in detoxification reactions, etc.



Fructose

- Modest intake (<10% energy) has beneficial affects on serum lipids and insulin sensitivity
- Typical servings of fruit contain 4-10 grams of fructose (for example, a medium apple---7-8 grams). A 12 oz. soft drink sweetened with HFCS delivers ~20 grams fructose PLUS 20 grams of glucose.
- Daily fructose consumption has risen from ~15 grams/day in 1900 to ~75 grams/day in 2010.



When Does Consuming Fructose Become A Problem?

- Fructose becomes a problem when consumed in excess(>20-25% of total calories)—large amounts of soft drinks, fruit drinks and other beverages and foods sweetened with high fructose corn syrup (HFCS)
- High fructose intake promotes insulin resistance which leads to diabetes, visceral adiposity (abdominal fat), and high blood lipids which can lead to cardiovascular disease.



Are Non-Caloric Sweeteners (Sugar Substitutes) Safe?

“Extensive scientific research has demonstrated the safety of the low-calorie sweeteners currently approved for use in foods in the United States.”

– Kroger et al. *Comp. Rev. Food Sci. Food Safety* 5, 35-47 (2006).

- A number of prominent websites contain extensive amounts of misinformation regarding non-nutritive sweeteners. The information on these websites is anecdotal, and has never been demonstrated in research studies or published in reputable scientific, peer-reviewed journals. Furthermore, the websites reference each other in an effort to create credibility.



Facts About Non-Caloric Sweeteners

- 7 Approved by the FDA
- Would not be approved by the FDA if they exhibited scientifically reproducible adverse effects
- No scientific evidence that they cause : headache, GI distress, compromised immune system, cancer, rash, diarrhea, altered hormones, obesity, heart disease, diabetes, and no deaths have ever been documented
- ~30 % of all soft drinks sold in USA use non-caloric sweeteners



How Can One Explain The Anecdotal Reports Of Adverse Events Associated With Non-Caloric Sweeteners?

- High probability of independent but concurrent events
- Power of suggestion (reverse placebo [nocebo] effect)
- Competing commercial interests (sugar and non-nutritive sweetener [NNS] industries, some healthcare industries, etc) providing misinformation
- Actual cases of adverse events lost in the background noise, and therefore not statistically significant in research studies



Position of the American Dietetic Association

“It is the position of the American Dietetic Association that consumers can safely enjoy a range of nutritive and non-nutritive sweeteners when consumed in a diet that is guided by current Federal nutrition recommendations, such as the Dietary Guidelines for Americans and the Dietary Reference Intakes, as well as individual health goals.”

– J. Amer. Dietetic Assoc. 104, 255-275, 2004.



Sucralose

- Chemistry – made from sucrose by substituting 3 chlorine atoms for 3 hydroxyl groups
- ~ 600X sweeter than sugar
- Stable at baking temperatures
- No unpleasant aftertaste
- Closest sweetness profile of all non-caloric sweeteners and sugar alcohols to sugar (sucrose)



Sucralose

- ~ 20–25% absorbed and most excreted unchanged in urine, with small amount excreted as glucuronides
- No effect on blood glucose utilization, carbohydrate metabolism or insulin production
- Is not carcinogenic, teratogenic or mutagenic
- Does not produce diarrhea, affect the immune system, alter hormonal systems, cause headaches, produce fatigue or skin conditions
- Gratz and Munro. An overview of the safety of sucralose. Reg. Toxicol. Pharmacol. 55, 1-5, 2009.



About Sweetener Choices

- There are approximately 30 sweeteners approved by the FDA for human consumption that are deemed to be safe and effective when used appropriately.
- Of these choices AdvoCare has selected over a dozen to use in varying combinations depending on the product.
- There are a number of prominent websites that contain extensive amounts of misinformation regarding sucralose and other sweeteners. The information they provide is not based on sound scientific consensus.
- AdvoCare does not use any ingredients that are not demonstrated to be safe, well studied and supported by sound scientific evidence.



Summary

- The increased incidence of diabetes and obesity parallel the increase in the consumption of sugary beverages
- Consumption of large amounts of simple sugars in the form of soft drinks, fruit drinks, fruit juices and other beverages as well as foods that contain high levels of rapidly absorbable sugars has a huge negative impact on health and wellness.
- It is not easy to define what is considered natural since all “natural” non-caloric sweeteners are highly refined as are most caloric sweeteners.
- Use of various non-nutritive sweeteners has continued to raise questions of safety by some individuals, and they have been anecdotally linked to many health maladies, with the exaggerated occurrence of purported health issues.
- There is no scientific evidence that natural non-caloric sweeteners are safer or offer any health benefits over synthetic non-caloric sweeteners.
- The bottom line is that for the FDA approved non-nutritive sweeteners, no scientific, peer-reviewed, published studies demonstrating a causal relationship between their use and health risks exist. The weight of scientific evidence supports their use at currently consumed amounts.



FAQ's

www.advocare.com

Resources → FAQs

Frequently Asked Questions

[What sweeteners does AdvoCare use in its products?](#)

[What is stevia and are stevia constituents used in AdvoCare® products?](#)

[What is sucralose? Is it safe?](#)

[What are sugar alcohols and why are they used in AdvoCare® products?](#)

[What are fructose and high fructose corn syrup \(HFCS\)? Does AdvoCare® use these ingredients in any products?](#)

