Steviva INGREDIENTS

Where Sweeteners Come Naturally

CLEAN LABEL

Sugar Reduction in Beverages

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CONTENTS

CLEAN LABEL

Sugar Reduction in Beverages

Consumers don't have a common definition of healthy food, but one theme is consistent. Whether they are looking for high protein, low carb, gluten-free or non-GMO, most consumers agree that an easy-to-understand ingredient statement is important.

Organic Growth for Clear Label holds first place in Innova Market Insights Top Ten Trends list for 2016. While clear label established itself as a key trend in 2015, the market research company calls clean eating an overarching theme in its top 10 list for 2016. In the April 2016 issue of Food Technology magazine Dr. Elizabeth Sloan called Chemical Consciousness a top trend. She finds that clean label claims have more appeal than general healthy descriptors.

Clean labeling is visibly coloring the beverage sector as consumers are steadily moving away from heavily processed caramel colors, unnatural dyes, artificial flavors and chemically produced sweeteners. Beverage developers are challenged to satisfy the consumers' appetite for refreshment. In many cases, they must meet sweetness expectations and goals for calorie reduction without using synthetic solutions. Because no two sweeteners perform exactly alike, it's not a simple substitution.

Artificial sweeteners that are used in many low calorie beverages are present in such small amounts that they do not contribute to texture. Their sole role is to provide sweetness, but often times they possess a lingering flavor that is off putting to some. Still some consumers prefer the flavor over the cloying sweetness of high fructose corn syrup (HFCS). Both categories are experiencing push back as consumers favor ingredients that are naturally processed.

Sucrose, or table sugar, has a rounded sweetness profile that is the traditional gold standard. Its clean flavor is instantly recognizable, but as important, it provides body that completes the sensory experience. If sugar reduction is the goal, formula adjustments will be required to build mouthfeel.

Fructose is sweeter than sucrose. It's commonly known as the sugar found in fruits. While it is natural, some consumers may view it negatively because of their acquaintance with HFCS. Honey and agave syrups both have a healthy halo and will impart distinct flavors. Like sucrose and fructose, they will contribute to added sugars, now required by FDA to be listed in the nutritional facts panel.

High intensity, plant-derived sweeteners such as stevia and monk fruit provide a triple win to clean label formulations. Besides supporting a consumer-friendly label, they contribute zero calories. Lastly, they deliver clean flavor.

Clean labeling and natural processing are top food trends in 2016

The choice of sweetener will begin with an understanding of the other ingredients in the formula. Stevia is so powerfully sweet that it sometimes lingers. Citric acid, lactic acid or tartaric acid in the beverage system will improve the flavor of stevia by cutting sweetness. A licorice note is often associated with stevia. This characteristic is diminished in the presence of cola, ginger, and root beer flavors.

Bitter flavors, such as grapefruit, have a natural masking effect. Inulin or fructooligosaccharides (FOS) can reduce the aftertaste of high-intensity sweeteners with the added benefit of improved mouthfeel.

Bulk can be built by adding a natural sugar alcohol such as erythritol. In its dry form it has a natural cooling effect. This effect will be less pronounced in a liquid. It is also non-cariogenic. It adds mild sweetness with zero calories per gram.

Hydrocolloids are a neutral choice to build body. Pectin is generally recognized by consumers as an ingredient in grandmother's pantry. Xanthan and carrageenan gums are accepted by Whole Foods Market, and thereby accepted by most consumers. However, over use can lead to an undesirable slimy quality. At the right level, viscosity is increased and astringency is decreased.

Even though an ingredient is perceived as natural, FDA does not have a standard definition. Consumers are left to their own interpretations. As they look for products that are minimally processed, they are demanding transparency about the ingredients used and the manufacturing steps involved in making the foods and beverages they buy.

The differences among natural sweeteners can be used to not only enhance flavors but to tell a story as well. Many stevia products, for example, are chemically extracted. They may have an unnatural petrochemical flavor. Water extracted stevia products deliver clean taste and a production method that consumers understand.

The optimum sweetness solution almost always comes from interplay of carefully chosen ingredients. Sweetener tendencies are magnified or muted in the presence or absence of other ingredients. When some sweeteners are used in tandem, they work together like a well-trained team. They bring out the best in each other, and together, they become more powerful than the simple sum of their parts. These synergies command lower usage levels with the benefit of cost reduction.

Appealing to consumers is the ultimate benefit to beverage processors. A well-honed sweetening system can lead to an uncluttered ingredient statement. That is the key to clean label.

STEVIA:
200 times sweeter than sugar

Stevia has a longer track record than most, used for centuries in other cultures. It is a zero-calorie sweetener derived from the South American plant Stevia rebaudiana. Stevia-derived sweeteners are one of the most thoroughly tested natural sweetening ingredients of the past two decades. Not only safe to use, having achieved FDA GRAS status in 2009, it has been shown in repeated research to have healthful, positive effects on blood glucose management and in the promotion of digestive health.

The active flavor component of stevia, steviol glycosides, consist of a glucose molecule bound with a steviol aglycone – commonly either stevioside or rebaudioside. (Rebaudiosides are sweeter than steviosides). The glucose half of the molecule stimulates the taste receptors on the tongue but are not broken down and absorbed during primary digestion. Rather, they are released in the lower GI tract, minimizing glycemic impact. And, because stevia molecules are metabolized in the lower intestine, they are believed to provide sustenance for beneficial bacteria, thus aiding digestive health.

Because it is 200 to 300 times as sweet as sugar, a very minute amount is required. Stevia is a natural fit as a core ingredient as it has a slower time to peak sweetness in the mouth compared with sucrose and a longer finish on the palate. Its unique qualities of chemistry and taste make it an ideal foundation for clean label sugar reduction.

To assist with dispersion in manufacturing, Stevia is often paired with a bulking agent such as erythritol (see below). When combined with other sweeteners, stevia works synchronistically, bringing out the best qualities in both, while using lower levels of each, allowing manufacturers to meet goals of total

200 to 300 times as sweet as sugar

sugar replacement or significant reduction. Stevia's compatibility with fructose enhances fruit flavors and it works well with tea and mint – two flavors that are making their way into bars.

MONK FRUIT:
200 times sweeter than sugar

Monk fruit (luo han guo) has a similarly long track record, used for centuries in Asia as a sweetener. With 150 to 250 times the sweetness of sucrose, it also acts as a natural flavor enhancer that helps mask "off" flavors from fortifying ingredients such as minerals and vitamins. While it has a neutral flavor in most applications, it imparts a slight melon-rind note, providing a decided advantage in formulations. Monk fruit's sweetness comes from a group of compounds called mogrosides within the fruit from the Siraitia grosvenorii plant. The dried whole fruit contains up to 1.5% extractable mogrosides. Maturity of the fruit affects the mogroside content.

150 to 250 times the sweetness of sucrose

Chemically, mogrosides are in the class of triterpenoid saponins. There are five numbered mogrosides – in addition to other glycosides - each of which has distinct sweetness characteristics. Mogroside-5 is the predominant of these. The sweetness of these individual mogrosides vary from 150-400 times the sweetness of table sugar. Typical commercial sweeteners derived from luo han guo average about 200 times sweeter than sugar. As with stevia, the FDA has recognized these monk fruit extracts as GRAS.

Because of its intensity, monk fruit is needed in very minimal amounts. To assist with dispersion in manufacturing, it, too, is often paired with a bulking agent such as erythritol (see below).

ERYTHRITOL

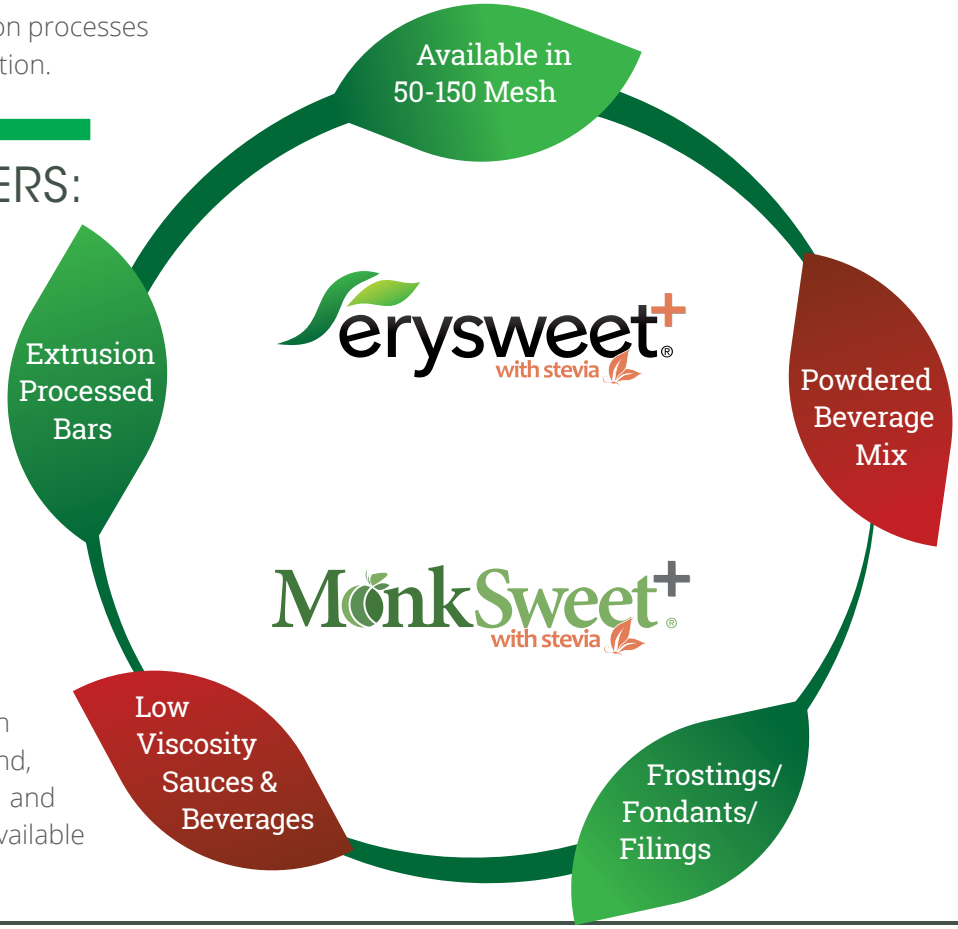
Mouthfeel and body are attributes that are tied to sensory perception. Along with the sweetness curve, they define our perception of sugar. If bulk is missing, a sweet taste can fall flat. And because of the high intensity in stevia and monk fruit, they are often paired with a bulking agent such as erythritol to ensure thorough dispersion.

Erythritol is a polyol or sugar alcohol, naturally occurring in fruit and some fermented foods. The structure of polyols is similar to sugar molecules and erythritol has the lowest molecular weight of all the polyols with a molar mass of 122.1198. Erythritol has a very low caloric value – only 0.2 kcals/g, thereby not affecting blood sugar. Its weight, reduced sweetness (70% as sweet as sugar) and negligible glycemic impact make it ideal for use as a bulking agent. Additionally, it lacks any off-taste and, most importantly, has been shown to be absent the negative gastric side effects typically associated with polyols. Neither intestinal microflora nor yeast can ferment erythritol. None of the polyols participate in the Maillard reaction. As a result, they are most suitable for extrusion processes and applications not needing caramelization.

SWEETENING PARTNERS: Dynamic Duos

Some years ago, formulators at Steviva Ingredients created a proprietary blend of stevia and erythritol as an elegant solution for manufacturers looking to reduce or eliminate sugar and high fructose corn syrup from their formulations. Called Erysweet+, this blended sweetener is twice as sweet as sugar and other sweetening systems, so half as much is used – which leads to savings of application and reduced storage necessities. Blended in Steviva's state-of-the-art plant in Portland, Oregon, consistency of mesh size and flowability is a hallmark of this product. Available in a granular (~50 mesh), fine powder (~100 mesh) and ultra-fine powder (~150 mesh), Erysweet+ is ideal for all cold process or extrusion manufacturing. Comprised of non-GMO erythritol and a 60% Reb A stevia, Erysweet+ in a 100-mesh size has been the hands down choice for manufacturers looking for Clean Label Sugar Reduction.

The new kid on the block is MonkSweet+, Steviva's proprietary blend of monk fruit (25% mogroside V), stevia and erythritol. Designed to give manufacturers a new flavor profile option, the combined sweetness of MonkSweet+ is rated at about 200 times the sweetness of sucrose, while the addition of erythritol tempers the sweet intensity. The result is a 1:2 plugin replacement for either sucrose or HFCS. MonkSweet+ delivers a complex sweetness profile that is rounded and full and has a mouthfeel similar to table sugar. Monk fruit acts as a natural flavor enhancer that can help mask "off"-notes in stevia, as well as other ingredients. Meanwhile, erythritol contributes body with MonkSweet+ finishing with an overall sweetness that is clean and neutral.

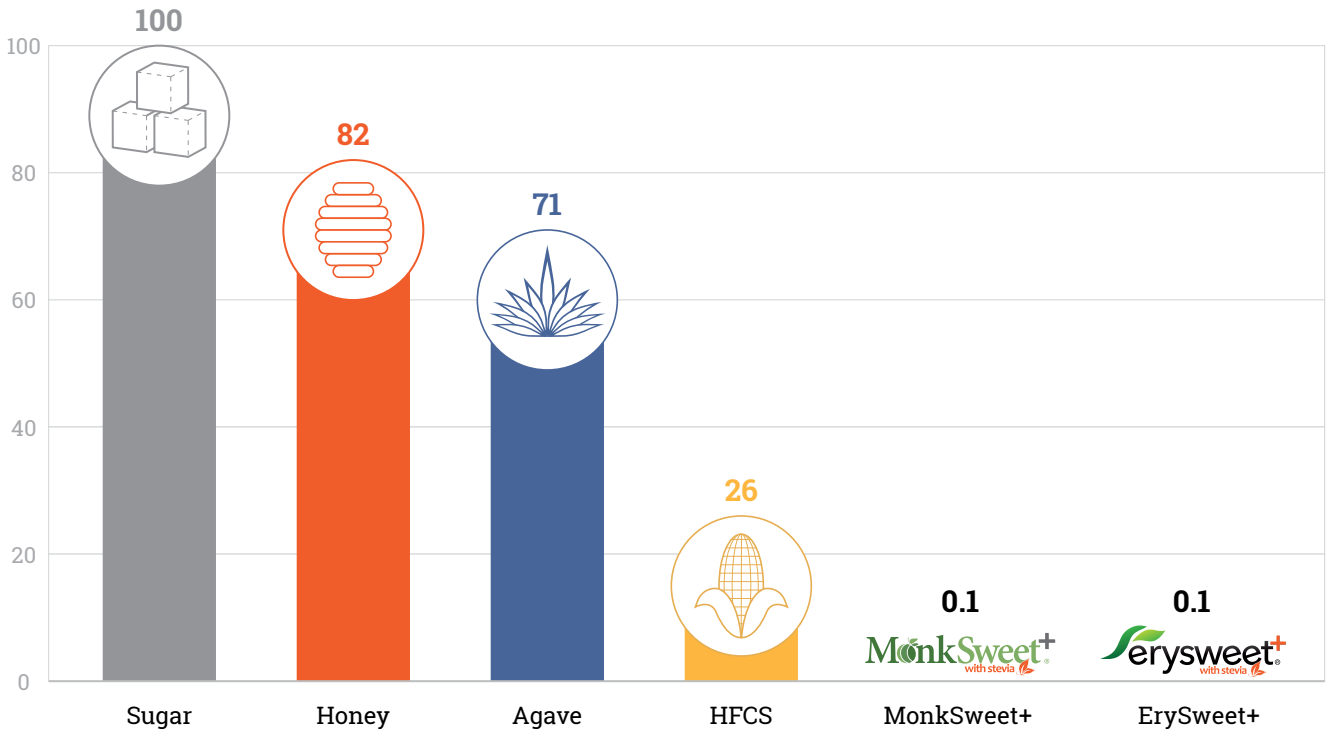


ADVANTAGES OF ERYSWEET+ AND MONKSWEET+ IN BEVERAGES

- 0 calories
- High solubility
- Flexible mesh options: ~50, ~100, ~150
- Tight mesh size is optimal for unheated process
- Thorough dispersion in process
- Shelf-stable
- Heat-stable
- pH-stable

- Twice as sweet as table sugar
- Gluten-free
- 0.2 kcals/gram
- Improved temporal profile
- Superior smooth flavor
- Low glycemic load, safe for diabetics
- GMO-free
- JECFA-compliant
- Kosher

GRAMS OF ADDED SUGAR PER 100 GRAM SAMPLE



CASE STUDY
Carbonated Soft Drink Utilizing Clean Label Sugar Reduction

Carbonated Soft Drink:
Blue Ridge Beverage, manufacturers of a carbonated soft drink, has an existing ingredient and nutritional panel consisting of nutritive sweeteners.

Goal:
Achieve Clean Label Sugar Reduction while improving flavor profile.

Method:
By simply removing some key ingredients and replacing them withMonkSweet+ 100 in a 100-mesh size, they are able to achieve the following significant gains:

Removing: high fructose corn syrup
Replace with: Monksweet+ 100

HIGH SUGAR
LEMON LIME
CARBONATED
SOFT DRINK

Nutrition Facts

1 can 12 fl oz (369 g)

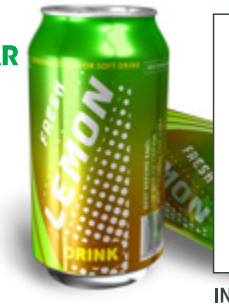
Calories 146
Calories from Fat 0

* Percent Daily Values are based on a 2,000 calorie diet.

Amount Per Serving	% Daily Value*	Amount Per Serving	% Daily Value*
Total Fat 0.1g	**0**%	**Total Carbohydrate** 37g	**12**%
Saturated Fat 0g	**0**%	Dietary Fiber 0g	**0**%
Trans Fat 0g		Sugars 33g	
Cholesterol 0mg	**0**%	**Protein** 0.2g	
Sodium 33mg	**1**%		
Potassium 4mg	**0%**		

INGREDIENTS: Carbonated water, high fructose corn syrup, citric acid, natural flavors, sodium citrate, sodium benzoate

CLEAN LABEL
REDUCED SUGAR
LEMON LIME
CARBONATED
SOFT DRINK



Nutrition Facts

1 can 12 fl oz (369 g)

Calories 3
Calories from Fat 0

* Percent Daily Values are based on a 2,000 calorie diet.

Amount Per Serving	% Daily Value*	Amount Per Serving	% Daily Value*
Total Fat 0g	**0**%	**Total Carbohydrate** 4g	**1**%
Saturated Fat 0g	**0**%	Dietary Fiber 0g	**0**%
Trans Fat 0g		Sugars 0g	
Cholesterol 0mg	**0**%	Alcohol Sugars 4g	
Sodium 20mg	**1**%	**Protein** 0g	
Potassium 2mg	**0%**		

INGREDIENTS: Carbonated Water, Erythritol, Tartaric Acid, Reb A (Stevia Extract), Citric Acid, Monk Fruit Extract, Natural Flavors

SUMMARY

As consumers look to increase their nutritional intake from natural sources, food developers are looking for assurance that the ingredients they buy are minimally processed. Steviva Ingredients, Portland, OR, is distinct in their dedication to supplying products that are derived via fermentation or natural water and vegetable-alcohol extractions. Stevia extracts are uniquely water-extracted. It is a process that consumers understand and it offers exceptionally clean flavor with no petrochemical residue. Steviva Ingredients' products are certified GMO free and kosher.

The company offers a variety of sweetener blends, including combinations of stevia with fructose, monk fruit, coconut sugar, agave nectar and erythritol, the natural sugar alcohol. This gives developers a single, easy-to-use ingredient for sweeteners, with the added benefit of ingredient consistency in the manufacturing process.

Steviva Ingredients' research and development team also offers custom sweetening solutions. Any sweetening blend can be combined with other sweeteners to create matchless sweetness profiles in reduced-sugar beverages. Unexpected synergies may enhance flavor and even allow for reduction of costly ingredients.

ABOUT

Steviva Ingredients works with food manufacturers to create plugin and custom sweetening systems of all particle sizes that function as a replacement for sucrose, 10x sugar, invert sugar and high fructose corn syrup. When you collaborate with Steviva Ingredients, you can be assured of chemical-free processing and 100% natural products with ingredients that are clean label, GMO-free, gluten-free, diabetic safe and kosher.

Steviva Ingredients has an extensive system in place for ensuring the highest possible standards for quality control and food safety... such as stringent ingredient oversight, adherence to good manufacturing practices with strict microbiological standards and ongoing heavy metal and pesticide testing.

For spec sheets, documentation and samples of Clean Label Sugar Replacements, call your Steviva Ingredients sales representative at 310-455-9876 or email info@steviva.com.

Steviva INGREDIENTS
Where Sweeteners Come Naturally

SteviaSweet 95-60

BraziliaSweet 95-60

MonkSweet+ with stevia

erysweet+ with stevia

CocoSweet+ with stevia

XeroSweet+ with stevia

FrüSweet

nectevia with stevia

Steviva- Where Sweeteners Come Naturally

Clean & Natural

sweeteners for every formulation

WHERE **SWEETENERS** COME NATURALLY

Steviva's custom sweetening systems address your desired functionality by replacing sugar and/or high fructose corn syrup to deliver clean label sugar reduction.

When you choose Steviva Ingredients as your supply chain partner you can be assured of the highest quality and reliability. We have an extensive system in place for ensuring the highest possible standards for quality control and food safety and a keen focus on; stringent ingredient oversight, adherence to good manufacturing practices, a commitment to strict microbiological standards along with continual testing for heavy metals, pesticides and pathogens.

Our proprietary contracts with suppliers provide consistent, dependable ingredient sourcing making Steviva Ingredients your reliable supply chain partner.

Certified Kosher | Allergen Free | Non GMO | Gluten Free | US FDA GRAS

Steviva INGREDIENTS
Where Sweeteners Come Naturally

For more information or to order a sampler kit
310.455.9876 | sales@steviva.com | **stevivaingredients.com**

REFRESHMENT!

REFRESH YOUR BEVERAGE FORMULATION WITH CLEAN LABEL SUGAR REDUCTION

Erysweet+ with stevia 100

Our stevia erythritol blend and monk fruit, stevia, erythritol blend in 100 mesh are the preferred sweeteners of every **successful beverage manufacturer.**

MonkSweet+ with stevia 100

We wrote the book on **Clean Label Sugar Reduction.**

Please contact us for free samples and specs.

Steviva INGREDIENTS
Where Sweeteners Come Naturally

Contact: info@steviva.com | 310-455-9876