



Working with Natural High Potency Sweeteners in New Product Development

1

Alex Woo, Ph.D.

VP, Product Innovation & Application

Sweet Green Fields

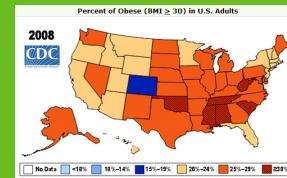
awoo@sweetgreenfields.com

425-985-8168



“Naturally Sweetened” and
“Reduced Calorie” are strong consumer drivers in
recent years

- Health & Wellness
- Obesity & Weight Management



“Naturally Sweetened” is the best of both worlds
which previously was not technically feasible with
artificial high potency sweeteners

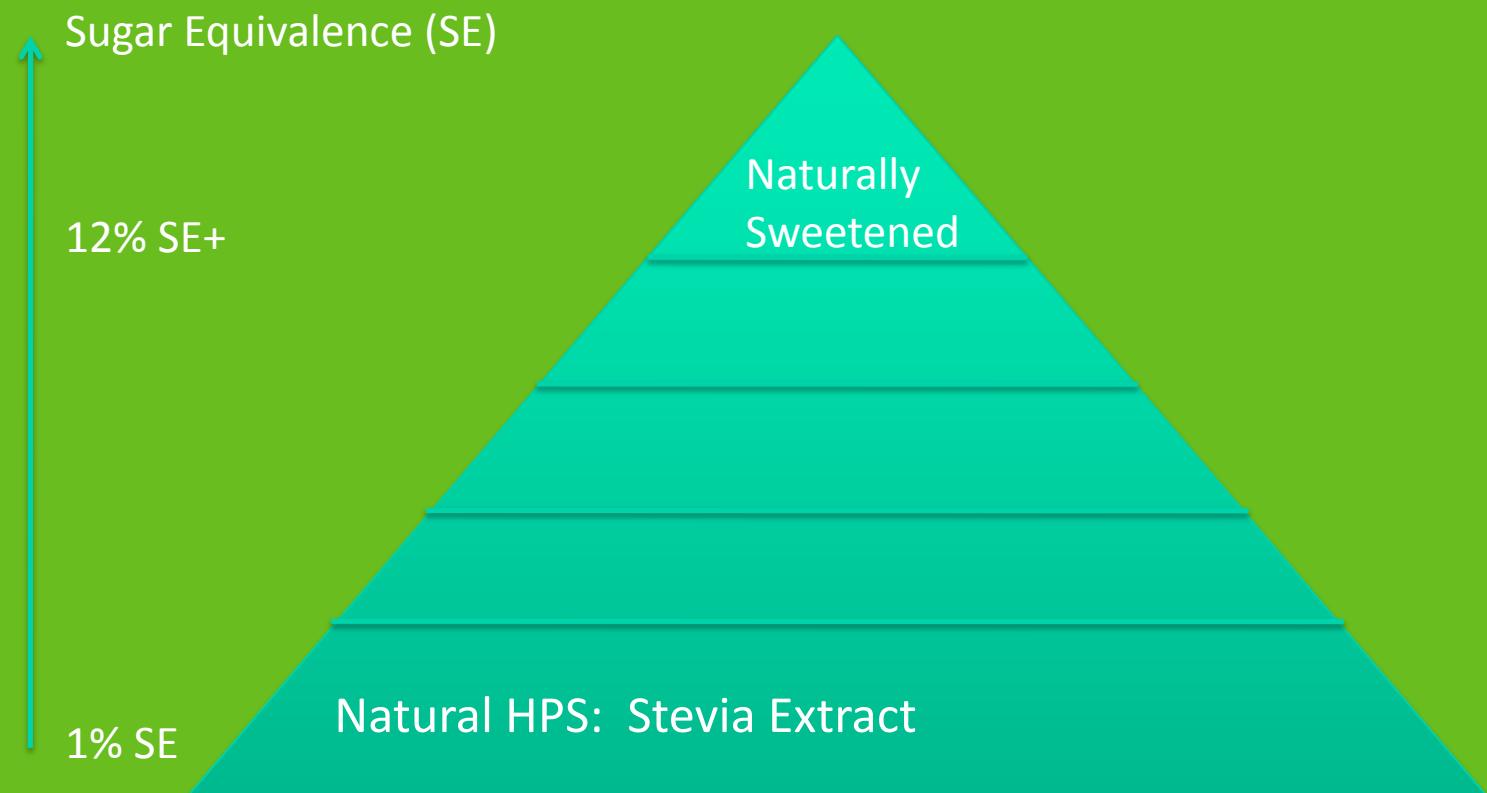
- Sugar: Great taste but caloric
- High Potency Sweeteners (HPS): Non caloric, but artificial



2



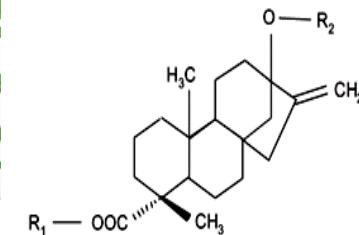
Start formulating “naturally sweetened” foods and beverages with high purity stevia extract which is currently the best natural HPS





Rebaudioside A (Reb A, Stevia Extract): We can achieve moderate level of sweetness with high purity Reb A 97

- Natural
- GRAS: FDA No Objection Letter 2008
- Up to 300X as sweet as sugar
- Non caloric
- Low Glycemic Index
- Heat Stable
- pH Stable above 3
- Licorice and bitter when too much used
- Non GMO
- Kosher & Halal Certified
- Exceeds FDA GRAS Specifications (SGF
Reb A97, >97% RA)



Deterpene glycoside	R ₁ ^a	R ₂ ^a	Sweetening potency (sucrose = 1)
Steviolbioside	H	glc ^{2—1} glc	100 — 125
Rubusoside	glc	glc	100 — 120
Stevioside	glc	glc ^{2—1} glc	150 — 300
Rebaudioside A	glc	glc ₃ ^{2—1} glc ₁ glc	250 — 450
Rebaudioside B	H	glc ₃ ^{2—1} glc ₁ glc	300 — 350
Rebaudioside C (dulcoside B)	glc	glc ₃ ^{2—1} rhm ₁ glc	500 — 120
Rebaudioside D	glc ^{2—1} glc	glc ₃ ^{2—1} glc ₁ glc	250 — 450
Rebaudioside E	glc ^{2—1} glc	glc ^{2—1} glc	150 — 300
Dulcoside A	glc	glc ^{2—1} rham	50 — 120

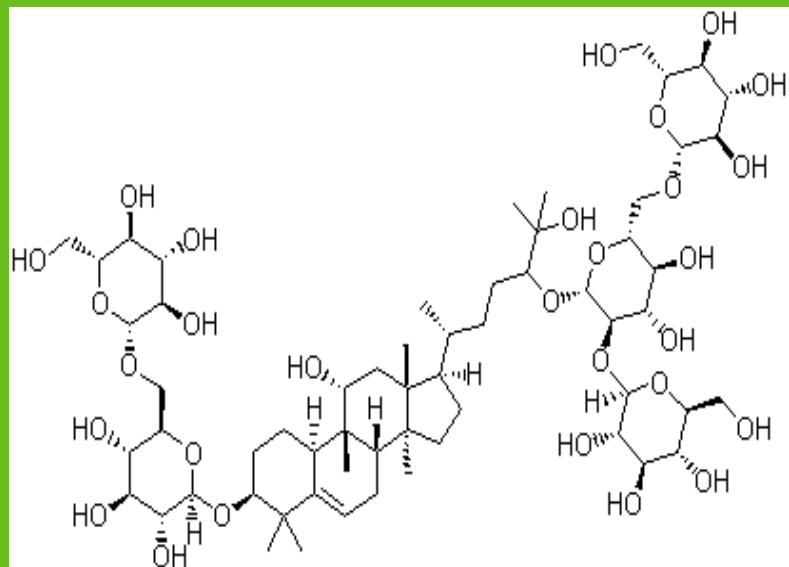
^a glc, β-D-glucopyranosyl; rham, α-L-rhamnopyranosyl.

Figure 1: Structure of some stevia glycosides (Crammer and Ikan, 1987).



Lou Han Guo (Monk Fruit Concentrate) was GRAS approved in 2010 as a natural sweetener

- Natural
- GRAS FDA No Objection Letter
- Up to 150X as sweet as sugar
- Non caloric
- Low Glycemic Index
- Heat Stable
- Non GMO
- Kosher Certified
- Licorice and ginger-ale like when too much used
- Biovittoria Fruit Sweet: Mogroside V 50%





It is possible to create great tasting naturally sweetened reduced sugar and sugar free products with SGF's Reb A 97

- Beverage
 - Enhanced Water and Fitness water
 - Juices
 - Coffee and teas
 - Carbonated soft drinks
 - Milk drinks
- Dairy
 - Ice cream and soft serve
 - Frozen novelties
 - Yogurt
- Confections
 - Chocolate
 - Chewing gum
 - Hard candies and mints
- Bakeries
 - Muffin
 - Cookie
 - Popcorn

50% Sugar Reduction Lemon Iced Tea

- Water
- Sugar
- Tea powder
- Citric acid
- Lemon Lime Extract
- SGF Reb A 97%



- Naturally sweetened
- 50% sugar reduction: 11 g vs. 22 g per 8 oz serving
- 40% calorie reduction: 45 cal vs. 80 cal/8 oz serving
- Taste: Lemon, tart, sweet, black tea

Diet Lemon Lime Carbonated Soft Drink

Water
Citric acid
Lemon Lime Flavor, NAT WONF
Potassium citrate
Potassium benzoate
SGF Reb A 97%
Lou Han Guo



- Naturally sweetened
- Sugar free: 0 g vs. 26 g per 8 oz serving
- Zero calorie: 0 cal vs. 100 cal per 8 oz serving
- Taste: Sweet, tart, lemon, lime, refreshing



Sugar Free Peppermint Chewing Gum

Erythritol
Chewing gum base
Flavors, NAT WONF
Glycerin
SGF Reb A 97%
Soy lecithin
Plasticizer
Menthol
Blue #1, Colorcon Lake

- Sugar free
- 5 calorie per stick or 2.7 g serving
- Naturally sweetened
- Taste: Sweet, minty, cooling

