Steviose™ 100 in context of the “next generation” natural high potency sweeteners:
a study of quality, feasibility and practicality

The future is now when it comes to superior stevia
A superior quality, abundant, natural high potency sweetener exists today – waste neither time nor resources waiting and wishing.
“The food and beverage industries need superior natural, zero calorie sweeteners today, not tomorrow. Urgently needed are straightforward product development solutions for seamless sugar reduction, not the complexities of blending. Blending extracts seems to reduce costs short term but it actually destroys economy of scale. Ingredient customers can benefit infinitely from more innovation and fewer R&D magic tricks. Innovation all but dies when “trust and trademark handcuffs” are allowed to prevent multiple supplier collaborations on strategic ingredients – it’s not a good business practice, either. Our approach is open engagements and common sense R&D that has produced great results already...not dreamy concepts that scientifically, and commercially, make no sense whatsoever.”

Katherine Oglesby, Commercial Director

Significance of Stevione™ 100, Extra High Purity Reb A with minimum Reb A content of 99.5 %

Why we aren’t interested in minor steviol glycosides/Reb D, M, X

Why we are not interested in blending, per se

Key to our success

What our customers can expect from us in the future..........really

Other important facts about Almendra

Almendra is a focused, technology-driven manufacturer of high purity stevia sweeteners. Our team has long and broad experience in stevia sweetener pioneering, development, process technology, manufacturing, and food product application. We are The Stevia People™, solely dedicated to stevia sweeteners.
Significance of Steviose™ 100, Extra High Purity Reb A with minimum Reb A content of 99.5%

The founders of Almenda are passionate about 2 things – technology and pure Reb A. There are some things that are just in one’s blood. In the days of Stevian Biotechnology, extra high purity Reb A was always the target for their success. Tiny laboratory quantities tasted great – no licorice taste, virtually no bitterness, much less lingering.........substantially more sugar-like than its crude predecessors and the glycosylated products. Two companies and 9 years later, it became a commercial reality and, as rarely happens, the pilot scale quantities, then the commercial product, tastes just the same.

Launched summer of 2013, amid industry pundits forecasting the rosy futures of vastly superior quality minor steviol glycosides Reb D and Reb M/X and their distant relatives, the “inexpensive” GMO Reb A, D, and M – or shall I say X? As commercial reality sets in on the minor steviol glycoside fad,

Steviose™ 100 proves itself again as the true trendsetter, “the next generation” of natural high potency sweetener that is here and available today.

To support this claim, we enlisted the professional sensory analysts at Sensory Spectrum. Samples were prepared in a beverage type tasting solution, acidified with 1% citric acid and sweetened with 400 mg/L of each product.

The results speak for themselves.

Compared to the fabled-superior Reb D, which has manifested itself as Reb-D-enriched-Reb-A, Steviose™ 100 has

- less lingering sweetness
- less bitter aftertaste
- less lingering bitterness
- no fruity aromatic to alter your flavor profile
- equally or more rapid sweetness onset

No reason to expect a different outcome for Reb M/X.

No reason to wish and wait anymore. Steviose™ 100 is just as clean tasting as any of “the next generation”.

Next Generation Stevia Sweeteners
Descriptive Analysis Profiles

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<thead>
<tr>
<th></th>
<th>Steviose™ 100</th>
<th>90% Reb A/7% Reb D</th>
<th>78% Reb A/10% Reb B/6% Reb D</th>
<th>90% Reb A/6% Reb B</th>
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<tr>
<td>SweetnessOnset</td>
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<tr>
<td>Lingering Bitterness (2 min)</td>
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<tr>
<td>Bitter Aftertaste</td>
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<tr>
<td>Fruity Aromatic</td>
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<td>Astringency</td>
<td></td>
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<tr>
<td>Lingering Sweetness (5 min)</td>
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Steviose™ 100 is a true “white paint” for great tasting, natural, high potency sweetness.

As is well proven by chemoreception researchers, Reb A has unique sensory properties due in part to its bitter character activating different receptors than many other bitter compounds, and in part due to its claying nature. While these phenomena are still not fully understood, and the unique bitter receptor findings are too recent to estimate the percentage of consumers that may be sensitive or whether there are ethno-cultural drivers at work, it is very important to study the differences as lingering taste is an area in which Reb D is said to outperform Reb A. Lingering behavior should be improved for Reb D; however, in sensory studies that evaluate how long sweetness persists in the mouth after consumption, our findings are to the contrary for Steviose™ 100.

Steviose™ 100 lingers less than any other stevia sweetener.

Similar results are expected for lingering bitterness and numbing/tingling effects which are accentuated at higher concentrations and in carbonated softdrinks.

Aerial view of our state-of-the-art manufacturing facility in Thailand, 150 km away from Bangkok in The Amata Industrial Estate, and 27 km from a deep sea port in a flood-free zone ~100m above sea level. Our capacity is sufficient to sweeten billions and billions of L of beverage and tons of food products.
Why we are not interested in minor steviol glycosides/Reb D, M, X

The answer to this question is quite straightforward and simple with only 3 considerations;

1. Even in their purest forms, the **taste improvement over Stevioso™ 100 is marginal** and even difficult for expert tasters to reliably discern in actual finished products. We prefer to further perfect Reb A (see the next orange section).

2. If you don’t start from leaves, and use a likely-GMO process, you end up with a product of questionable value from a consumer standpoint and use a lot of expensive designed enzymes ($), then do the reaction ($), and then purify fermentation pot liquor ($) so it’s **unlikely to be that cost effective** anyway.

3. If you do start with leaves, you can do additional, very expensive processing
   a. make a bioconversion of Reb A ($) using enzymes ($), do the reaction ($), then purify fermentation pot liquor ($)

   b. fractionate stevia purification waste streams to collect specific minor glycosides ($$), add them back to Reb A at an unnatural level ($$). The mass balances are simply **not sustainable** when you look at the natural occurrences of these minor steviol glycosides

<table>
<thead>
<tr>
<th>Steviol Glycosides</th>
<th>% Occurrence in crude extract *</th>
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<tbody>
<tr>
<td>Reb A</td>
<td>5-10</td>
</tr>
<tr>
<td>Reb D</td>
<td>0.07-0.14</td>
</tr>
<tr>
<td>Reb M/X</td>
<td>0.03-0.06</td>
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*composite of literature references, Stevia rebaudiana Bertoni

You can also try to breed plants that produce greatly enhanced levels of trace steviol glycosides ($) and this will either take a very long time ($$$) or a GMO product.

In summary, **we continue our commitment to Reb A** – it is the only truly commercially viable natural high potency sweetener and we will apply our resources to make it work increasingly better as a sugar alternative.

Why we are not interested in blending, per se

Most of us grew up, professionally speaking, blending artificial high potency sweeteners to take advantage of what was discovered from the late ‘60’s through the 80’s to be sweetness synergy. We now understand very well that this happens because different sweeteners act on different sites on the sweet taste receptor and, when they bind at the same time, enhancement (aka synergy) is observed. Many but not all blends of aspartame, acesulfame potassium, cyclamate and sucralose (to a lesser extent) exhibit synergy. However, **sweetness synergy does not exist among steviol glycosides**. They all activate the same site on the sweet taste receptor. In order to exhibit synergy, the sweeteners must bind concurrently to different sites on the receptor.

In the absence of this benefit, blending stevia extracts is reduced to a method for optimizing cost and taste, but primarily it is used as a quality management tool by companies who buy stevia extracts from manufacturers with antiquated process technologies. Certainly, there are product applications where less pure products can work well (i.e., some flavored black teas and other products that have inherent bitterness like fruit juices). We strongly promote our consistent quality, cold water soluble, Stevioso™ Blend product (which is a natural blend, not man-made) for these more tolerant applications. We just **don’t consider it customer intimacy** to tie every new product development to another unique stevia blend product. **Blending disables customers, hides defects, and destroys access to the economies of scale** that will make stevia increasingly affordable.
Key to our success

We focus on a few things and do them very well.

1. Make the best quality stevia sweeteners in the industry - no distractions.

2. Bring our customers what they need - straightforward and clearly articulated product development support and solutions. We are actively engaged in problem solving with many customers and we welcome the challenge. In addition being The Stevia People™, we have the product development expertise that helps us nearly “see with your eyes and hear with your ears”.

What our customers can expect from us in the future...........really

As fond as we are of magic shows, we keep our R&D well grounded and medium term in focus. Our aim is to make Reb A a more perfect healthy natural sweetener and replacement for sugar. We have already successfully addressed many sensory eccentricities of Reb A through our proprietary purification process. Even the worrisome adaptation behavior of sweetness intensity reduction on repeated exposure (normal consumption situation) is greatly reduced compared to standard stevia extracts.

<table>
<thead>
<tr>
<th>Sweetness Intensity</th>
<th>Sip 1</th>
<th>Sip 3</th>
<th>Adaptation Effect (Δ sweetness)</th>
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</thead>
<tbody>
<tr>
<td>Stevioste™ 100</td>
<td>10.2</td>
<td>9.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Reb A 95</td>
<td>10.1</td>
<td>8.9</td>
<td>1.2</td>
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Our pipeline is based on three key assumptions:
- Reb A is the only commercially viable solution.
- Stevioste™100 solves nearly all of the bitterness and licorice taste issues.
- Stevioste™100 is free from insolubility/re-crystallization issues – it has the fastest cold water solubility of any stevia extract and it maintains this feature throughout its 2 year shelf-life.

Many technical challenges have been addressed already in our current product portfolio. Hence, our research pipeline is focused on minimizing or eliminating outstanding formulation challenges in a label-friendly way.

**Priority 1:** More sugar-like profile, ultimate target zero calorie/no added sugar ingredient solutions  
**Priority 2:** Relatively low maximal sweetness response  
**Priority 3:** Bulking solutions

Great progress has already been made on priorities one and two.
Other Important information about Almendra

Our brand
Steviose™

Our belief
the best stevia products are the purest, which are the easiest to use, and the most consistent batch-to-batch

Our approach
superior taste, quality and manufacturing performance for a reasonable price

Our portfolio
small and efficient but growing to include ingredient solutions designed to minimize or eliminate stevia sweetened product formulation challenges in a label-friendly way.

<table>
<thead>
<tr>
<th>Product</th>
<th>Specification</th>
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<tr>
<td>Steviose™ 100</td>
<td>&gt; 99.5 % Reb A</td>
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<tr>
<td>Steviose™ Blend</td>
<td>&gt; 99.5 % TSG</td>
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Our presence
We are also pleased to announce that our products are now available in Australia and New Zealand through the most recent addition to our network of exclusive distribution partners, Pacific Resources International (PRI).