



Hua Jun  
President  
Sichuan Ingia Biosynthetic Co., Ltd.  
Room 7-701#, Tongwei International Centre, No., 588  
Central Tianfu Avenue, High-tech Zone  
Chengdu, Sichuan Province  
CHINA

Re: GRAS Notice No. GRN 000799

Dear Mr. Jun:

The Food and Drug Administration (FDA, we) completed our evaluation of GRN 000799. We received Sichuan Ingia Biosynthetic Co., Ltd.'s (Sichuan Ingia) notice on July 9, 2018, and filed it on August 2, 2018.

The subject of the notice is rebaudioside M obtained by enzyme treatment of rebaudioside A purified from the leaves of *Stevia rebaudiana* (Bertoni) Bertoni (rebaudioside M) for use as a general purpose sweetener in foods, excluding infant formula and meat and poultry products, at levels determined by good manufacturing practices. The notice informs us of Sichuan Ingia's view that these uses of rebaudioside M are GRAS through scientific procedures.

The rebaudioside M that is the subject of GRN 000799 is made from highly purified components of the leaves of the stevia plant. We note that a GRAS notice for the use of specific purified components of stevia, such as rebaudioside M, and FDA's response do not necessarily apply to the uses of other stevia products.

Our use of the terms "rebaudioside M obtained by enzyme treatment of rebaudioside A purified from the leaves of *Stevia rebaudiana* (Bertoni) Bertoni," "rebaudioside M," "rebaudioside A," "steviol glycosides," or "SGs" in this letter is not our recommendation of that term as an appropriate common or usual name for declaring the substance in accordance with FDA's labeling requirements. Under 21 CFR 101.4, each ingredient must be declared by its common or usual name. In addition, 21 CFR 102.5 outlines general principles to use when establishing common or usual names for nonstandardized foods. Issues associated with labeling and the common or usual name of a food ingredient are under the purview of the Office of Nutrition and Food Labeling

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(ONFL) in the Center for Food Safety and Applied Nutrition. The Office of Food Additive Safety did not consult with ONFL regarding the appropriate common or usual name for “rebaudioside M.”

Sichuan Ingia provides information about the identity and composition of rebaudioside M. Rebaudioside M (CAS No. 1220616-44-3), a glycoside of steviol, is identified as 13-[(O-β-D-glucopyranosyl-(1-2)-O-[β-D-glucosylpyranosyl-(1-3)]-β-D-glucosylpyranosyl)oxy]-kaur-16-en-18-oic acid (4-α)-O-β-D-glucosylpyranosyl-(1-2)-O-[β-D-glucosylpyranosyl-(1-3)]-β-D-glycosylpyranosyl ester. Rebaudioside M is one of a group of known steviol glycosides (SGs) that differ from each other by the number of glycoside moieties and bonding order.

Sichuan Ingia provides information about the manufacturing process for rebaudioside M. Sichuan Ingia states that the manufacturing process starts with the extraction of *S. rebaudiana* (stevia) leaves with a suitable solvent and then filtered and concentrated. The stevia extract is then subjected to purification steps that include treatment with an adsorption resin, deionization, and recrystallization to obtain an extract containing ≥ 95% rebaudioside A. Sichuan Ingia describes a non-pathogenic and non-toxicogenic strain of *Pichia pastoris* engineered to express two glucosyltransferases that are used to catalyze the conversion of rebaudioside A to rebaudioside M. The *P. pastoris* strain is grown in culture and the cells harvested by filtration. The cells are suspended in a sodium phosphate buffer and transferred to a reaction tank. The stevia extract is added, and the reaction allowed to proceed until the desired conversion to rebaudioside M is complete. The enzymes and yeast cells are inactivated by heating and removed by filtration. The resulting solution is subjected to an adsorption resin that is then eluted with ethanol. The eluate is concentrated by evaporation, cooled, and then centrifuged. The precipitate is dissolved in ethanol, activated carbon added, and the mixture filtered. Rebaudioside M is crystallized from the resulting solution, collected by centrifugation, and finally dried.

Sichuan Ingia provides specifications for rebaudioside M that include the content of total SGs (≥ 95 %), rebaudioside M (≥ 95 %), as well as limits for total ash (≤ 1 %), loss on drying (≤ 6 %), lead (≤ 1 mg/kg), arsenic (≤ 1 mg/kg), mercury (≤ 1 mg/kg), cadmium (≤ 1 mg/kg), methanol (≤ 200 mg/kg), ethanol (≤ 5000 mg/kg), as well as limits on microorganisms. Sichuan Ingia provides results from five batch analyses to demonstrate that rebaudioside M can be produced to meet specifications.

Sichuan Ingia provides estimates of dietary exposure to rebaudioside M. Sichuan Ingia discusses a published study on dietary exposures to rebaudioside A (Ref. 1). Based on the methodology described in Ref. 1 and a relative sweetness intensity of 300 times that of sucrose, Sichuan Ingia estimates maximum dietary exposure in adults (expressed as steviol equivalents) to be 0.74 mg/kg body weight (bw)/day (d) and in children to be 0.81 mg/kg bw/d. Sichuan Ingia states that the use of rebaudioside M in food is self-limiting due to organoleptic factors and consumer taste considerations.

Sichuan Ingia summarizes published studies pertaining to the metabolic fate and safety of rebaudioside M. Based on pharmacokinetic studies, Sichuan Ingia concludes that

microorganisms in the colon hydrolyze SGs completely to steviol and thus rebaudioside M shares a common metabolic fate. Sichuan Ingia discusses previously reviewed published acute, subchronic, and chronic toxicity/carcinogenicity studies; published multigenerational reproductive and developmental toxicology studies conducted with rebaudioside A; as well as *in vitro* and *in vivo* mutagenicity/genotoxicity studies for its safety conclusion of rebaudioside M. Sichuan Ingia includes an update of the literature regarding the safety of rebaudioside M through June 2018 and reports that no studies relevant to toxicology were found that would alter its safety conclusion.

To further support its view that rebaudioside M is GRAS for the intended use, Sichuan Ingia summarizes the decisions on the safety of SGs by the Joint FAO/WHO Expert Committee on Food Additives (JECFA), the European Food Safety Authority, Food Standards Australia New Zealand, and Health Canada for use in food as sweeteners. Sichuan Ingia notes that JECFA established an acceptable daily intake (ADI) for SGs of 0-4 mg/kg bw/d (expressed as steviol equivalents). This ADI was based on a no observed adverse effect level of 970 mg/kg bw/d (383 mg/kg bw/d, as steviol equivalents) from a two-year rat study, and the application of a safety factor of 100 to account for intra- and inter-species differences.

Sichuan Ingia includes the statement of a panel of individuals (Sichuan Ingia's GRAS panel). Based on its review, Sichuan Ingia's GRAS panel concluded that rebaudioside M is safe under the conditions of its intended use.

Based on all the available scientific information, Sichuan Ingia concludes that rebaudioside M is GRAS for its intended use in foods.

### **Standards of Identity**

In the notice, Sichuan Ingia states its intention to use rebaudioside M in several food categories, including foods for which standards of identity exist, located in Title 21 of the Code of Federal Regulations. We note that an ingredient that is lawfully added to food products may be used in a standardized food only if it is permitted by the applicable standard of identity.

### **Section 301(ll) of the Federal Food, Drug, and Cosmetic Act (FD&C Act)**

Section 301(ll) of the FD&C Act prohibits the introduction or delivery for introduction into interstate commerce of any food that contains a drug approved under section 505 of the FD&C Act, a biological product licensed under section 351 of the Public Health Service Act, or a drug or a biological product for which substantial clinical investigations have been instituted and their existence made public, unless one of the exemptions in section 301(ll)(1)-(4) applies. In its review of Sichuan Ingia's notice that rebaudioside M is GRAS for the intended use, FDA did not consider whether section 301(ll) or any of its exemptions apply to foods containing rebaudioside M. Accordingly, this response should not be construed to be a statement that foods that contain rebaudioside M, if introduced or delivered for introduction into interstate commerce, would not violate section 301(ll).

## Conclusions

Based on the information that Sichuan Ingia provided, as well as other information available to FDA, we have no questions at this time regarding Sichuan Ingia's conclusion that rebaudioside M is GRAS under its intended conditions of use. This letter is not an affirmation that rebaudioside M is GRAS under 21 CFR 170.35. Unless noted above, our review did not address other provisions of the FD&C Act. Food ingredient manufacturers and food producers are responsible for ensuring that marketed products are safe and compliant with all applicable legal and regulatory requirements.

In accordance with 21 CFR 170.275(b)(2), the text of this letter responding to GRN 000799 is accessible to the public at [www.fda.gov/grasnoticeinventory](http://www.fda.gov/grasnoticeinventory).

Sincerely,

Michael A. Adams

Digitally signed by Michael A.  
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Date: 2018.09.25 13:24:12 -04'00'

Dennis M. Keefe, Ph.D.

Director

Office of Food Additive Safety

Center for Food Safety

and Applied Nutrition

## Reference

1. Renwick, A.G. 2008. The use of a sweetener substitution method to predict dietary exposures for the intense sweetener rebaudioside A. *Food and Chemical Toxicology* 46:S61–S69.