



Daniel Tusé, Ph.D.
DT/Consulting Group
2695 13th Street
Sacramento, CA 95818

Re: GRAS Notice No. GRN 001320

Dear Dr. Tusé:

The Food and Drug Administration (FDA, we) completed our evaluation of GRN 001320. We received the notice that you submitted on behalf of Nomad Bioscience GmbH (Nomad) on January 5, 2026, and filed it on May 4, 2026. Nomad submitted an amendment to the notice on July 20, 2026, that provided additional information regarding the intended uses, batch analyses, safety, as well as additional references to support statements within the notice.

The subject of the notice is thaumatin II for use as a sweetener in the food categories and at the maximum levels as shown in Table 1 (excluding use in infant formula and products under the U.S. Department of Agriculture's jurisdiction). The notice informs us of Nomad's view that these uses of thaumatin II are GRAS through scientific procedures.

Table 1. Intended food uses and maximum use levels for thaumatin II.

Food Category	Maximum Use Level (mg/kg)
Beverages: flavored and enhanced waters, sport and "energy" drinks	10
Carbonated beverages: diet and regular soft drinks, and carbonated water	10
Fruit juice drinks and ades: fruit punch, lemonade, vegetable and fruit drink blends, carbonated and non-carbonated fruit drinks	10
Flavored milks and milk drinks ready-to-drink (RTD): chocolate milk, hot chocolate made with dairy, strawberry milk, milk shakes, eggnog	10
Fruit juices, nectars, and fruit-based smoothies: 100% fruit juice, nectars, fruit and vegetable smoothie drinks (with and	10

Food Category	Maximum Use Level (mg/kg)
without dairy)	
Fermented dairy products: buttermilk, yogurt, kefir	10
Bottled coffee and teas, RTD	10
Imitation dairy beverages: soy milk, almond milk, rice milk, coconut milk, and other imitation milks	10
Vegetable juices: tomato, carrot, celery, mixed vegetable juices	10

Our use of the term, “thaumatin II” 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 (ONFL) in the Nutrition Center of Excellence. The Office of Pre-Market Additive Safety did not consult with ONFL regarding the appropriate common or usual name for “thaumatin II.”

Nomad describes thaumatin II as a white to off-white powder containing $\geq 80\%$ total protein of which $\geq 95\%$ is thaumatin II protein. Nomad states that thaumatin II protein is a single polypeptide chain consisting of 207 amino acids with eight disulfide linkages and the molecular weight of ~ 22 kDa. Nomad states that the thaumatin II protein is recombinantly expressed in the seeds of *Nicotiana tabacum* (tobacco) 'Burley B5' and is identical in amino acid composition, sequence, and structure to that in GRN 000738 and GRN 000910¹, as well as to thaumatin II protein isolated from *Thaumatococcus daniellii*.

Nomad describes the manufacturing process of thaumatin II as a plant seed-based process. Thaumatin II is expressed in and purified from the seeds of transgenic *N. tabacum* 'Burley B5', which are naturally devoid of nicotine and other pyridine alkaloids found in the green tissues of *Nicotiana* species.

The thaumatin II gene is expressed under a seed-specific phaseolin promoter using the transformation plasmid pNMD52711, introduced via *Agrobacterium tumefaciens*-mediated transformation. Transgenic plant lines are selected and propagated through

¹ Thaumatin II was the subject of GRNs 000738 and 000910. We evaluated these notices and responded in letters dated April 18, 2018 and September 9, 2020, respectively, stating that we had no questions at that time regarding the notifiers’ GRAS conclusions.

multiple generations (T₀–T₄) to establish stable, homozygous seed-producing lines. Seeds are harvested mechanically from mature plants. The downstream purification process begins with cold oil pressing of cleaned seeds to remove >90% of the seed oil, yielding a partially defatted seed cake. The seed cake is milled and subjected to extraction with diluted acetic acid, which precipitates host proteins while thaumatin II remains in solution. The extract is clarified by centrifugation and sequential ultrafiltration. Thaumatin II is further purified by cation exchange chromatography, concentrated by precipitation with ammonium sulfate and subjected to centrifugation. The resulting pellet is resuspended in deionized water, concentrated and subjected to diafiltration to remove residual ammonium sulfate. The final thaumatin II solution is stabilized with pH regulators, standardized with water, and spray dried or lyophilized to produce the final powder. Nomad states that thaumatin II is manufactured according to current good manufacturing practices and that all raw materials and processing aids are food grade and are used in accordance with appropriate U.S. regulations. Nomad also states that all plants are grown in semi-contained greenhouses under environmentally controlled conditions, and good agricultural and collection practices are applied.

Nomad provides specifications for thaumatin II that include total protein (≥80% (w/w), thaumatin II protein (≥95% of total protein), and limits for moisture (≤5% w/w) ash (≤10% w/w), arsenic (≤1.0 mg/kg), lead (≤0.2 mg/kg), cadmium (≤0.1 mg/kg), mercury (≤0.1 mg/kg) and microorganisms. Nomad provides results from the analyses of three non-consecutive batches to demonstrate that thaumatin II can be manufactured to meet the specifications. Nomad states that thaumatin II is stable for at least 6 months at 4° and ambient temperature (~20°C).

Nomad states that the intended uses of thaumatin II are the same as those in the supplement to GRN 000910 and cites dietary exposure estimates from that supplement. Nomad states that based on the intended uses and food consumption data from the 2013-2016 National Health and Nutrition Examination Surveys (NHANES), the estimated mean and 90th percentile eaters-only dietary exposure to thaumatin II for the U.S. population aged 2 years and older is 0.082 mg/kg body weight (bw)/d and 0.172 mg/kg bw/d, respectively. Nomad states that because the intended uses are the same as in the supplement to GRN 000910, the cumulative dietary exposure to thaumatin II is not expected to change.

Nomad discusses the safety of thaumatin II by incorporating published safety studies and information previously discussed in GRN 000738 and GRN 000910, supplemented by new data and analyses to support the safe use of the *N. tabacum* seed-based production process. Nomad states that an updated literature search through July 2026 was also conducted and did not identify any new literature reporting safety concerns. Nomad discusses a published *in vivo* digestibility study in rats that reports thaumatin is readily digested prior to absorption. Nomad also discusses three published subchronic studies, one in dogs and two in rats, in which the animals were exposed to thaumatin in their diets up to 3% for 13 weeks with no treatment-related adverse effects reported at any level. Nomad also discusses studies that report thaumatin as being non-teratogenic in pregnant rats and non-mutagenic in bacterial and mouse dominant-lethal assays. Additionally, Nomad discusses published *in vivo* and *in silico* allergenicity studies

previously reviewed in GRN 000738 and GRN 000910, supplemented by updated *in silico* analyses of residual proteins specific to the seed-produced thaumatin II, that conclude thaumatin II has a low allergenic potential. Nomad also discusses the safety of host-derived impurities specific to the seed-based process, noting the absence of pyridine alkaloids (such as nicotine), and relying on published multi-species oral exposure studies and compositional analyses to support the safety of residual tobacco seed proteins at the intended levels of use.

Based on the totality of data and information available, Nomad concludes that thaumatin II is GRAS under its intended conditions of use.

Standards of Identity

In the notice, Nomad states its intention to use thaumatin II 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.

Potential Labeling Issues

Under section 403(a) of the FD&C Act, a food is misbranded if its labeling is false or misleading in any way. Section 403(r) of the FD&C Act lays out the statutory framework for labeling claims characterizing a nutrient level in a food or the relationship of a nutrient to a disease or health-related condition (also referred to as nutrient content claims and health claims). If products containing thaumatin II bear any nutrient content or health claims on the label or in labeling, such claims are subject to the applicable requirements and are under the purview of the Office of Nutrition and Food Labeling (ONFL) in the Nutrition Center of Excellence. The Office of Pre-Market Additive Safety did not consult with ONFL on this issue or evaluate any information in terms of labeling claims. Questions related to food labeling should be directed to ONFL.

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 our evaluation of Nomad's notice concluding that thaumatin II is GRAS under its intended conditions of use, we did not consider whether section 301(ll) or any of its exemptions apply to foods containing thaumatin II. Accordingly, our response should not be construed to be a statement that foods containing thaumatin II, if introduced or delivered for introduction into interstate commerce, would not violate section 301(ll).

Conclusions

Based on the information that Nomad provided, as well as other information available to FDA, we have no questions at this time regarding Nomad's conclusion that thaumatin II is GRAS under its intended conditions of use. This letter is not an affirmation that thaumatin II 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 001320 is accessible to the public at www.fda.gov/grasnoticeinventory.

Sincerely,

**SUSAN J.
CARLSON -S**

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Susan J. Carlson, Ph.D.
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