



Joan Sylvain Baughan
Steptoe & Johnson, LLP
1300 Connecticut Ave, NW
Washington, DC 20036

Re: GRAS Notice No. GRN 000904

Dear Ms. Baughan:

The Food and Drug Administration (FDA, we) completed our evaluation of GRN 000904. We received the notice that you submitted on behalf of The Fynder Group, Inc. (doing business as Nature's Fynd; previously Sustainable Bioproducts, Inc.) (Nature's Fynd) on January 15, 2020 and filed it on April 22, 2020. Nature's Fynd submitted amendments to the notice on May 13, 14, and 29, 2020, October 7, 2020, December 11, 2020, and February 22, 2021, that updated the notifier's name, provided suggestions on nomenclature, and provided additional safety information.

The subject of the notice is fungal protein from cultured *Fusarium* sp.¹ mycelia (*Fusarium* protein) for use as an ingredient in meat and poultry analogs; dairy product analogs; meal replacement products; fruit and vegetable juices; grain products and pastas; baked goods and baking mixes; soups and soup mixes; and fats and oils² at levels up to 23.3% dry weight. The notice informs us of Nature Fynd's view that these uses of *Fusarium* protein are GRAS through scientific procedures.

Our use of the term, "*Fusarium* protein," 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 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 "*Fusarium* protein."

Nature's Fynd provides information on the identity and composition of *Fusarium* protein. Nature's Fynd states that *Fusarium* protein is 20-30% solids and may also be

¹ Nature's Fynd states the fungal species is designated *Fusarium* strain *flavolapis* and was previously identified as *F. novum yellowstonensis*. Nature's Fynd notes that it was deposited at ATCC as "*Fusarium oxysporum*: MK7" under accession number PTA – 10698 on March 2, 2010. Since 2010, further taxonomic characterization and genetic analysis has indicated the organism is a distinct species.

² Nature's Fynd states that *Fusarium* protein is not intended for use in infant formula or in products subject to regulation by the U.S. Department of Agriculture.

dried to a product that is approximately 95% solids. On a dry weight basis, *Fusarium* protein is >45% protein, 25-35% fiber, 5-15% non-fiber carbohydrates, 5-10% fat, <5% ash, and <0.5% sugar. Nature's Fynd provides a summary of analyses describing the amino acid profile of *Fusarium* protein.

Nature's Fynd describes the method of manufacture for *Fusarium* protein. A pure culture of *F. strain flavolapis* is grown through surface fermentation under controlled conditions until the mycelial biomat is formed. Nature's Fynd states that *Fusarium* strain *flavolapis* is non-pathogenic and non-toxigenic. The biomat is harvested and the fungal cells are inactivated by heat treatment. Water is removed by mechanical pressing to obtain the final *Fusarium* protein product, and Nature's Fynd states that the product may be further dried and ground to produce a flour. Nature's Fynd states that all materials used in the manufacture of *Fusarium* protein are suitable for production of food and that *Fusarium* protein is manufactured in accordance with current good manufacturing practices.

Nature's Fynd provides specifications for *Fusarium* protein that include water content (70-80%),³ fiber (25-35% on a dry matter basis (DM)), non-fiber carbohydrates (5-15% DM), and total fat (4-10% DM). Specifications also includes limits for protein (>45% DM), glycerol (<4% DM), total sugars (<0.5% DM), ash (<5% DM), ribonucleic acids (<2% DM), total fumonisins (<0.5 mg/kg DM), lead (<0.1 mg/kg), and microorganisms. Nature's Fynd provides the results of three non-consecutive batch analyses to demonstrate that *Fusarium* protein can be produced to meet these specifications. In addition, Nature's Fynd states that *Fusarium* strain *flavolapis* may produce mycotoxins during cultivation and discusses the results of genomic analysis and provides the results from the analyses of three batches of *Fusarium* protein for mycotoxins. Nature's Fynd states that genome analysis indicated a potential for formation of fumonisins, beauvericin, fusarin C, and fusaric acid. Fusarin C and fusaric acid were not detected in batch analyses but fumonisins and beauvericin may be present at levels well below the stated specifications. Nature's Fynd also discusses the results of stability studies and concludes that *Fusarium* protein is stable for at least twelve weeks at -20 °C.

Nature's Fynd provides estimates of dietary exposure to *Fusarium* protein based on the maximum intended use in food and estimates of the *per capita* mean consumption of the intended food categories for the total population that were provided in GRN 000609⁴ and derived from the 2011-2012 National Health and Nutrition Examination Survey (NHANES). Nature's Fynd estimates the dietary exposure to *Fusarium* protein to be 24.4 g/p/d at the mean on a dry weight basis. Nature's Fynd provides a pseudo-90th percentile exposure of 48.8 g/p/d, which was obtained by multiplying the mean exposure by two.

³ The specifications for *Fusarium* protein are on a dry weight basis, with the exception of water content, and Nature's Fynd states that water content is the only difference between *Fusarium* protein (20-30% solids) and the dried form (approximately 95% solids).

⁴ Rice protein containing 80% and 90% protein was the subject of GRN 000609 for use as an ingredient, formulation aid, and texturizer in a variety of foods at levels up to 34.3%. We evaluated this notice and responded in a letter dated June 6, 2016, stating that we had no questions at that time regarding the notifier's GRAS conclusion.

Nature's Fynd discusses potential exposure to mycotoxins resulting from the intended use of *Fusarium* protein. Nature's Fynd estimates the mean and 90th percentile dietary exposures for a 60 kg individual based on average levels determined in batch analyses of *Fusarium* protein to be 0.022 and 0.045 µg/kg body weight (bw)/d, respectively, for fumonisins and 0.033 and 0.067 µg/kg bw/d, respectively, for beauvericin.

Nature's Fynd discusses publicly available safety information on mycoprotein, an ingredient similar to *Fusarium* protein, described in GRN 000091⁵ to support the safety of the uses of *Fusarium* protein. To corroborate the published safety information, Nature's Fynd also discusses an unpublished acute toxicology study in Sprague Dawley rats and two genetic toxicology studies (Ames test and an *in vitro* micronucleus assay) performed using *Fusarium* protein. They note that none of the studies showed the potential for *Fusarium* protein to produce toxicity. Nature's Fynd also provides discussion regarding the potential for *Fusarium* protein to produce an allergic response in humans. They note that the proteins produced by their production source have no homology to the eight major food allergens and that the unpublished results of simulated gastric and intestinal fluid digestion assays using *Fusarium* protein indicate that oral consumption of *Fusarium* protein is unlikely to result in allergic response. They also state that an extensive review of the published literature indicated that allergic reactions from consumption of foods containing proteins derived from various *Fusarium* sp. are rare. Additionally, Nature's Fynd states that *Fusarium* protein is well tolerated in consumption trials and without reports of major gastrointestinal (GI) issues, such as diarrhea or vomiting. Nature's Fynd concludes that it is very unlikely that consumption of *Fusarium* protein would result in adverse GI effects.

Nature's Fynd includes the opinion of a panel of individuals (Nature's Fynd's GRAS panel). Based on its review, Nature's Fynd's GRAS panel concluded that *Fusarium* protein is safe based on scientific procedures under the conditions of its intended use.

Based on the totality of evidence, Nature's Fynd concludes that *Fusarium* protein is GRAS for its intended use.

Standards of Identity

In the notice, Nature's Fynd states its intention to use *Fusarium* protein in several food categories, including foods for which standards of identity exist, located in Title 21 of the CFR. 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 Federal Food, Drug, & Cosmetic Act (FD&C Act), a food is misbranded if its labeling is false or misleading in any way. Section 403(r) of the FD&C

⁵ Mycoprotein from *Fusarium venenatum* strain PTA-2684 was the subject of GRN 000091 for use as an ingredient in foods generally. We evaluated this notice and responded in a letter dated January 7, 2002, stating that we had no questions at that time regarding the notifier's GRAS conclusion.

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 *Fusarium* protein 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 ONFL in the Center for Food Safety and Applied Nutrition. The Office of Food 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 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 notice concluding that *Fusarium* protein 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 *Fusarium* protein. Accordingly, our response should not be construed to be a statement that foods containing *Fusarium* protein, if introduced or delivered for introduction into interstate commerce, would not violate section 301(ll).

Conclusions

Based on the information that Nature's Fynd provided, as well as other information available to FDA, we have no questions at this time regarding Nature's Fynd's conclusion that *Fusarium* protein is GRAS under its intended conditions of use. This letter is not an affirmation that *Fusarium* protein 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 000904 is accessible to the public at www.fda.gov/grasnoticeinventory.

Sincerely,

Susan J.
Carlson -S

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Susan Carlson, Ph.D.
Director
Division of Food Ingredients
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