Ryan Simon
Sr. Director, Safety & Regulatory
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CANADA

Re: GRAS Notice No. GRN 000943

Dear Mr. Simon:

The Food and Drug Administration (FDA, we) completed our evaluation of GRN 000943 submitted by CP Kelco Aps (CPK). We received this notice on May 18, 2020 and filed it on September 8, 2020. We received an amendment to the notice on November 9, 2020, stating that Intertek Health Science Inc. is serving as CPK's authorized agent and the contact for all correspondence. Additionally, we received amendments to the notice on December 1, 2020, and December 11, 2020, providing clarifications and additional information on the manufacturing process, specifications, intended use, dietary exposure, and safety of the subject of the notice.

The subject of the notice is fiber from citrus peel (citrus fiber) for use as an ingredient, binder, gelling aid, thickening aid, bulking aid, emulsion stabilizer, or cloud stabilizer in baked goods and baking mixes; alcoholic beverages (cocktail drinks); beverage and beverage bases (sport or electrolyte drinks, fluid replacement drinks, non-milk-based meal replacement beverages, protein drinks); breakfast cereals (excluding instant); cheeses; specialty coffee drinks and ready-to-drink tea beverages; ketchup and relish; confections and frostings (excluding raw sugars); dairy product analogs; egg substitutes; fats and oils (fat-based sauces, salad dressings, margarine and margarine-like spreads, mayonnaise and mayonnaise-type dressings); fish products (excluding catfish); frozen dairy desserts; fruit and water ices; gelatins, puddings, and fillings; grain products and pastas; gravies and sauces; jams and jellies; milk products; nuts and nut products; plant protein products; processed fruits and fruit juices; processed vegetables and vegetable juices; soft candy; soups and soup mixes; and sweet sauces, toppings, and syrups at levels up to 3%.[1] The notice informs us of CPK's view that these uses of citrus fiber are GRAS through scientific procedures.

[1] CPK states that citrus fiber is not intended for use in infant formula, products that are under the jurisdiction of the United States Department of Agriculture, or in products that have standards of identity that do not permit the addition of citrus fiber.

Our use of the terms, "fiber from citrus peel" or "citrus fiber" 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 (OFAS) did not consult with ONFL regarding the appropriate common or usual name for "citrus fiber."

CPK provides information on the identity, chemical structure, and composition of citrus fiber. CPK describes citrus fiber as an off-white powder obtained from the peels of oranges (*C. sinensis*), lemons (*C. limon*), and limes (*C. latifolia or aurantifolia*). Citrus fiber contains approximately 40 to 45% insoluble fiber (cellulose, hemicellulose, and lignin), 40 to 45 % soluble fiber (pectin), and up to 12% moisture.

CPK describes the manufacturing process for citrus fiber. Citrus peels are chopped and can undergo an optional wash step with ethanol followed by agitation. The peels are then subjected to an acidification step and a neutralization step to remove impurities (sugars, salts, residual oils, and flavonoids). The citrus fiber solution is transferred into a shovel dryer in order to reduce the moisture content and then milled to yield the final powder. CPK states that citrus fiber is manufactured in accordance with current good manufacturing practices and that all processing aids are food-grade or equivalent and are used in accordance with appropriate federal regulations, have previously been concluded to be GRAS for their respective uses, or have been the subject of an effective food contact notification.

CPK provides specifications for citrus fiber that include fiber (>80%), loss on drying (≤12%), ethanol (≤0.5%), ash (<5%), lead (<0.5 mg/kg), arsenic (<0.5 mg/kg), pH (pH 3-5, for a 1% solution), particle size (<3% on a 0.25 mm sieve), water holding capacity (15-35 g/g), and limits for microorganisms. CPK provides the results from the analyses of three non-consecutive lots to demonstrate that citrus fiber meets the stated specifications. CPK also provides data on residual levels of major orange peel flavonoids (hesperidin, <4%) and primary components of citrus peel oils (D-limonene and eucalyptol, <200 µg/kg) from 3 non-consecutive batches of citrus fiber.

CPK provides stability data for citrus fiber that demonstrate the absence of microbial contamination in samples stored for up to 13 weeks at 55 °C and 80% relative humidity (corresponding to 84 weeks at ambient temperature). Based on these studies, CPK states that citrus fiber is stable under ambient storage conditions for 18 months when stored in paper bags with a perforated polyethylene inner liner.

CPK provides a dietary exposure estimate for citrus fiber from the intended uses for various populations based on food consumption data from the 2015-2016 National Health and Nutrition Examination Survey (NHANES). CPK estimates the eaters-only mean and 90th percentile dietary exposure for the U.S. population aged 2 years and older to be 11.6 g/p/d (194 mg/kg bw/d) and 20.1 g/p/d (388 mg/kg bw/d), respectively. CPK states that the intended uses of citrus fiber will be largely substitutional for existing uses of citrus fiber in the diet, and therefore, CPK concludes that there would be no appreciable change in the dietary exposure to citrus fiber.

CPK discusses the safety of citrus fiber. CPK states that the absorption, distribution, metabolism, and excretion characteristics of the processed citrus fiber ingredients containing cellulose, hemicellulose, lignin, and pectin are expected to closely resemble those of cellulose, hemicellulose, lignin, and pectin. In support of its safety determination, CPK states that its citrus fiber is compositionally similar to other ingredients produced from citrus peel for use in conventional food, as discussed in GRNs 000154, 000487, 000541, and 000599.[2] The dietary exposure of CPK's citrus fiber remains within the Institute of Medicine's recommended daily adequate intake of dietary fiber (IOM, 2005).

CPK also summarizes published data and information in support of its safety determination, including multiple published *in vitro*, experimental animal, and human studies in which no adverse effects were observed related to consumption of citrus fiber or other constituents derived from citrus peel. Citing literature reviews and expert opinion, CPK notes that citrus fruits are not major food allergens and concludes that there is a low risk of allergic reactions associated with citrus fiber.

CPK states that an updated literature search through May 2019 identified two new toxicology studies. However, the test articles used in these studies, hesperidin and citrus fruit extract, were not representative of CPK's citrus fiber and were not considered relevant to the safety assessment.

CPK includes the opinion of a panel of individuals (CPK's GRAS panel). Based on its review, CPK's GRAS panel concluded CPK's citrus fiber is safe based on scientific procedures under the conditions of its intended uses.

Based on the totality of the data and information, CPK concludes that citrus fiber is GRAS for its intended use.

Standards of Identity

In the notice, CPK states its intention to use citrus fiber in several food categories,

[2] We evaluated GRNs 00154, 000487, 000541, and 000599 and responded in letters dated December 13, 2004, September 24, 2014, March 24, 2015 and February 17, 2016 respectively, stating that we had no questions at that time regarding the notifiers' GRAS conclusions.

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 Federal Food, Drug, and 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 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 citrus fiber 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 ONFL. OFAS 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.[3]

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 CPK's notice concluding that citrus fiber 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 citrus fiber. Accordingly, our response should not be construed to be a statement that foods containing citrus fiber, if introduced or delivered for introduction into interstate commerce, would not violate section 301(ll).

Conclusions

Based on the information that CPK provided, as well as other information available to FDA, we have no questions at this time regarding CPK's conclusion that citrus fiber is GRAS under its intended conditions of use. This letter is not an affirmation that citrus fiber 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.

[3] The definition of "dietary fiber" in 21 CFR 101.9(c)(6)(i) was added by FDA's final rule revising the nutrition and supplement facts labels (81 FR 33742, May 27, 2016). This final rule, among other things, defines dietary fiber as non-digestible soluble and insoluble carbohydrates (with three or more monomeric units), and lignin that are intrinsic and intact in plants; isolated or synthetic non-digestible carbohydrates (with three or more monomeric units) determined by FDA to have physiological effects that are beneficial to human health.

In accordance with 21 CFR 170.275(b)(2), the text of this letter responding to GRN 000943 is accessible to the public at www.fda.gov/grasnoticeinventory.

Sincerely,

Susan J. Carlson -S

Digitally signed by Susan J. Carlson -S
Date: 2021.04.09 15:20:37 -04'00'

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