

Memorandum

Date: November 21, 2022

Subject: Cadmium (Cd) in Roasted Organic Seaweed Snack

Re: CMS Case # 646592, Task # 679341, Private laboratory sample # 3868858

From: Jacqueline Heilman, Ph.D. _____
Contaminant Assessment Branch (CAB) (HFS-005)
Division of Risk and Decision Analysis (DRDA), Office of Analytics and Outreach (OAO)

Judith Spungen, M.S., R.D. _____
Exposure Assessment Branch (EAB) (HFS-005), DRDA, OAO

To: Gabriela Luta, Ph.D.
Division of Plant Products and Beverages, Office of Food Safety (OFS) (HFS-317)

As requested by OFS, DRDA evaluated the safety of exposure to Cd in Organic Roasted Seaweed Snack (seaweed snack). A sample of the seaweed snack was analyzed by a private laboratory, Certified Laboratories, and found to contain 0.749 mg/kg ($\mu\text{g/g}$) Cd. DRDA was informed by email that ORS supports these findings under CMS case WA 483122, but a memorandum of review was not available to DRDA.

DRDA Conclusion

DRDA concludes that exposures to Cd from consumption of the seaweed snack are not likely to be a health concern for children (MF 0-6 y) or the general population (MF 2+ y).

Consumption and Exposure Estimates

DRDA generally relies upon results of the National Health and Nutrition Examination Survey (NHANES), What We Eat In America (WWEIA) component for estimating dietary intakes of foods and for estimating contaminant exposures from intake of those foods. However, the number of WWEIA/NHANES respondents reporting dried seaweed consumption is too low to assure statistical reliability of estimates. Seaweed snacks generally are packaged as 5 g single servings, and DRDA generally estimates upper-level daily intake of seaweed snacks assuming consumption of one 5 g serving per day. The seaweed snack that is the subject of the current case is sold in 17

The information contained in this document is confidential and distributed for internal purposes only.

The content of this document is pre-decisional and deliberative.

g packages, with a labeled serving size of 1/5 package, or 3.4 g. However, for consistency, DRDA estimated upper-level daily intake of the dried seaweed snacks to be 5 g/day, for both adults and children.

Estimated Cd exposures from consumption of the seaweed snack are shown in Table 1.

Table 1. Estimated exposure to Cd from consumption of seaweed snack.

Contaminant	Population	Contaminant Concentration (µg/g)	Estimated Upper-Level Chronic Consumption of Seaweed Snack ^a (g/kg bw/day)	Estimated Upper-Level Chronic Contaminant Exposure from Seaweed Snack ^b (µg/kg bw/day)
Cd	MF 0-6 y	0.749	0.31	0.23
	MF 2+ y		0.07	0.05

^a Estimated based on serving size of most single packages of seaweed snacks. Intakes were converted to g/kg bw/day using body weights of 75.4 kg for the general population and 16.1 kg for children (based on average body weights measured in NHANES 2017-2018).

^b Concentration in sample (µg/g) * upper-level consumption (g/kg bw/day) = estimated total exposure (µg/kg bw/day)

Safety Assessment

Cadmium (Cd)

Cd is an accumulative toxic element with a long biological half-life between 10 to 33 years in humans. Therefore, the toxicity of Cd generally results from chronic exposure. For the general population who are non-smokers, diet is the major source of Cd exposure. Chronic exposure to Cd in food may lead to its accumulation in the kidney (generally regarded as the most sensitive target for Cd toxicity), and this can cause renal tubular dysfunction and damage over time (WHO, 2011). EFSA has established a tolerable weekly intake (TWI) of 2.5 µg/kg bw/weekly for Cd, corresponding to **0.36 µg/kg bw/day** (EFSA, 2009). The TWI is based on a meta-analysis of human epidemiological studies assessing the relationship between urinary Cd and beta-2-microglobulin levels and a toxicological model to convert urinary Cd to dietary Cd exposure.

As shown in Table 1, regular consumption of the seaweed snack would result in Cd exposures for children (MF 0-6 y) and the general population (MF 2+ y) that are less than 0.36 µg/kg bw/day, which is the EFSA TWI adjusted for daily exposure. Therefore, Cd exposure from consumption of the seaweed snack is not likely to be a health concern for children or the general population.

References

The information contained in this document is confidential and distributed for internal purposes only.
The content of this document is pre-decisional and deliberative.

European Food Safety Authority (EFSA) (2009). Cadmium in Food. Scientific Opinion of the Panel on Contaminants in the Food Chain. *EFSA Journal* 980, 1-139.

World Health Organization (WHO) (2011). Cadmium. Safety evaluation of certain food additives and contaminants. WHO Food Additives Series, No. 64/FAO JECFA Monographs 8. World Health Organization, Geneva. Available at

http://apps.who.int/iris/bitstream/handle/10665/44521/9789241660648_eng.pdf;jsessionid=D96891CABDCBCF63BE8F57D7CA615E2C?sequence=1

Accessed 11/17/2022.