

Integrating mercury data on nutrition labels of local canned tuna and its relevance to the Minamata Convention

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INTRODUCTION

Nutritional composition data on processed and packaged foods, including canned fish products, are essential for consumers to make informed and healthier food choices. This information is crucial for promoting food security and sustainable, nutrition-sensitive food systems. Canned fish products such as tuna serve as a vital source of nutrition especially in Pacific Island Countries and Territories (PICTs). Increased accessibility and intake of canned fish products like tuna, can help fill the gaps in sustainable coastal fish production and provide recommended dietary nutrition. Fish provide key nutrients during pregnancy, breastfeeding and for childhood development.

Mercury is a non-essential, toxic, persistent and bioaccumulative element; which is naturally present as well as anthropogenically introduced in the environment. Hg has been recognized by the World Health Organization (WHO) as a chemical of global concern⁹ due to its long-range atmospheric transportation, persistence and bioaccumulation in the environment⁷ and its deleterious effects on human and ecosystem health. Mercury is a toxin to the central nervous system and readily crosses the placental barrier. It bioaccumulates up the food chain, with large predatory fishes acquiring the greatest concentrations of Hg.

Fish is the key food source of Hg exposure. Tunas being migratory predators and located at higher trophic positions in the marine ecosystems, are an important fishery resource for many nations; yet Hg contamination in local and imported tuna products has become a food safety concern.

Hence, this poster aims to access the extent to which nutrition information labels on locally produced canned tuna include details about mercury (Hg) content and the recommended consumption guidelines.; thus assessing the effectiveness of Minamata Convention⁸.

RESULTS & DISCUSSIONS

Nutrition information per 100g serving																			
Brand/content	Protein (g)	Total fat (g)	Dietary fibre (g)	Sugar (g)	Carbohydrates (g)	Cholesterol (g)	Energy (kJ)	Sodium (g)	Iron (g)	Potassium (g)	Calcium (g)	Vitamin C (g)	Saturated fat (g)	Monounsaturated fat (g)	Polysaturated fat (g)	Vitamin A (g)	Mercury (g)	Ash (g)	Moisture (g)
1	13	20	0	20	< 0.1	0	1.1	0.27	0.00133	0.15	0.01	< 1	5	–	–	< 1.0	–	–	–
2	13	17	< 0.1	< 0.1	< 0.1	0	0.8	0.41	0.00158	0.18	0	< 1.0	< 7.8	7.9	0.9	0.1	–	–	–
3	14	15	< 0.1	< 0.1	< 0.1	0	0.8	0.59	0.00081	0.17	0	< 1.0	5.6	6	2.9	0	–	–	–
4	15	22	< 0.1	< 0.1	< 0.1	0.1	1	0.37	0.00047	0.15	0	< 1.0	5.1	5.1	11	< 1.0	–	–	–
5	14	15	0	< 0.1	< 0.1	0	0.8	0.36	0.00117	0.15	0.04	< 1.0	5.6	–	–	< 1.0	–	–	–
6	15	22	< 0.1	< 0.1	< 0.1	0.1	1.1	0.32	0.00029	0.21	0	< 1.0	7.2	7.9	7	< 1.0	–	–	–
7	17	21	–	< 1	< 1	–	1086	0.66	–	–	–	–	–	–	–	–	–	–	–
8	12	18	–	–	< 0.1	–	869	0.48	–	0.18	–	–	5.3	–	–	–	–	1.5	68
9	16	13	–	< 1.0	< 1.0	–	768	0.47	–	–	–	–	2	–	–	–	–	–	–
10	18	5	–	< 1	< 1	–	–	0.56	–	–	–	–	1	–	–	–	–	–	–

Table 1. Nutritional Information labeling on canned fish products with the inclusion of Hg data

	n	THg range (mg/kg)	Average THg (mg/kg) ± SD	Type of Tuna used
Brand 1	3	0.0964 - 0.1069	0.10 ± 0.05	Albacore tuna
Brand 2	3	0.0940 - 0.1002	0.10 ± 0.03	Skipjack tuna
Brand 3	3	0.0551 - 0.0665	0.06 ± 0.04	Skipjack tuna

Table 2. Mercury concentrations in three canned tuna flakes locally consumed. N = number of samples; SD = standard deviation.

Canned Fish Type	n	[Hg] range (mg/kg)	[Hg] average (mg/kg) ± SD
Canned Albacore	6	0.16 – 0.27	0.20 ± 0.03
Canned Skipjack	9	0.06 – 0.11	0.08 ± 0.02

Table 3. Mercury concentrations in canned Albacore and Skipjack tuna in study by Kumar et al. 2004.

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Methodological Approach		
1.0 A look at the relevant UN Sustainable Development Goals was done.	2.0 A visit to major supermarkets in the greater Suva area of Fiji Islands was made to examine the nutritional labeling on locally produced canned tuna products.	3.0 Analytical approach to analyzing three locally different brands of canned tuna flakes to determine the Hg content at the Institute of Applied Sciences using the FIMS-400 cold vapor atomic absorption spectrophotometer (CVAAS) was carried out.
	2.1 Comparisons were made on the labeling information, with particular emphasis on the inclusion of Hg details.	3.1 Using EPA 1631 method, 2 g portions of the respective canned tuna flake was weighed and digested using HCl (1ml), HNO ₃ (5ml) and H ₂ SO ₄ (2.5 ml) for 2 hours. Samples were cooled, filtered and 5 ml of BrCl was added before topping up to the 100 ml mark and analyzed using CVAAS.
	2.2 Literature review of four ¹⁻²⁻⁴⁻⁵ studies, which looked into the Hg concentrations of various tuna species, within the Western and Central Pacific Island countries was used to form the basis of this research.	3.2 Comparisons were made for Hg concentrations in canned tuna with a local ³ study.

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RESULTS & DISCUSSIONS

SDG 14	
*SDG14.1 and Target 14-A are closely associated with this research. *University of the South Pacific's (USP) teaching, research and community projects have significantly contributed to UN's SDG14. *USP's Institute of Marine Resources (IMR) conducted a free SDG14 course in 2023. * USP engages with industrial stakeholders by way of research and engagements on technologies or practices that would enable the marine industry to minimize or prevent damages to aquatic ecosystems. *USP was ranked in the Times Higher Education Impact Rankings 2022 for SDG14; indicating the caliber of expertise and commitment of the University towards its regional communities and fisheries. *Hence, for a small island nation like Fiji, it is commendable to note that USP has contributed to workshops relating to Ocean Policy, nature-based solutions, fisheries as well as community projects and education whilst upholding the principles of SDG14.	
NUTRITION LABELS ON CANNED TUNA	
*Nutritional labels on locally produced canned tuna provide a standardized format of reporting and essential information either per 100 g serving or per serve with some variability in the level of details provided on the labels as shown in table 1. *Findings provide valuable insights into the labeling practices and their potential implications for consumer awareness and safety. *Whilst the standardized labeling format is applauded, the absence of information about Hg content on the labels of canned tuna is observed. *The maximum tolerable limits (MTL) or Provisional Tolerable Weekly Intake (PTWI) for consumption for dietary intake is not available on the labels. (PTWI: established by the joint FAO/WHO Expert Committee on Food Additives for MethylHg is referred to as the amount of contaminant which is not cleared rapidly from the body and can be ingested over a lifetime without an appreciable risk).	
Hg ANALYSIS FOR CANNED TUNA FLAKES	
*It is observed that the Hg concentrations in these three brands analysed are below the FAO/WHO guidelines. *Similar results were obtained in Kumar ³ et al. 2004. *Food and Agriculture Organization/World Health Organization (FAO/WHO) Codex Alimentarius Commission guidelines is 1 mg/kg for predatory fish and 0.5 mg/kg for smaller fish ⁶ . *Even though Hg is a non-essential dietary requirement, its presence in fish is a concern due to its potential health risks, hence there is a need to raise consumer awareness and understanding of Hg in canned tuna.	

Policy Implications in relation to Minamata Convention effectiveness

- *Potential regulatory changes requiring manufacturers' to include Hg content information on canned fish products;
- *Consumer awareness and safety; Impact on public health.
- *Sustainable seafood consumption nationally, regionally and globally.