Watermelon

Karen Pendergrass · Heavy Metal Index, Institute of Contaminant Standards

HEAVY METAL INDEX · INGREDIENT PROFILE

October 2026

DOI 10.83376/hmi.ingredient.watermelon

CITE AS

Pendergrass, K. (2026). Watermelon. Heavy Metal Index. https://doi.org/10.83376/hmi.ingredient.watermelon

CORRESPONDENCE

Corrections are logged publicly on the article page, each with its date, the affected value, and the source that resolved it.

KEYWORDS

heavy metals, food safety, dietary exposure

PUBLICATION HISTORY

This revision 2026-10-22.

Abstract

Watermelon in the HMI library has 450 reported results for lead, cadmium, total arsenic, inorganic arsenic, total mercury, nickel, chromium, aluminum, tin, antimony, uranium, Co, Cu, Fe, Mn, Zn, V, As and Mg from 20 sources. WHO gems/food submissions reported lead in watermelon as sold from 628 results in 5 reporting regions, with a subgroup median of 30 µg/kg. In the US Total Diet Study, frozen watermelon had a median lead result below 4 µg/kg across 27 composites from 2017-2020.

1 | Watermelon overview

Across 4 other studies of ordinary farms and markets, reported lead means and medians on a dry-weight basis ranged from 10 µg/kg (Elbagory et al. 2025) to 500 µg/kg (Elbagermi et al. 2012).[7,8] For cadmium, 5 studies on a dry-weight basis reported means and medians from 1.23 µg/kg (Reza et al. 2019) to 250 µg/kg (Elbagory et al. 2025).[7,9]

For a buyer the practical points are the form bought, the basis a result is reported on, where the watermelon came from and the laboratory’s reporting limit. Testing finds contamination but does not remove it.

2 | What counts as watermelon

This page covers watermelon in 3 forms kept separate in every comparison: watermelon as sold (440 results), frozen watermelon (9 results) and watermelon juice (1 result).[1,2,3,4,5,6]

Results stay on the basis each source reports: as sold or fresh weight, dry weight, or unstated. Dry-weight, as-sold and unstated results are never pooled, and no moisture conversion is applied.

3 | How metals reach watermelon

No study in the library compared watermelon from contaminated and ordinary settings, so the routes by which metals reach it are not measured here.

4 | Which forms and regions measured lower

The hmi reference for lead in watermelon as sold pools 45 subgroup units from 2 sampling families, with a median of between 160 and 170 µg/kg and a middle half spanning below 5 (lower quartile) and 170 µg/kg (upper quartile).[1,5] frozen for lead in watermelon, the reference median was below 4 µg/kg, with a middle half from below 4 to below 4 µg/kg across 28 units.[2,11] for cadmium in watermelon as sold, the reference median was 20 µg/kg, with a middle half from below 2.5 to 20 µg/kg across 44 units.[1,5]

In one study, lead across 20 groups of watermelon ranged from 10 µg/kg (L6 site) to 110 µg/kg (L10 site); the lowest is the lowest observed in that study, not an established sourcing preference.[7] In another study, lead across 5 groups of watermelon ranged from 120 µg/kg (Ketu market (Ikosi/Isheri)) to 140 µg/kg (Iyana-Ipaja market (Alimosho)); the lowest is the lowest observed in that study, not an established sourcing preference.[12]

5 | Processing, cooking and preparation

No processing study for metals in this food is in the library yet.

6 | Mitigation for watermelon

Lot testing against the applicable limit is the check that can be verified.

7 | Trade-offs and limits of controls

Metals do not move together, so a lot that passes a lead limit says little about cadmium, arsenic or nickel unless those are tested as well.

8 | Testing watermelon for metals

Results depend on the method and its reporting limit. Reporting limits for lead ranged from 1 µg/kg (WHO GEMS/Food) to 3,000 µg/kg (WHO GEMS/Food), so a non-detect from a less sensitive method says much less.[1] Reporting limits for cadmium ranged from 0.3 µg/kg (WHO GEMS/Food) to 1,000 µg/kg (WHO GEMS/Food), so a non-detect from a less sensitive method says much less.[1] Reporting limits for total arsenic ranged from 0.03 µg/kg (WHO GEMS/Food) to 120 µg/kg (WHO GEMS/Food), so a non-detect from a less sensitive method says much less.[1]

A useful lot result names the form, the basis and a quantification limit well below the limit that applies.

9 | Buying and verifying watermelon

No maximum level for metals in watermelon was verified from primary text for this page; buyers should confirm the limit that applies in the destination market.

10 | Exposure from watermelon

No source in the library converted watermelon concentrations into a verified estimate of intake for a defined population. Concentrations describe the food, not individual risk.

11 | Evidence review and remaining gaps

Every source record that names watermelon was decided on its content: 20 occurrence extracted, 20 records in all. The occurrence table renders every extracted result; held values remain visible with their reason.

References identify the sources used in these answers. The Sources index preserves additional discovery links; inclusion there does not mean a source has been reviewed for this assessment. Corrections, completed searches, new direct evidence and changes in requirements should reopen the relevant answer.

12 | Watermelon FAQs

The library reports lead, cadmium, total arsenic, inorganic arsenic, total mercury, nickel, chromium, aluminum, tin, antimony, uranium, Co, Cu, Fe, Mn, Zn, V, As and Mg in watermelon, most often lead, cadmium and total arsenic.[1,2,3,4] WHO gems/food submissions reported lead in watermelon as sold from 628 results in 5 reporting regions, with a subgroup median of 30 µg/kg.[1]

In one study, lead across 20 groups of watermelon ranged from 10 µg/kg (L6 site) to 110 µg/kg (L10 site); the lowest is the lowest observed in that study, not an established sourcing preference.[7] In another study, lead across 5 groups of watermelon ranged from 120 µg/kg (Ketu market (Ikosi/Isheri)) to 140 µg/kg (Iyana-Ipaja market (Alimosho)); the lowest is the lowest observed in that study, not an established sourcing preference.[12]

Inorganic arsenic, the more toxic form, was measured in 3 results from 3 sources, far fewer than total arsenic.[1,13,14] European Food Safety Authority (EFSA) 2014 reported inorganic arsenic at 1.5 µg/kg (mean) in watermelon as sold from European dietary-survey occurrence data.[14]

References

[1] GEMS/Food Contaminants database heavy-metal exports
World Health Organization · GEMS/Food Contamination Monitoring and Assessment Programme · 2026 · extranet.who.int
DATASET

[2] FY2018-FY2020 TDS Elements Analytical Results
U.S. Food and Drug Administration · FDA Total Diet Study · 2022 · www.fda.gov
DATASET

[3] healthy eating patterns should include a variety of vegetables from all ve of the Access this article online
Unknown authors · Peer-reviewed article · 2020 · doi.org/10.3126/ajms.v12i6.33792
PEER-REVIEWED

[4] Quantification and Reduction in Heavy Metal Residues in Some Fruits and Vegetables: A Case Study Galați County, Romania
Bora FD, Bunea A, Pop SR, Banita SI, Dusa DS, Chira A, et al. · Horticulturae · 2022 · doi.org/10.3390/horticulturae8111034
PEER-REVIEWED

[5] Heavy metals in vegetables and potential risk for human health
Guerra F, Trevizam AR, Muraoka T, Marcante NC, and Canniatti-Brazaca SG · Scientia Agricola 69(1):54-60 · 2012 · doi.org/10.1590/s0103-90162012000100008
PEER-REVIEWED

[6] Level of heavy metals in sliced watermelon fruits in selected markets in Akure, Nigeria
Oladele OO and Aladesanmi OC · Bulletin of the National Research Centre (2020) 44:102 · 2020 · doi.org/10.1186/s42269-020-00356-2
PEER-REVIEWED

[7] Assessment of Potentially Toxic Elements in Four Melon Fruit Varieties Grown in the Ganges and Yamuna River Basin
Elbagory M, Abd El-Aziz MA, Omara AED, Abou Fayssal S, and Kumar V · Horticulturae · 2025 · doi.org/10.3390/horticulturae11020216
PEER-REVIEWED

[8] Monitoring of Heavy Metal Content in Fruits and Vegetables Collected from Production and Market Sites in the Misurata Area of Libya
Elbagermi MA, Edwards HGM, and Alajtal AI · ISRN Analytical Chemistry · 2012 · doi.org/10.5402/2012/827645
PEER-REVIEWED

[9] Assessment of Lead and Cadmium Levels in Watermelon and Carrot
Sharafati Chaleshtori Reza and Jadi Zahra · Iranian Journal of Toxicology · 2019 · doi.org/10.32598/ijt.13.4.585.1
PEER-REVIEWED

[10] Health Risk Assessment of Heavy Metals from Selected Fruits and Vegetables Sold in Dutse Ultra-Modern Market, Jigawa State
Uba G, Abdulhadi Y, Lawan MA, Ahmad A, and Kabir A · Journal of Biochemistry, Microbiology and Biotechnology 10(2):52-55 · 2022 · doi.org/10.54987/jobimb.v10i2.758
PEER-REVIEWED

[11] Infants' and young children's dietary exposures to lead and cadmium: FDA total diet study 2018-2020
Spungen JH and et al. · Food Additives & Contaminants: Part A · 2024 · doi.org/10.1080/19440049.2024.2396910
PEER-REVIEWED

[12] Evaluation of Heavy Metals Level and Proximate Analysis of Common Fruits from Selected Markets in Lagos, Nigeria
Rotimi OT, Ogunyebi AL, and Fingesi TS · Journal of Applied Sciences and Environmental Management, Vol. 22 (5) 791-795 · 2018 · doi.org/10.4314/jasem.v22i5.34
PEER-REVIEWED

[13] The First Hong Kong Total Diet Study: Inorganic Arsenic
Centre for Food Safety FEHD HKSAR · Centre for Food Safety, Food and Environmental Hygiene Department, Government of the Hong Kong Special Administrative Region · 2012 · www.cfs.gov.hk
GOVERNMENT

[14] Dietary exposure to inorganic arsenic in the European population
European Food Safety Authority (EFSA) · EFSA Journal 2014;12(3):3597 · 2014 · doi.org/10.2903/j.efsa.2014.3597
GOVERNMENT

STATUS AND LICENCE

Editorially reviewed in-house; no external peer review has been completed on this ingredient profile. Published as an institutional technical report with its review state tracked on the article page. Released under CC BY 4.0.

COMPETING INTERESTS

The Heavy Metal Index reports what the peer-reviewed and regulatory literature supports. It is operated separately from any certification program, does not evaluate or endorse brands, and does not use certification thresholds as evidence for the statements made here.

DATA AVAILABILITY

Every source behind this ingredient profile is listed with its own source record at https://heavymetalindex.com/ingredients/watermelon#sources.

PUBLICATION HISTORY

This revision 2026-10-22. The full dated record is maintained at https://heavymetalindex.com/ingredients/watermelon.