Celery

Karen Pendergrass · Heavy Metal Index, Institute of Contaminant Standards

HEAVY METAL INDEX · INGREDIENT PROFILE October 2026

DOI 10.83376/hmi.ingredient.celery

CITE AS

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

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

Celery in the HMI library has 233 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 Mo from 23 sources. WHO gems/food submissions reported lead in celery as sold from 1,027 results in 4 reporting regions, with subgroup medians from 3 to 620 µg/kg. In the US Total Diet Study, celery as sold had a median lead result below 4 µg/kg across 27 composites from 2017-2020.

1 | Celery overview

Across 2 other studies of ordinary farms and markets, reported lead means and medians on an as-sold or fresh-weight basis ranged from 6 µg/kg (Rusin et al. 2021) to 470 µg/kg (Guerra et al. 2012).[5,7] For cadmium, 4 studies on an as-sold or fresh-weight basis reported means and medians from 16 µg/kg (Dearing et al. 2025) to 152 µg/kg (Rusin et al. 2021).[7,8] Higher results came from contaminated or exposed settings rather than ordinary supply. Celery as sold from fresh product, Poland retail/official control had cadmium higher at 152 µg/kg, against 44 µg/kg for frozen product, Poland retail/official control in the same study.[7]

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

2 | What counts as celery

This page covers celery as sold (233 results).[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 celery

The evidence on how metals reach celery comes from studies that compared exposed and ordinary settings. Celery as sold from fresh product, Poland retail/official control had cadmium higher at 152 µg/kg, against 44 µg/kg for frozen product, Poland retail/official control in the same study.[7]

These are observational comparisons from single studies; the size of the difference depends on the site, metal and distance.

4 | Which forms and regions measured lower

The hmi reference for lead in celery as sold pools 105 subgroup units from 3 sampling families, with a median of below 4 µg/kg and a middle half spanning below 4 (lower quartile) and below 5 µg/kg (upper quartile).[1,2,11] for lead in celery as sold, the reference median was between 61.5 and 100 µg/kg, with a middle half from below 78 to between 118 and 125 µg/kg across 8 units.[1] for cadmium in celery as sold, the reference median was 21 µg/kg, with a middle half from 16 to 38 µg/kg across 95 units.[1,2,8]

Among GEMS/Food reporting regions, celery as sold had the lowest lead subgroup median in WPRO (3 µg/kg) and the highest in PAHO (620 µg/kg); reporting regions are markets, not growing areas.[1] For cadmium, the lowest regional median was in WPRO (10 µg/kg) and the highest in EURO (640 µg/kg).[1]

Targeted celery as sold samples in EURO had cadmium higher at 39 µg/kg, against 11 µg/kg for EURO in the same study.[1] In another study, targeted celery as sold samples in WPRO had cadmium lower at 8 µg/kg, against 53 µg/kg for WPRO in the same study.[1]

5 | Processing, cooking and preparation

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

6 | Mitigation for celery

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

7 | Trade-offs and limits of controls

Avoiding exposed growing areas lowered the metal measured in the studies available, but no study measured the cost or supply effect of doing so.[7] 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 celery for metals

Results depend on the method and its reporting limit. Reporting limits for lead ranged from 2 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 0.5 µg/kg (WHO GEMS/Food) to 50 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 3 µg/kg (FDA Total Diet Study) to 500 µg/kg (WHO GEMS/Food), so a non-detect from a less sensitive method says much less.[1,2]

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

9 | Buying and verifying celery

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

10 | Exposure from celery

No source in the library converted celery 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 celery was decided on its content: 23 occurrence extracted, 23 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 | Celery 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 Mo in celery, most often lead, cadmium and total arsenic.[1,2,3,4] WHO gems/food submissions reported lead in celery as sold from 1,027 results in 4 reporting regions, with subgroup medians from 3 to 620 µg/kg.[1]

In the studies available, celery from contaminated or exposed settings carried more metal than celery from the same study's control.[7] celery as sold from frozen product, Poland retail/official control had lead higher at 64 µg/kg, against 31 µg/kg for fresh product, Poland retail/official control in the same study.[7]

Among GEMS/Food reporting regions, celery as sold had the lowest lead subgroup median in WPRO (3 µg/kg) and the highest in PAHO (620 µg/kg); reporting regions are markets, not growing areas.[1] For cadmium, the lowest regional median was in WPRO (10 µg/kg) and the highest in EURO (640 µg/kg).[1]

Inorganic arsenic, the more toxic form, was measured in 3 results from 3 sources, far fewer than total arsenic.[1,12,13] Across 2 other studies of ordinary farms and markets, reported inorganic arsenic means and medians with the basis not stated ranged from 4 µg/kg (Centre for Food Safety FEHD HKSAR 2012) to 10.9 µg/kg (European Food Safety Authority (EFSA) 2014).[12,13]

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] 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

[4] Risk of cadmium, lead and zinc exposure from consumption of vegetables produced in areas with mining and smelting past
Ćwieląg-Drabek, M., Piekut, A., Gut, K., and Grabowski, M. · Scientific Reports · 2020 · doi.org/10.1038/s41598-020-60386-8
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] HEAVY METALS ACCUMULATION IN SOIL AND CELERY ROOT (APIUM GRAVEOLENS L.) HARVESTED FROM THE POLLUTED AREAS IN SIBIU COUNTY, CENTRAL ROMANIA
Bogdan Ștefan Oprea, Nicoleta Olimpia Vrînceanu, Dumitru-Marian Motelică, Georgiana Iuliana Plopeanu, Vera Carabulea, and Mihaela Costea · Annals of the University of Craiova—Agriculture,Montanology,Cadastre52(1):422–429 · 2022 · doi.org/10.52846/aamc.v52i1.1370
PEER-REVIEWED

[7] Concentration of cadmium and lead in vegetables and fruits
Rusin M, Domagalska J, Rogala D, Razzaghi M, and Szymala I · Scientific Reports · 2021 · doi.org/10.1038/s41598-021-91554-z
PEER-REVIEWED

[8] Assessment of Heavy Metals in Organic and Non-Organic Vegetables Post Severe Tropical Cyclone Gabrielle: A cross-sectional comparative analysis
Dearing C, Ye Z, and Robertshaw G · F1000Research · 2025 · doi.org/10.12688/f1000research.175538.1
PEER-REVIEWED

[9] Assessment of Heavy Metals Concentration and Health Risks of Selected Vegetables Sold In Jos Metropolis
Adeniyi O, Bayo D, Adeniyi A, and Okeke-Agulu K · Archives of Medical Case Reports and Case Study 4(5) · 2021 · doi.org/10.31579/2694-0248/072
PEER-REVIEWED

[10] Determination of some heavy metals and their potential risk in selected vegetables on sale within Kaduna Metropolis, Kaduna State, Nigeria
Imongben CO, Tomori WB, Umoru PE, and Oyerinde WA · World Nutrition · 2026 · doi.org/10.26596/wn.20261718-18
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] 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

[13] 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

COMPETING INTERESTS

The Heavy Metal Index reports what the peer-reviewed and regulatory literature supports. It is operated separately from

institutional technical report with its review state tracked on the article page. Released under CC BY 4.0.

DATA AVAILABILITY

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

any certification program, does not evaluate or endorse brands, and does not use certification thresholds as evidence for the statements made here.

PUBLICATION HISTORY

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