Cucumber

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Abstract

Cucumber in the HMI library has 551 reported results for lead, cadmium, total arsenic, inorganic arsenic, dimethylarsinic acid, monomethylarsonic acid, total mercury, nickel, chromium, aluminum, tin, antimony, uranium, Co, Cu, Fe, Mn, Zn, V, Se, As, Ba, Ca, DBT, DOT, Hg, OTC_sum_as_Sn, Sr, sumOTC, TBT, Ti, Tl, TMA, TPhT and TPT from 48 sources. WHO gems/food submissions reported lead in cucumber as sold from 2,199 results in 5 reporting regions, with subgroup medians from 4 to 520 µg/kg. In the US Total Diet Study, peeled or flesh cucumber had a median lead result below 4 µg/kg across 27 composites from 2017-2020.

1 | Cucumber overview

Across 5 other studies of ordinary farms and markets, reported lead means and medians on an as-sold or fresh-weight basis ranged from 40 µg/kg (Alimohammadi et al. 2018) to 370 µg/kg (Guerra et al. 2012).[4,8] For cadmium, 5 studies on an as-sold or fresh-weight basis reported means and medians from 1 µg/kg (Alimohammadi et al. 2018) to 48.6 µg/kg (Bora et al. 2022).[4,5] Higher results came from contaminated or exposed settings rather than ordinary supply. Cucumber as sold from Location A1 (industrial-affected area) had total mercury higher at 38.5 µg/kg, against 0.87 µg/kg for Control (grocery store >55 km from any power plant) in the same study.[9]

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

2 | What counts as cucumber

This page covers cucumber in 3 forms kept separate in every comparison: cucumber as sold (503 results), canned cucumber (39 results) peeled or flesh and cucumber (9 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 cucumber

The evidence on how metals reach cucumber comes from studies that compared exposed and ordinary settings. Cucumber as sold from Location A1 (industrial-affected area) had total mercury higher at 38.5 µg/kg, against 0.87 µg/kg for Control (grocery store >55 km from any power plant) in the same study.[9] In another study, cucumber as sold from Ruschita (mining area R) (mining-affected area) had Mn higher at 6,730 µg/kg, against 450 µg/kg for Borlova (reference area) in the same study.[7] a third study found that cucumber as sold from private garden (industrial-affected area) had lead higher at 82.3 µg/kg, against 20.5 µg/kg for private garden in the same study.[14]

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

For cadmium, the HMI peeled or flesh reference median was lowest for cucumber (1.6 µg/kg) and highest for cucumber as sold (102 µg/kg); forms differ in water content, so this compares foods as sold or eaten, not uptake.[1,2,15,16] The peeled or flesh hmi reference for lead in cucumber pools 28 subgroup units from 2 sampling families, with a median of below 4 µg/kg and a middle half spanning below 4 (lower quartile) and below 4 µg/kg (upper quartile).[2,17] for lead in cucumber as sold, the reference median was below 8.45 µg/kg, with a middle half from below 5 to between 4.19 and 12 µg/kg across 104 units.[1] for cadmium in cucumber as sold, the reference median was 102 µg/kg, with a middle half from below 1 to 102 µg/kg across 5 units.[1,15,16]

Among GEMS/Food reporting regions, cucumber as sold had the lowest lead subgroup median in PAHO (4 µg/kg) and the highest in EURO (520 µg/kg); reporting regions are markets, not growing areas.[1] For cadmium, the lowest regional median was in PAHO (2 µg/kg) and the highest in EMRO (11 µg/kg).[1] For inorganic arsenic, the lowest regional median was in EURO (7.05 µg/kg) and the highest in EURO (388 µg/kg).[1]

Targeted cucumber as sold samples in WPRO had cadmium lower at 1.23 µg/kg, against 3 µg/kg for WPRO in the same study.[1]

In one study, lead across 7 groups of cucumber ranged from 46 µg/kg (supermarket sampling point SP6, Fars Province) to 109 µg/kg (supermarket sampling point SP1, Fars Province); the lowest is the lowest observed in that study, not an established sourcing preference.[18] In another study, lead across 6 groups of cucumber ranged from 310 µg/kg (unit 1 (glass jar)) to 450 µg/kg (unit 2 (tin can)); the lowest is the lowest observed in that study, not an established sourcing preference.[19]

5 | Processing, cooking and preparation

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

6 | Mitigation for cucumber

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.[9] 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 cucumber for metals

Results depend on the method and its reporting limit. Reporting limits for lead ranged from 0.5 µg/kg (Al-Salimi et al. 2026) to 3,000 µg/kg (WHO GEMS/Food), so a non-detect from a less sensitive method says much less.[1,20] Reporting limits for cadmium ranged from 0.09 µg/kg (Shavali-gilani et al. 2025) to 1,000 µg/kg (WHO GEMS/Food), so a non-detect from a less sensitive method says much less.[1,21] Reporting limits for total arsenic ranged from 0.03 µg/kg (WHO GEMS/Food) to 3,300 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 cucumber

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

10 | Exposure from cucumber

No source in the library converted cucumber 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 cucumber was decided on its content: 48 occurrence extracted, 48 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 | Cucumber FAQs

The library reports lead, cadmium, total arsenic, inorganic arsenic, dimethylarsinic acid, monomethylarsonic acid, total mercury, nickel, chromium, aluminum, tin, antimony, uranium, Co, Cu, Fe, Mn, Zn, V, Se, As, Ba, Ca, DBT, DOT, Hg, OTC_sum_as_Sn, Sr, sumOTC, TBT, Ti, Tl, TMA, TPhT and TPT in cucumber, most often lead, cadmium and total arsenic.[1,2,3,4] WHO gems/food submissions reported lead in cucumber as sold from 2,199 results in 5 reporting regions, with subgroup medians from 4 to 520 µg/kg.[1]

In the studies available, cucumber from contaminated or exposed settings carried more metal than cucumber from the same study's control.[7] cucumber as sold from Moldova Noua (mining area M) (mining-affected area) had lead higher at 370 µg/kg, against 160 µg/kg for Borlova (reference area) in the same study.[7]

For cadmium, the HMI peeled or flesh reference median was lowest for cucumber (1.6 µg/kg) and highest for cucumber as sold (102 µg/kg); forms differ in water content, so this compares foods as sold or eaten, not uptake.[1,2,15,16]

Among GEMS/Food reporting regions, cucumber as sold had the lowest lead subgroup median in PAHO (4 µg/kg) and the highest in EURO (520 µg/kg); reporting regions are markets, not growing areas.[1] For cadmium, the lowest regional median was in PAHO (2 µg/kg) and the highest in EMRO (11 µg/kg).[1]

Inorganic arsenic, the more toxic form, was measured in 10 results from 5 sources, far fewer than total arsenic.[1,22,23,24,25] Across 2 other studies of ordinary farms and markets, reported inorganic arsenic means and medians with the basis not stated ranged from 9 µg/kg (Centre for Food Safety FEHD HKSAR 2012) to 11.1 µg/kg (European Food Safety Authority (EFSA) 2014).[23,24]

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STATUS AND LICENCE

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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/cucumber#sources.

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