Beer

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HEAVY METAL INDEX · INGREDIENT PROFILE October 2026
DOI 10.83376/hmi.ingredient.beer

CITE AS

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

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

Beer in the HMI library has 476 reported results for lead, cadmium, total arsenic, inorganic arsenic, dimethylarsinic acid, monomethylarsonic acid, total mercury, methylmercury, nickel, chromium, aluminum, tin, antimony, uranium, Co, Cu, Fe, Mn, Zn, V, Se, Ba, I, Mo, Sr and Tl from 22 sources. WHO gems/food submissions reported lead in beer as sold from 5,381 results in 3 reporting regions, with subgroup medians from 1 to 1.65 µg/kg. In the US Total Diet Study, beer as sold had a median lead result below 1 µg/kg across 3 composites from 2018-2020.

1 | Beer overview

Across 2 other studies of ordinary farms and markets, reported lead means and medians with the basis not stated ranged from 2 µg/kg (Centre for Food Safety (Hong Kong) 2013) to 8.2 µg/kg (Dabeka et al. 1995).[7,8] For cadmium, 2 studies with the basis not stated reported means and medians from 0.1 µg/kg (Dabeka et al. 1995) to 1.4 µg/kg (Joint FAO/WHO Expert Committee on Food Additives 2022).[8,9]

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

2 | What counts as beer

This page covers beer in 2 forms kept separate in every comparison: beer as sold (470 results) canned and beer (6 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 beer

No study in the library compared beer 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 beer as sold pools 59 subgroup units from 3 sampling families, with a median of below 1 µg/kg and a middle half spanning below 1 (lower quartile) and below 2.15 µg/kg (upper quartile).[1,2,6] for cadmium in beer as sold, the reference median was below 1 µg/kg, with a middle half from below 1 to below 1 µg/kg across 60 units.[1,2,6] for total arsenic in beer as sold, the reference median was between 3 and 5 µg/kg, with a middle half from below 3 to 5 µg/kg across 36 units.[1,2,10]

Among GEMS/Food reporting regions, beer as sold had the lowest lead subgroup median in PAHO (1 µg/kg) and the highest in PAHO (1.65 µg/kg); reporting regions are markets, not growing areas.[1] For cadmium, the lowest regional median was in EURO (0.3 µg/kg) and the highest in EMRO (109 µg/kg).[1]

In one study, tin across 6 groups of beer ranged from 2,500 µg/kg (brand B3, expiry 2015) to 3,660 µg/kg (brand B1, expiry 2014); the lowest is the lowest observed in that study, not an established sourcing preference.[11]

5 | Processing, cooking and preparation

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

6 | Mitigation for beer

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 beer for metals

Results depend on the method and its reporting limit. Reporting limits for lead ranged from 0.5 µg/kg (Dabeka et al. 1995) to 1,000 µg/kg (WHO GEMS/Food), so a non-detect from a less sensitive method says much less.[1,8] Reporting limits for cadmium ranged from 0.04 µg/kg (WHO GEMS/Food) to 500 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 1 µg/kg (FDA Total Diet Study) to 5,520 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 beer

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

10 | Exposure from beer

No source in the library converted beer 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 beer was decided on its content: 22 occurrence extracted, 22 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 | Beer FAQs

The library reports lead, cadmium, total arsenic, inorganic arsenic, dimethylarsinic acid, monomethylarsonic acid, total mercury, methylmercury, nickel, chromium, aluminum, tin, antimony, uranium, Co, Cu, Fe, Mn, Zn, V, Se, Ba, I, Mo, Sr and Tl in beer, most often lead, cadmium and total arsenic.[1,2,3,4] WHO gems/food submissions reported lead in beer as sold from 5,381 results in 3 reporting regions, with subgroup medians from 1 to 1.65 µg/kg.[1]

Among GEMS/Food reporting regions, beer as sold had the lowest lead subgroup median in PAHO (1 µg/kg) and the highest in PAHO (1.65 µg/kg); reporting regions are markets, not growing areas.[1] For cadmium, the lowest regional median was in EURO (0.3 µg/kg) and the highest in EMRO (109 µg/kg).[1]

Inorganic arsenic, the more toxic form, was measured in 75 results from 7 sources, far fewer than total arsenic.[1,3,12,13,14,15,16] Across 2 other studies of ordinary farms and markets, reported inorganic arsenic means and medians on an as-sold or fresh-weight basis ranged from 1.6 µg/kg (Marín et al. 2018) to 6 µg/kg (US Food and Drug Administration 2016).[3,12]

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REGULATION

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/beer#sources.

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PUBLICATION HISTORY

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