White bread

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Abstract

White bread in the HMI library has 125 reported results for lead, cadmium, total arsenic, inorganic arsenic, total mercury, nickel, chromium, aluminum, tin, uranium, Co and Cu from 10 sources. WHO GEMS/Food submissions reported lead in white bread as sold from 1,127 results in 3 reporting regions, with subgroup medians from 5.5 to 60 µg/kg. In the US Total Diet Study, white bread as sold had a median lead result below 4 µg/kg across 27 composites from 2017-2020.

1 | White bread 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 2.5 µg/kg (Spungen et al. 2024) to 25.3 µg/kg (Marín et al. 2018).[3,4] For cadmium, 2 studies on an as-sold or fresh-weight basis reported means and medians from 16.4 µg/kg (Marín et al. 2018) to 27 µg/kg (Spungen et al. 2024).[3,4]

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

2 | What counts as white bread

This page covers white bread in 2 forms kept separate in every comparison: white bread as sold (118 results) cooked and white bread (7 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 white bread

No study in the library compared white bread 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 white bread as sold pools 110 subgroup units from 2 sampling families, with a median of below 5.3 µg/kg and a middle half spanning below 4 (lower quartile) and between 4.5 and 17 µg/kg (upper quartile).[1,2] cooked for lead in white bread, the reference median was 2.95 µg/kg, with a middle half from 2.13 to 5 µg/kg across 4 units.[1] for cadmium in white bread as sold, the reference median was between 21 and 22 µg/kg, with a middle half from between 17.5 and 18 to 26 µg/kg across 119 units.[1,2]

Among GEMS/Food reporting regions, white bread as sold had the lowest lead subgroup median in WPRO (5.5 µg/kg) and the highest in EURO (60 µg/kg); reporting regions are markets, not growing areas.[1] For cadmium, the lowest regional median was in WPRO (13 µg/kg) and the highest in EURO (20.3 µg/kg).[1] For total arsenic, the lowest regional median was in EURO (21.4 µg/kg) and the highest in EURO (25.1 µg/kg).[1]

Targeted white bread as sold samples in WPRO had lead lower at 6.5 µg/kg, against 7.5 µg/kg for WPRO in the same study.[1] In another study, targeted white bread as sold samples in WPRO had cadmium lower at 7.57 µg/kg, against 13 µg/kg for WPRO in the same study.[1]

5 | Processing, cooking and preparation

Processed or prepared forms were compared only with unprocessed white bread in the same study and group. Cooked white bread (WPRO) had lead higher at 8.54 µg/kg, against 6.5 µg/kg for the unprocessed form in the same group (white bread as sold).[1]

Forms differ in water content, so a per-kilogram difference is not by itself a measured removal or gain of metal.

6 | Mitigation for white bread

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 white bread 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 1 µg/kg (FDA Total Diet Study) to 63.2 µg/kg (WHO GEMS/Food), so a non-detect from a less sensitive method says much less.[1,2] Reporting limits for total arsenic ranged from 3 µg/kg (FDA Total Diet Study) to 4,320 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 white bread

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

10 | Exposure from white bread

No source in the library converted white bread 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 white bread was decided on its content: 10 occurrence extracted, 10 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 | White bread FAQs

The library reports lead, cadmium, total arsenic, inorganic arsenic, total mercury, nickel, chromium, aluminum, tin, uranium, Co and Cu in white bread, most often lead, cadmium and total arsenic.[1,2,3,4] WHO GEMS/Food submissions reported lead in white bread as sold from 1,127 results in 3 reporting regions, with subgroup medians from 5.5 to 60 µg/kg.[1]

Among GEMS/Food reporting regions, white bread as sold had the lowest lead subgroup median in WPRO (5.5 µg/kg) and the highest in EURO (60 µg/kg); reporting regions are markets, not growing areas.[1] For cadmium, the lowest regional median was in WPRO (13 µg/kg) and the highest in EURO (20.3 µg/kg).[1]

Only comparisons between forms in the same study are available, not before-and-after measurements of the same white bread.[1] cooked white bread (WPRO) had lead higher at 8.54 µg/kg, against 6.5 µg/kg for the unprocessed form in the same group (white bread as sold).[1]

Inorganic arsenic, the more toxic form, was measured in 9 results from 2 sources, far fewer than total arsenic.[1,3] Marín et al. 2018 reported inorganic arsenic at 6.7 µg/kg (mean) in white bread as sold from Cereals.[3]

References

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

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