Soybean Oil

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CORRESPONDENCE

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Abstract

Soybean oil in the HMI library has 219 reported results for lead, cadmium, total arsenic, inorganic arsenic, total mercury, nickel, chromium, aluminum, tin, Co, Cu, Fe, Mn, Zn, V, As and Ba from 13 sources. WHO GEMS/Food submissions reported lead in soybean oil from 103 results in 4 reporting regions, with subgroup medians below 195 µg/kg, mostly non-detects. For cadmium, GEMS/Food gave subgroup medians below 10 µg/kg, mostly non-detects from 75 results.

1 | Soybean oil overview

Across 6 other studies of ordinary farms and markets, reported lead means and medians on an as-sold or fresh-weight basis ranged from 1.13 µg/kg (S-T et al. 2024) to 90 µg/kg (Onoja et al. 2025).[6,7] For cadmium, 5 studies on an as-sold or fresh-weight basis reported means and medians from 1.3 µg/kg (Pehlivan et al. 2008) to 860 µg/kg (Onoja et al. 2025).[6,8] Higher results came from contaminated or exposed settings rather than ordinary supply. Soybean oil from factory A crude oil (A1) had nickel higher at 550 µg/kg, against 10 µg/kg for factory A refined oil (A2) in the same study.[6]

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

2 | What counts as soybean oil

This page covers soybean oil (219 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 soybean oil

The evidence on how metals reach soybean oil comes from studies that compared exposed and ordinary settings. Soybean oil from factory A crude oil (A1) had nickel higher at 550 µg/kg, against 10 µg/kg for factory A refined oil (A2) in the same study.[6] In another study, soybean oil from extraction had cadmium higher at 150 µg/kg, against 20 µg/kg for pressed bleached oil, fraction 4, one production lot in the same study.[9]

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 soybean oil pools 45 subgroup units from 2 sampling families, with a median of 40 µg/kg and a middle half spanning below 26.3 (lower quartile) and 330 µg/kg (upper quartile).[1,4] for cadmium in soybean oil, the reference median was below 2.59 µg/kg, with a middle half from below 1 to below 5 µg/kg across 10 units.[1] for total arsenic in soybean oil, the reference median was below 14.4 µg/kg, with a middle half from below 5 to 23.3 µg/kg across 7 units.[1]

In one study, lead across 9 groups of soybean oil ranged from 40 µg/kg (sample S2, Dhaka/Chattogram/Cumilla/-Feni retail markets) to 1,870 µg/kg (sample S4, Dhaka/Chattogram/Cumilla/Feni retail markets); the lowest is the lowest observed in that study, not an established sourcing preference.[4]

5 | Processing, cooking and preparation

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

6 | Mitigation for soybean oil

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.[6] 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 soybean oil for metals

Results depend on the method and its reporting limit. Reporting limits for lead ranged from 5 µg/kg (WHO GEMS/Food) to 98 µg/kg (Ashraf 2012), so a non-detect from a less sensitive method says much less.[1,3] Reporting limits for cadmium ranged from 5 µg/kg (WHO GEMS/Food) to 92 µg/kg (Ashraf 2012), so a non-detect from a less sensitive method says much less.[1,3] Reporting limits for total arsenic ranged from 5 µg/kg (WHO GEMS/Food) to 35 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 soybean oil

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

10 | Exposure from soybean oil

No source in the library converted soybean oil 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 soybean oil was decided on its content: 13 occurrence extracted, 13 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 | Soybean oil FAQs

The library reports lead, cadmium, total arsenic, inorganic arsenic, total mercury, nickel, chromium, aluminum, tin, Co, Cu, Fe, Mn, Zn, V, As and Ba in soybean oil, most often lead, cadmium and total arsenic.[1,2,3,4] WHO GEMS/Food submissions reported lead in soybean oil from 103 results in 4 reporting regions, with subgroup medians below 195 µg/kg, mostly non-detects.[1]

In the studies available, soybean oil from contaminated or exposed settings carried more metal than soybean oil from the same study's control.[6] soybean oil from factory B crude oil (B1) had lead higher at 90 µg/kg, against 80 µg/kg for factory A crude oil (A1) in the same study.[6]

In one study, lead across 9 groups of soybean oil ranged from 40 µg/kg (sample S2, Dhaka/Chattogram/Cumilla/-Feni retail markets) to 1,870 µg/kg (sample S4, Dhaka/Chattogram/Cumilla/Feni retail markets); the lowest is the lowest observed in that study, not an established sourcing preference.[4]

Inorganic arsenic, the more toxic form, was measured in 1 result from 1 source, far fewer than total arsenic.[10] European Food Safety Authority (EFSA) 2014 reported inorganic arsenic at 14.9 µg/kg (mean) in soybean oil from european dietary-survey occurrence data.[10]

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GOVERNMENT

STATUS AND LICENCE

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COMPETING INTERESTS

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DATA AVAILABILITY

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

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