Plant milks, soy-based: HMTc Standard

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CORRESPONDENCE

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heavy metals, food safety, dietary exposure

PUBLICATION HISTORY

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Abstract

The Heavy Metal Tested & Certified heavy-metal-safety standard for plant milks, soy-based in Beverages, evaluated on ready-to-drink liquid, as consumed (wet weight, single strength); a concentrate or a powder-to-liquid product is assessed as reconstituted to single strength per the manufacturer's own directions, which is the basis EU 2023/915 and Codex CXS 193 write into their juice cells and Hong Kong Cap 132V Note 11 writes into its beverage entries. 5 of 11 panel analytes publish a numeric limit taken from the strictest applicable government maximum; the remainder are held under mandatory control or a substantiated not-material determination.

1 | How every number on this standard is set

HMTc Method v2.0 (government-limit-only): the strictest applicable sovereign maximum level for this exact beverage form and analyte in the row's declared native basis, with disclosed read-across where the exact cell is unregulated, a substantiated not-material determination where a species is bounded or is a method artifact, and a control where no defensible sovereign number and no supportable near-neighbour exist. Never occurrence-derived. Ready-to-drink and dry-commodity bases are never mixed and no brewing, dilution or reconstitution factor is invented.

2 | Master limit table

All values in ppb (µg/kg), as consumed basis. A brand meeting every value qualifies for the mark.

ANALYTE	HMTC LIMIT	BASIS
Lead (Pb)	20	read-across (Hong Kong)

Cadmium (Cd)	control	measured every lot; no human-food maximum
Total arsenic (tAs)	control	measured every lot; no human-food maximum
Inorganic arsenic (iAs)	20	read-across (EU 2023/915)
Mercury, total (tHg)	10	read-across (Hong Kong)
Methylmercury (MeHg)	n/m	not material in this matrix
Nickel (Ni)	250	read-across (EU 2024/1987)
Tin (Sn)	100,000	government maximum level (EU 2023/915)
Aluminium (Al)	control	measured every lot; no human-food maximum
Total chromium (Cr)	control	measured every lot; no human-food maximum
Hexavalent chromium (Cr-VI)	control	measured every lot; no human-food maximum

3 | Derivation — where each number comes from

Every cell traces to one named sovereign maximum level (the strictest for the nearest analog), or to an explicit control, not-material, or species-bounded determination. No occurrence statistic selects a certification value.

ANALYTE	HMTC	SOVEREIGN ANALOG / DETERMINATION
Lead (Pb)	20	read-across (Hong Kong); Milk

Cadmium (Cd)	control	No credible sovereign sets a cadmium maximum level for a soy-based plant drink. EU 2023/915, Codex CXS 193, FSANZ Schedule 19, Health Canada and Hong Kong Cap 132V set no cadmium maximum level for a plant-based drink, and none of them sets a cadmium cell for dairy milk either, so the dairy-milk analog relied on for lead and total mercury in this row supplies nothing for cadmium. The sovereign cadmium cells for the dry source seeds, grains and nuts (for example soy beans at 200 ug/kg) are as-sold dry-commodity values and cannot be carried into a ready-to-drink liquid without an invented dilution factor. No near-neighbour read-across is supportable, so the fail-safe disposition is a control: cadmium testing is mandatory on every certified lot and no ceiling is invented from occurrence data.
Total arsenic (tAs)	control	No credible sovereign sets a total-arsenic maximum level for a soy-based plant drink. Regulators write beverage arsenic limits on the inorganic species (EU 2023/915 section 3.4.4 fruit juices at 20 ug/kg and section 3.4.1.6 non-alcoholic rice-based drinks at 30 ug/kg; the US FDA apple-juice action level at 10 ug/kg) and write unspeciated arsenic limits only in the packaged-water and public-water-supply schedules, which are Category 8 instruments. The inorganic-arsenic cell in this row carries the health-relevant fraction. Total arsenic is therefore mandatory on every lot as the parent screen and no total-arsenic ceiling is invented.
Inorganic arsenic (iAs)	20	read-across (EU 2023/915); fruit juices, concentrated fruit juices as reconstituted, and fruit nectars
Mercury, total (tHg)	10	read-across (Hong Kong); Milk

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Methylmercury (MeHg)	n/m	Methylmercury has no formation pathway in a plant-based drink: there is no marine bioaccumulation step in the supply chain and no anaerobic, sulfate-reducing methylation environment in the product or its process. Methylmercury is a component of total mercury (MeHg <= tHg) and is governed by and bounded by the total-mercury cell; no separate methylmercury ceiling is published.
Nickel (Ni)	250	read-across (EU 2024/1987); fruit/vegetable juices and nectars, general
Tin (Sn)	100,000	government maximum level (EU 2023/915)
Aluminium (Al)	control	No credible sovereign sets an aluminium maximum level for a soy-based plant drink. The only sovereign aluminium values in a dietary basis are the packaged-drinking-water quality standards (US 21 CFR 165.110 secondary allowable level 200 ug/kg, EU 2020/2184, Health Canada 2900 ug/kg), which govern water sold as water and are Category 8 instruments, and the FSANZ infant-formula aluminium limits, which are Category 1 and are excluded from this category's anchor set by the taxonomy boundary rule. In this form aluminium is a packaging and processing signal (aluminium cans and can linings, closures, filter aids, additive carry-over) rather than a raw-material contaminant. Plant-based drinks additionally carry mineral--fortification premixes and stabiliser systems, so an aluminium result is investigated against the fortificant and stabiliser specifications as well as the packaging.

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Total chromium (Cr)	control	No credible sovereign sets a total-chromium maximum level for a soy-based plant drink. The only sovereign chromium values reachable from this basis family are the packaged-drinking-water quality standards (US 21 CFR 165.110 at 100 ug/kg, Hong Kong Cap 132V packaged drinking water at 50 ug/kg), which govern water sold as water and are Category 8 instruments, and the public-water-system maximum contaminant levels (US EPA, Health Canada), which are water-utility instruments and not food law at all. Total chromium in this form is dominated by benign Cr(III) and is reported as a stainless-steel equipment and process-water leaching screen, not as a health limit; the health-relevant species is addressed in the Cr-VI cell.
Hexavalent chromium (Cr-VI)	control	No credible sovereign sets a hexavalent-chromium limit for any food or beverage, and the in-matrix reduction argument that supports a not-material determination in an acidic beverage is not available here: a plant-based drink is near-neutral (typically pH 6.5 to 7.5) and low in the organic acids and ascorbate that drive Cr(VI) reduction in an acidic beverage, so the reduction cannot be assumed. Because Cr(VI) cannot be assumed to be reduced to Cr(III) in this matrix, the fail-safe disposition is a control rather than a not-material determination, and no ceiling is invented.

4 | Cite this standard

Pendergrass, K. (2026). *Plant milks, soy-based: HMTc standard*. Institute of Contaminant Standards.

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References

[1] Hong Kong
Binds Pb, tHg. Milk.
READ-ACROSS

[2] EU 2024/1987
Binds Ni. fruit/vegetable juices and nectars, general.
READ-ACROSS

[3] EU 2023/915
Binds Sn, iAs.
MAXIMUM LEVEL

STATUS AND LICENCE

A normative certification standard, editorially reviewed and version-controlled in-house; every value traces to a named sovereign maximum level, disclosed in the derivation. © 2026 Institute of Contaminant Standards / Heavy Metal Certified. All rights reserved.

COMPETING INTERESTS

This standard is published by the Heavy Metal Tested & Certified (HMTc) program, operated by the Institute of Contaminant Standards. Its statements about government regulations, toxicology, and occurrence are sourced to the cited primary and expert-body records and to the independently maintained Heavy Metal Index; the program's own certification thresholds are not used as evidence for any factual claim made here.

DATA AVAILABILITY

The works this standard draws on are listed in full in the references above and on the standard page at https://heavymetalcertified.com/standards/plant-milks-soy-based. Primary legal instruments and expert-body assessments are named with their public identifiers; the underlying occurrence and toxicology corpus is maintained on the Heavy Metal Index.

PUBLICATION HISTORY

This revision 2026-08. The full dated record is maintained at https://heavymetalcertified.com/standards/plant-milks-soy-based.