

Why is chromium limited in food? The certification rationale

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THE RATIONALE

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HMTc limits chromium because its two forms could not be more different — trivalent chromium is a low-toxicity form long treated as an essential nutrient, while hexavalent chromium is an IARC Group 1 carcinogen assessed by the US EPA as likely carcinogenic by the oral route — so chromium is limited only where a credible hexavalent-chromium pathway exists, and total chromium is never read as if it were the hexavalent form.

In brief

Chromium is limited in food only after a distinction is drawn, and getting that distinction right is the whole rationale. Trivalent chromium, the form that dominates in most foods, is of low toxicity and has long been treated as an essential trace element. Hexavalent chromium is a different substance: an IARC Group 1 carcinogen on occupational evidence, assessed by the US EPA as likely carcinogenic by the oral route. A total-chromium number lumps the two together and cannot, on its own, be mapped to risk. So HMTc carries chromium with a speciation discipline — it limits chromium where a credible hexavalent pathway exists, rather than treating every trace of total chromium as a hazard.

The health basis for limiting chromium

Chromium's regulation depends entirely on which form is present. Trivalent chromium, Cr(III), is of low toxicity and has been treated as an essential trace element; EFSA set a Cr(III) tolerable daily intake of 300 µg/kg body weight per day in 2014, a value far above ordinary dietary exposure. Hexavalent chromium, Cr(VI), is a distinct hazard: IARC classifies it Group 1, carcinogenic to humans, established on occupational-inhalation evidence for lung and nasal cancer, and the US EPA's 2024 assessment derives a chronic oral reference dose of 9×10^{-4} mg/kg-day and an oral cancer slope factor, treating it as likely carcinogenic by the oral route.

The consequence for measurement is decisive: a total-chromium figure combines a benign nutrient and a carcinogen, and cannot be mapped to risk without speciation. A rationale that read total chromium as if it were hexavalent would overstate the hazard; one that ignored a credible hexavalent pathway would

understate it. The full agency record is on [the chromium analyte reference](#).

Who the exposure reaches

Because most dietary chromium is the trivalent form, the general eater is not carrying a meaningful hexavalent load from ordinary food. The population that matters is defined by pathway rather than by age: where a credible route introduces or preserves hexavalent chromium — certain contaminated drinking water used in preparation, specific oxidising processing or contact conditions, or leaching from some materials — the carcinogenic form can reach the plate. The discipline is therefore to identify those pathways rather than to apply a blanket chromium limit that would mostly be measuring a nutrient.

Where chromium shows up in food

Occurrence data for food are almost always reported as total chromium, and in most matrices that total is dominated by the trivalent form. Hexavalent chromium is favoured by oxidising conditions and specific sources: it is a known drinking-water contaminant in some regions, and it can arise from certain contact materials and processing. Stainless steel cookware and utensils contribute chromium by leaching, mostly as the trivalent form. The reporting caveat is the recurring theme — the number on a certificate must state which species it represents.

The per-category occurrence figures and the derivation behind each limit are on the [standards register](#); the complete occurrence corpus, reported as total chromium with its speciation caveats, is on [the Heavy Metal Index](#)^[7].

Why a certification limit is warranted

The certification value of chromium is precision, not blanket coverage: a limit is worth setting where a credible hexavalent pathway exists, and worth withholding where the evidence says the chromium present is the benign trivalent form. Applying a firm number indiscriminately would either chase a nutrient or, worse, imply a false precision about a species that was never measured.

HMTc treats hexavalent chromium as a claim analyte carried on a trigger: total chromium is measured, and a hexavalent determination is applied where a credible pathway makes it material, adopting the strictest existing government maximum level where one exists. A regulatory hard-stop blocks certification of any product over an applicable legal limit. This is the same speciation discipline the program applies to [arsenic](#) and [mercury](#) — measure the total, act on the toxic fraction. How the limit is derived is set out under [how limits are derived](#).

Findings that bear on Chromium

Program analyses that trace how chromium enters specific foods. Each covers a finding from the independent Heavy Metal Index and applies it to the certification question; the underlying occurrence record is on the Index.

Metal leaching from cookware and utensils

Stainless steel contributes chromium by leaching, mostly as the trivalent form.

Multi-metal bioaccumulation in tea

The tea plant takes up chromium along with several other metals.

Wastewater-irrigated crops carry multiple metals

Industrial wastewater can introduce hexavalent chromium into the crop pathway.

Frequently asked questions

▼ Is chromium in food dangerous?

It depends on the form. Trivalent chromium, which dominates in most foods, is of low toxicity and has been treated as an essential trace element. Hexavalent chromium is a different substance — an IARC Group 1 carcinogen assessed by the US EPA as likely carcinogenic by the oral route. The risk is tied to the hexavalent form, not to total chromium.

▼ What is the difference between trivalent and hexavalent chromium?

Trivalent chromium, Cr(III), is a low-toxicity form long regarded as an essential nutrient, with a tolerable intake far above ordinary dietary exposure. Hexavalent chromium, Cr(VI), is a carcinogen favoured by oxidising conditions. A total-chromium measurement combines both and cannot be mapped to risk without speciation.

▼ Why does HMTc limit chromium only on a trigger?

Because most dietary chromium is the benign trivalent form. Applying a blanket chromium limit would mostly measure a nutrient. HMTc measures total chromium and applies a hexavalent determination where a credible pathway — such as contaminated water or specific processing — makes the carcinogenic form material.

▼ Where does hexavalent chromium in food come from?

It is favoured by oxidising conditions and specific sources: it is a known drinking-water contaminant in some regions and can arise from certain contact materials and processing. Stainless steel cookware contributes chromium by leaching, but mostly as the trivalent form.

▼ How does HMTc set its chromium limit?

HMTc treats hexavalent chromium as a claim analyte carried on a trigger: total chromium is measured, and a hexavalent determination is applied where a credible pathway makes it material, adopting the strictest existing government maximum level where one exists. A regulatory hard-stop blocks any product over a legal limit.

Evidence and sources

This page synthesises three surfaces that carry the underlying evidence, and links to them rather than re-hosting them:

The government and expert-body assessments, agency by agency, with the toxicological reference points — the Chromium analyte reference	REFERENCE
The certification limits in force, and the Method v2.0 derivation behind each — the HMTc standards register	STANDARD
The complete peer-reviewed and regulatory literature and the occurrence corpus — Chromium on the Heavy Metal Index [↗]	INDEX · ONE-WAY

The Heavy Metal Index is an independent literature reference; this certification site cites it one way and applies its evidence to the certification question. The Index never cites back — that is what keeps it a disinterested source.

Cite this page

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