

# Factsheet Heavy Metals



## HEAVY METALS

Heavy metals are naturally occurring elements found throughout the earth's crust. However, human activities such as mining, industrial production and use, and domestic and agricultural use of metals and metal-containing compounds have caused heavy metals to distribute throughout the environment in the air, water, and land. Heavy metals are of public health significance as most are classified as human carcinogens and have the potential to cause multiple organ damage. The toxicity of heavy metals depends on several factors including the dosage, route of exposure, chemical form, and the age, gender, genetics, and nutritional status of the exposed individual. Exposure to heavy metals most often occurs through drinking contaminated water, eating contaminated food, using contaminated water in food preparation and irrigation of food crops, industrial processes, or smoking tobacco.

- **Arsenic** – Arsenic is used as an alloying agent and in the processing of glass, pigments, textiles, paper, metal adhesives, wood preservatives and ammunition. Historically, and to a limited extent today, arsenic is used in pesticides. In certain geographical areas, there may be high levels of arsenic present in the soil where it was once used as a pesticide or in the groundwater because of leaching. Arsenic and its compounds are classified as Group 1 carcinogenic agents (carcinogenic to humans) by the International Agency for Research on Cancer.
- **Cadmium** – Cadmium is used in the production of batteries, paint pigments, coatings and plating, stabilizers, and alloys. Cadmium sulphide is used as a pigment in plastics, ceramics, glasses, enamels, etc. Cadmium salts are used as stabilizers in PVC plastics and corrosion-resistant coatings for electronics, steel, and aluminium. Cadmium compounds are classified as Group 1 carcinogenic agents (carcinogenic to humans) by the International Agency for Research on Cancer.
- **Cobalt** – Cobalt is used in the production of corrosion-resistant metal alloys, as a binding agent in cutting and drilling tools, and as a component in batteries, pigments, electronics, and medicine. Cobalt compounds are classified as Group 2B carcinogenic agents (possibly carcinogenic to humans) by the International Agency for Research on Cancer.
- **Copper** – Copper is mainly used in construction and the manufacturing of electrical equipment and industrial machinery. Copper sulphate is a permitted food additive in wine as a fining agent. It can be added in such quantity that the content of copper in the finished product shall not exceed 1000 µg/L. Copper is also an essential element for biochemical and physiological functions in plants and animals. Copper is classified as a Group 3 carcinogenic agent (not classifiable as to its carcinogenicity to humans) by the International Agency for Research on Cancer.
- **Lead** – Lead is mainly used in the production of lead-acid batteries for automobiles. Lead solder used in food cans has been virtually eliminated. Elemental lead is classified as a Group 2B carcinogenic agent (possibly carcinogenic to humans), inorganic lead compounds are classified as Group 2A carcinogenic agents (probably carcinogenic to humans), and organic lead compounds are classified as Group 3 carcinogenic agents (not classifiable as to its carcinogenicity to humans) by the International Agency for Research on Cancer.

## HEAVY METAL LIMITS

The following are limits established by the NSLC for the heavy metals outlined above:

Heavy Metal	Beer	Cider	Ready to Drink	Spirits	Wine
Arsenic (µg/L)	Less than 100	Less than 100	Less than 100	Less than 100	Less than 100
Cadmium (µg/L)	Less than 20	Less than 20	Less than 20	Less than 20	Less than 20
Cobalt (µg/L)	Less than 20	Less than 20	Less than 20	Less than 20	Less than 20
Copper (µg/L)	Not Tested	Not Tested	Not Tested	Not Tested	Less than 1000
Lead (µg/L)	Less than 200	Less than 200	Less than 200	Less than 200	Less than 200

## SOURCE OF HEAVY METALS

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### Raw Materials

- Fruits, vegetables, grains, botanicals, etc. may take up heavy metals from soil and water through their roots. Heavy metals may also be deposited on raw materials from traffic fumes and other air pollution.
- Water used during the growing of crops may be contaminated with excess levels of heavy metals.
- Water used as an ingredient may be contaminated with excess levels of heavy metals.
- Although arsenic is generally no longer permitted in agricultural chemicals, it may still be present in the soil where it was previously used or have leached into groundwater increasing the content in the water supply.

### During Processing

- Excess levels of copper sulphate used as a fining agent in wine. One study has shown that other fining agents, such as diatomaceous earth can contain elevated amounts of heavy metals.
- Water used during processing such as for washing bottles and equipment may be contaminated with excess levels of heavy metals.
- Different equipment and containers used during processing or storage may contain different heavy metals. For example, copper stills for whisky and other sources such as fermentation drums, pipes, barrels, and casks.

## CONTROLLING HEAVY METAL CONTAMINATION

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- Consider the raw material supplier. Ensure raw materials are purchased from approved, trusted suppliers. Consult with the supplier for further information on the presence of heavy metals in their raw materials, soil, and water supplies. Consider which pesticides are used and if the soil and water sources have been assessed for potential hazards. Visit Perennia's [website](#) for more information on commodity-specific production.
- Ensure all food additives, such as copper sulphate, are used in accordance with the maximum levels of use as outlined in [Health Canada's List of Permitted Additives](#).
- Ensure water used as an ingredient and for processing and cleaning meets [Health Canada's Guidelines for Canadian Drinking Water Quality](#). Heavy metals in water can be removed by treatment processes such as reverse osmosis. Regular testing of all water

sources used throughout production and processing is recommended. Maximum allowable concentrations and sources are as follows:

- » **Arsenic** – 10µg/L or as low as reasonably achievable. Sources include naturally occurring (erosion and weathering of soils, minerals, ores), releases from mining, and industrial effluent.
- » **Cadmium** – 7µg/L. Sources include leaching from galvanized pipes and solders, and industrial and municipal waste.
- » **Cobalt** – Federal guidelines have not been established for cobalt in drinking water.
- » **Copper** – 2000µg/L. Sources include naturally occurring and leaching from copper piping.
- » **Lead** – 5µg/L or as low as reasonably achievable. Sources include leaching from plumbing (lead service lines, lead solder, and brass fittings).

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## **FOR MORE INFORMATION**

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If you have questions about the information found in this factsheet, please contact one of Perennia's specialist at:

### **Quality and Food Safety**

Phone: **902-896-0277**

Email: [foodsafety@perennia.ca](mailto:foodsafety@perennia.ca)

or

### **Food and Beverage Innovation Centre**

Phone: **902-896-8782**

Email: [innovation@perennia.ca](mailto:innovation@perennia.ca)

If you have questions regarding the established limits or product testing, please contact the NSLC at [product.testing@mynslc.com](mailto:product.testing@mynslc.com)