

1. Sources



Arsenic is a naturally occurring metalloid that is ubiquitous in the Earth's crust. It is present in various inorganic and organic forms. Arsenic and arsenic compounds are used intentionally in wood preservatives, pesticides, animal feed additives, pharmaceuticals, glass production, alloy manufacturing, electronics, and semiconductor manufacturing.

2. Why is it relevant?

Arsenic and many arsenic compounds are highly toxic to human health and many wildlife species. Once released to the environment, they persist and accumulate. Arsenic and arsenic compounds have been:



Identified by the World Health Organization (WHO) as one of the 10 chemicals of major public health concern, and by the Global Chemicals Outlook II as an issue with emerging evidence of risks to human health and the environment;



Classified as carcinogenic to humans. Long-term exposure to arsenic in drinking water is causally related to increased risks of cancer and skin changes such as hyperkeratosis and pigmentation changes;



Associated with diabetes, cardiovascular disease, and adverse effects on the nervous, respiratory, immune and endocrine systems;



Shown to cause acute and chronic effects at concentrations ranging from a few micrograms to milligrams per litre. Aquatic and terrestrial biota have shown a wide range of sensitivities to different arsenic compounds.

Releases of arsenic and arsenic compounds to the environment may occur from both natural sources and anthropogenic sources, with anthropogenic sources playing a major role in the global exposure.



Today, elevated contamination levels of arsenic and arsenic compounds in environmental media, wildlife and humans are a global phenomenon, resulting in major concern.

Anthropogenic sources include fossil fuel and coal combustion, mining and smelting of metals, and sources related to the production, use, disposal and recycling of the metals and their related products.



For the general population, the primary route of arsenic exposure is via ingestion of contaminated food and water.

Arsenic is released into the atmosphere where it is mainly adsorbed on particulate matter. These particles are transported long distance away from the source



Human exposure to arsenic may also occur from arsenic-related industry activities and arsenic-containing products.

In an occupational setting, inhalation of arsenic-containing particles is a primary route of exposure with possible significant ingestion and dermal exposure in particular situations.



3. Existing instruments and actions

Arsenic-containing wastes are listed as hazardous wastes under the Basel Convention. As a result, they are subject to the Convention's provisions.

Some countries and regions have adopted legally binding instruments to restrict the use or presence of arsenic in one or more product categories, including anti-fouling systems, treatment of industrial waters, wood preservatives, fertilizers, animal feeds, toys, packaging material, perfume and cosmetics, and/or foodstuffs.

Legally binding instruments are further complemented by guideline values related to exposure. In particular, the WHO has established a provisional guideline value for arsenic in drinking water (10 µg/L) but not in air or through dietary exposure. Guideline values for arsenic levels in different exposure media (e.g., in occupational settings) have also been established in a number of countries.

Voluntary actions have also been taken in some places, for example, the phase-out of arsenic-containing animal feeds by some major manufacturers. Similarly, multiple third-party standards and certification schemes have included arsenic in their listings.



4. Challenges and opportunities



Addressing global exposure to arsenic and arsenic compounds is both critical and complex due to ubiquitous exposures around the world and the resulting significant human-health impacts and thus associated societal costs.

It requires different strategies for a wide range of sources, including uncontrollable to unintentional releases.

Some sources may influence places far away from the original sources through long-range transport via air and global trade of arsenic-containing goods. Meanwhile, substantial releases have been accumulated over centuries and are continuously being made.

Current instruments and actions, while important for addressing several particular issues in some specific countries and regions, are far from comprehensive in addressing current widespread exposure to arsenic and arsenic compounds at the global level.

Further international concerted actions that cover all major sources are urgently needed to address arsenic in an integrated and holistic manner, possibly through legally binding instruments.

Similarities among arsenic, mercury, cadmium and lead, in terms of their sources and challenges, need to be taken into consideration for future actions, particularly at the international level, in order to capitalize on any possible synergies.

