



Heavy Metal Contaminants of Emerging Concern (CECs) in South African Water Resources



What are heavy metal CECs?

Heavy metals are inorganic chemical hazards that are mostly found in contaminated environments and are of emerging concern. These include metals such as Lead (Pb), Chromium (Cr), Arsenic (As), Zinc (Zn), Cadmium (Cd), Copper (Cu), Mercury (Hg) and Nickel (Ni). These heavy metals have relatively higher density and are toxic at low concentrations. They are persistent in the environment, and are absorbed by organisms at a faster rate.

Where do heavy metal CECs originate from?

Heavy metal natural sources include volcanic eruptions and weathering of metal-bearing rock scenarios. Their anthropogenic sources include various industrial, agricultural and mining activities through smelting, leaching and metal mining respectively. Such activities are their primary source of pollution.

What are the dangers associated with heavy metal CECs?

Heavy metals can get into a living organism's system through inhaling contaminated air or ingesting contaminated food and water or by being absorbed by the skin through dermal contact. If these metals accumulate in the body, they can cause heavy metal poisoning which can lead to severe health problems. Some signs and symptoms of metal poisoning may include nausea, vomiting, abdominal pain, diarrhoea and dehydration. Other fatal symptoms include heart abnormalities or difficulty in breathing. The heavy metals of major concern in humans are Cd, Pb, As and Hg.

How to prevent contamination of water resources with heavy metal CECs

Clean-up technologies to reduce heavy metal contamination include physical removal of the contaminated material through excavation, stabilization of the metals in the soil on site, as well as making use of growing plants that can absorb these metals to stop the spread of contamination. In addition, frequent heavy metal testing on sites to monitor heavy metal levels is necessary. Illegal dumping of waste should also be avoided.

How to remove heavy metal CECs from water

Various methods have been used to remove heavy metals from contaminated water. They include remediation through adsorption, membrane filtration, chemical precipitation, electrochemical, etc. Treatment after high level exposure consists of the use of various chelating agents via a IV needle which causes the heavy metal to bind with the drug and be excreted in the urine. For low level exposure, some foods such as garlic, spirulina, barley have been reported to assist in detoxification gradually within the digestive process.

