

# Possible Natural ways to eliminate Toxic Heavy Metals

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**Abstract:** Environmental pollution is one of the major problems of the world and it is increasing day by day due to urbanization and industrialization. Over the last few decades large scale usage of chemicals in various human activities have thrown very fast, particularly in a country like India which has to go for rapid industrialization in order to sustain over growing large problem of population. The current pattern of industrial activity alters the natural flow of materials and introduces novel chemicals into the environment. The released organic compounds and heavy metals are one of the key factors that exert negative influences on man and environment causing toxicity to plants and other forms of biotics and abiotics that are continually exposed to potentially toxic heavy metals. Of the various sources of pollutants industrial effluents containing heavy metals pose a threat to the ecosystem. These metals are present in the waste water of different industries such as metal cleaning, oil refineries, mining, electroplating, paper and pulp, paint, textile and tanneries. Water used in these industries creates a waste that has potential hazards for our environment because of the introduction of various contaminants such as heavy metals into soil and water. This article briefly describes the possible natural ways to eliminate toxic heavy metals thereby to attain good health.

## Introduction

The periodic table contains 105 elements, of which 80 are considered metals. Toxic effects in humans have been described for less than 30 of these. Heavy metals is a general collective term which applies to the group of metals and metalloids with an atomic density greater than 4 g/cm<sup>3</sup>. Heavy metals become toxic when they are not metabolized by the body and accumulate in the soft tissues. Heavy metals may enter the human body through food, water, air, or absorption through the skin when they come in contact with humans in agriculture and in manufacturing, pharmaceutical, industrial, or residential settings. Industrial exposure accounts for a common route of exposure for adults. Heavy metals<sup>1-4</sup> most often considered poisonous to humans are lead, mercury, arsenic and cadmium. Others such as copper, zinc, chromium, however, necessary to the body in small

quantities, can become toxic at higher doses. We find them mainly in industrial and municipal waste water (Cd, Cu, Pb, Zn), atmospheric precipitations, and waters resulting from the agricultural activity (Hg, Cu, Pb). Food, vegetables, cereals, fruits, fishes can be contaminated by accumulation of the toxic from the ground or from the water. Heavy metals are in our bodies whether we want them there or not. Mercury, lead, aluminum, cadmium and arsenic are all examples of the toxic brew that lurks in our bodies. Drinking water, dental fillings, breathing contaminated air and even eating food grown in contaminated soil are all entry methods for heavy metals. Heavy metals cause serious damage to human health<sup>5-11</sup>, especially when these toxins accumulate in the body over time.

**Lead:** Lead is a naturally occurring bluish-gray metal. Although it can be found in all parts of our environment most of it is in human activities including

manufacturing, mining, and burning fossil fuels. Lead is used in the production of batteries. Lead is probably the more common metal that is associated with heavy metal poisoning and toxicity. All the recent news about the presence of lead in kids' toys have helped create public awareness about the dangerous effects of lead. Every year, industry produces about 2.5 million tons of lead throughout the world. Most of this lead is used for batteries.

### Sources of Lead in the human diet

- High acid foods that are stored in containers that use ceramic to hold the food inside. This ceramic could contain glazes with lead. This lead can easily leech into high acid foods.
- Printing ink, gasoline, and fertilizer contain lead.
- Drinking water in houses with lead pipes – It is best to let water run for a while before drinking from the tap. This will ensure that any lead from the pipes that may have seeped into the drinking water is gotten rid of.
- Cigarette smoke can contain small traces of lead.

### Health effects of Lead exposure

- Long term exposure to Lead can affect the nervous system.
- Lead can lead to Anemia.
- Brain and kidney damage.
- Pregnant women may have miscarriages
- Affects sperm production in men.
- Lead affects the cardiovascular system, gastrointestinal track, renal system, nervous system and more.

**Arsenic:** Arsenic comes in two forms – Organic and Inorganic. Inorganic Arsenic is known to cause cancer and is a common carcinogen. Arsenic is the most common cause of acute heavy metal poisoning. Arsenic is released into the environment by the smelting process of copper, zinc, and lead, as well as by the manufacturing of chemicals and glasses. Arsenic gas is a common byproduct produced by the manufacturing of pesticides that contain arsenic. Arsenic is well known as a poison used in homicidal and suicidal attempts. Napoleon may have ultimately succumbed to its effects, albeit accidentally. His exposure is thought to have been due to a greenish pigment used in the decorative wallpaper hung in his room on St Helena during his exile.

### Sources of Arsenic

- Chicken can carry arsenic if the chicken were fed a diet that contained arsenic.

- Wines can be a source of arsenic if the grapes, that they were made from, were sprayed with pesticides containing inorganic arsenic.
- Sea food like fish sometime contain inorganic arsenic. Fishes can absorb arsenic directly into their bodies from the water they live in.

### Health Effects Of Arsenic

Arsenic exposure can have severe health effects. Here are some known problems associated with exposure to inorganic arsenic.

- Irritation of the intestines, lungs and stomach.
- Increased risk of lung cancer, lymphatic cancer, liver and skin cancer.
- Infertility.
- Negatively affects the skin, liver, nervous system, respiratory and gastrointestinal systems.
- Brain damage.
- Reduced productions of **RBC** (Red Blood Cells) & **WBC** (White Blood Cells).
- DNA damage.
- Exposure to high levels of Arsenic can lead to death.

**Mercury:** Unlike Arsenic, the organic form of mercury is more hazardous. The Environmental Protection Agency (EPA) has classified mercury chloride and methyl mercury as possible human carcinogens.

### Source of mercury in the human diet

- The main dietary source of mercury is from fish. Methyl mercury in the sea binds to the proteins in fish tissue.
- Mercury continues to be used in thermometers, thermostats, and dental amalgam fillings.
- Mining operations, chloralkali plants, and paper industries are significant producers of mercury.
- Inorganic mercury like mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.
- Organic mercury is found in antiseptics, fungicides, and industrial run-off.
- Commonly used brand name food products that use high fructose corn syrup like products made by Quaker and Smuckers.

### Health Effects Of Mercury

- Exposure to high level of Methyl mercury can lead to permanent brain and kidney damage.

- Can cause personality changes, deafness and muscle incoordination.
- Damage to stomach and intestines.

**Cadmium:** All rocks and soils, including mineral fertilizers and coal contain cadmium. Cadmium does not corrode easily and has many uses including: batteries, metal coatings, pigments and plastics. It is used in nickel-cadmium batteries, PVC plastics, and paint pigments. It can be found in soils because insecticides, fungicides, sludge, and commercial fertilizers that use cadmium are used in agriculture.

### Sources of Cadmium in the human diet

- Drinking water in some countries is known to have low concentrations of Cadmium.
- Internal organs like kidneys and livers of certain species of oysters, scallops and mussels.
- Crops that were grown on cadmium polluted soils and fertilized with rock phosphate derivatives and sewage sludge.
- Cigarettes can contain different amounts of cadmium depending upon the brand. It depends on where the cigarette manufacturers are sourcing their tobacco. Now is a good time to kick the nasty habit smoking.
- Fish.
- Food containers that are colored with cadmium pigment and can leech into the food that is stored in the container.

### Health effects of Cadmium exposure

- Severe irritation of the stomach leading to vomiting and diarrhea can sometime result in death.
- Kidney damage.
- Long term exposure to cadmium causes fragile bones and decreased bone strength.
- Cadmium is also a proven human carcinogen.

### Ridding the Body of Heavy Metals with Chelation Therapy

Chelation therapy, simply defined, is the process by which a molecule encircles and binds to the metal and removes it from tissue. Depending on the drug used, chelating agents specific to the heavy metal involved are given orally, intramuscularly, or intravenously. Once the bound metal leaves the tissue, it enters the bloodstream, is filtered from the blood in the kidneys, and then is eliminated in the urine.

Chelation is a chemical process that has applications in many areas, including medical treatment, environmental site rehabilitation, water

purification, and so forth. In the medical environment, chelation is used to treat cardiovascular disease, heavy metal toxicity, and to remove metals that accumulate in body tissues because of genetic disorders. Therapies to remove heavy metals from humans include chelation. Chelating agents are what is needed in order to detox the body of these heavy metals. These agents create a chemical bond with heavy metals in the body and makes them less active.

Ethylene Diamine Tetraacetic Acid (**EDTA**) is a chelating agent that was developed in Germany in the 1930's and was used to treat lead poisoning. In the 1950's, doctors observed that other medical problems such as arthritis and atherosclerosis greatly improved with EDTA chelation therapy. EDTA also helps to make bones stronger and reduces cholesterol by improving calcium and cholesterol metabolism. Although EDTA chelation is effective, many people are unaware of this process. EDTA chelation is effective at removing metals from the blood. This process is also a preventative therapy for heart attacks, strokes and it inhibits blood clotting.

An agent frequently used in chelation therapy is dimercaprol (also known as **BAL** or British Anti-Lewisite). Oral chelating agents used as alternatives to BAL are 2,3-dimercaptosuccinic acid (**DMSA**), dimercaptopropanesulfonate (**DMPS**) and D-penicillamine. D-penicillamine is an oral chelating agent used to treat heavy metal toxicity, particularly arsenic and mercury.

### Natural Chelation at Home

There are many things, individuals can use every day to help reduce heavy metals in their body and to help prevent many health ailments. **Cilantro** is very helpful in removing heavy metals. Cilantro aids in restoring the normal functions of body cells and this is found in the produce section of most grocery stores. It can be easily added to salads and soups.



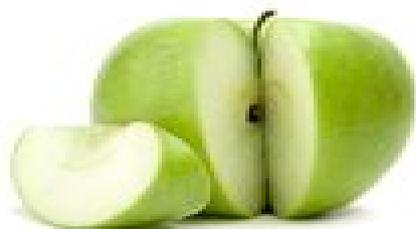
**Chlorella** is a chelator that is available in many health food stores in pill form. Chlorella has a three-layered cell wall that contains cellulose microfibrils, and this aids in heavy metal detox. Green algae contains chlorella and is very healthy.



**Garlic** contains sulphur which oxidizes mercury, cadmium and lead and makes them water-soluble. It is also a potent anti-microbial and anti-fungal making it effective against candida albicans and parasites. Fresh garlic can be added to most foods when cooking, taken in pill form and for those who are daring, garlic salt can replace standard table salt on a meal.



**Malic acid** is one of the most potent aluminum detoxifiers. It helps reduce aluminum toxicity of the brain and for that reason can be used to help avert Alzheimer's disease. Malic acid is a dicarboxylic acid that is found in many sour or tart-tasting foods and has been shown to increase fecal and urinary excretion of aluminum. Malic acid is found in unripe fruit, salt and vinegar potato chips as well as sour candies.



**Raw apple cider vinegar** is a weaker chelator than EDTA but it is excellent as a daily natural chelation regime to aid in removing heavy metals from the body.



**Pectin** is another excellent way to remove heavy metals from the body. Pectin is found in the rinds of many fruits and vegetables. The best sources of pectin are apples, bananas, grapes, okra, beets, carrots and the pith in all citrus fruits.



### Conclusions

Given the fact that these heavy metals enter our bodies through some very commonly used foods, we cannot completely avoid exposure to them. We can and should try our best to keep our exposure to a minimum. This is the ideal time to eat more fresh and organic food. Organic crops and vegetables are grown in healthy soil and no chemical fertilizers and pesticides are used. So there is very minimal chance of heavy metals entering the plants through the soil. No matter what we do in life, we will get heavy metals into us, so it's essential to incorporate as many natural ways as possible to eliminate these toxins in order to attain optimum health.

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