



Heavy Metal Impurities in Copper Products

By Melanie Turner, Sales & Marketing Manager, Melpat International Pty Ltd.

Hello... it's a great pleasure to have the opportunity to speak to you all today...

My name is Mel Turner, and I'm from Melpat International. Our company was established 15 years ago, and we have distributed Coppox® to the Australian market for the past 15 years.

Coppox® is a 500g active copper oxychloride, the formulation of which is of exceptionally high-quality. We are very grateful for this continued support from the low-chill stonefruit industry – and I would like to take this opportunity to thank you for this valued support.

One of the considerations when formulating Coppox® - back in the developmental days – was heavy metal impurities.

This issue has emerged again recently – the main products of focus are fertilisers, and copper products. We have recently been contacted by both the ABC and SHC (World Wide Web) networks – with a view to exploring the prevalence of HMI's in agricultural products.

By way of background: Heavy or toxic metals are trace metals that are at least five times denser than water. They have no function in the body and can be highly toxic.

Heavy metals are taken into the body via inhalation, ingestion, and skin absorption. If they enter and accumulate in body tissue faster than the body's detoxification pathways can dispose of them, a gradual buildup of these toxins will occur.

Environmental contamination and exposure to heavy metals such as mercury, cadmium and lead is a serious growing problem throughout the world.

Breathing heavy metal particles, even at levels well below those considered nontoxic, can have serious health effects. Virtually all aspects of animal and human immune system function are compromised by the inhalation of heavy metal particulates.

The heavy metals commonly found in agricultural products are:

✓ **Arsenic:**

- The Department of Health and Human Services (DHHS) has determined that arsenic is a known carcinogen.
- Arsenic damages many tissues including nerves, stomach and intestines, and skin.
- High levels of inorganic arsenic in food or water can be fatal – a high level being 60 parts of arsenic per million parts of food or water (60 ppm).

✓ **Lead:**

- Lead accounts for most of the cases of pediatric heavy metal poisoning (Roberts 1999).
- Target organs are the bones, brain, blood, kidneys, and thyroid gland (International Occupational Safety and Health Information Centre 1999; ASTDR ToxFAQs? for Lead).
- Reduced IQ, learning and behavioral difficulties have been reported in children even with low blood lead levels.
- Lead crosses the placental barrier, and reduced fetal birth weight, neonatal body weight and motor activity, premature birth & decreased mental ability of the child.

✓ **Mercury:**

- Inhalation is the most frequent cause of exposure to mercury.
- Target organs are the brain and kidneys (Roberts 1999; ASTDR ToxFAQs? for Mercury).

✓ **Cadmium:**

- Long term exposure to lower levels of cadmium in air, food, or water leads to a build up of cadmium in the kidneys and possible kidney disease. Other potential long term effects are lung damage and fragile bones, abdominal pain and choking.

✓ **Iron:**

- Iron is a heavy metal of concern, particularly because ingesting dietary iron supplements may acutely poison young children (e.g., as few as five to nine 30-mg iron tablets for a 30-lb child).
- Target organs are the liver, cardiovascular system, and kidneys (Roberts 1999).

✓ **Aluminium:**

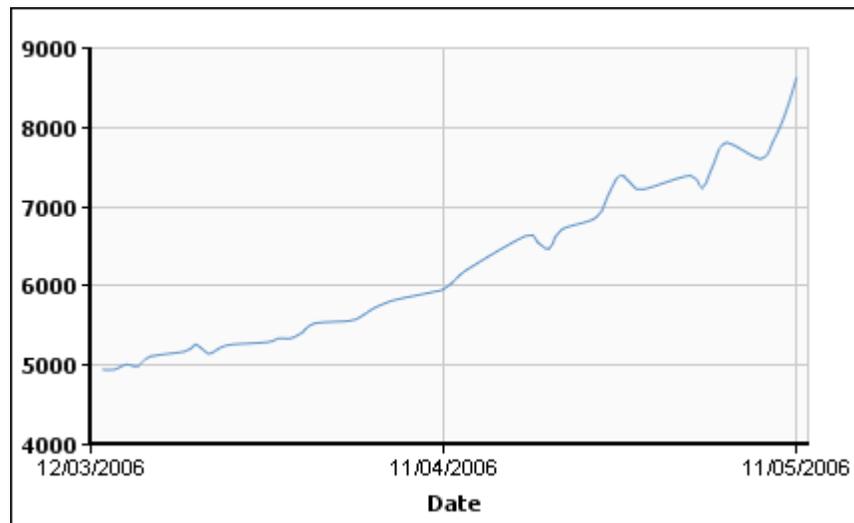
- Aluminum is not (technically) a heavy metal, but is a metal “of concern.”
- Target organs for aluminum are the central nervous system, kidney, and digestive system.
- Signs and symptoms include colic, dementia, esophagitis, gastroenteritis, kidney damage, and liver damage.
- Studies began to emerge about 20 years ago suggesting that aluminum might have a possible connection with developing Alzheimer's disease. Although there is no conclusive evidence for or against aluminum as a primary cause for Alzheimer's disease, most researchers agree that it is an important factor in the dementia component and most certainly deserves continuing research efforts. Therefore, at this time, reducing exposure to aluminum is a personal decision.
- Workers in the automobile manufacturing industry also have concerns about long-term exposure to aluminum (contained in metal working fluids) in the workplace and the

development of degenerative muscular conditions and cancer (Brown 1998; Bardin et al. 2000).

Heavy metals exist in copper-based products... they range from a few parts per million (ppm) to several thousand ppm.

With regards to copper products – heavy metal impurities originate either from poor-quality (cheap) copper scrap metal, or poorly “cleaned” mined copper ore.

With copper prices currently at record levels, these cheaper options are becoming more attractive to the price-driven supplier.



Up until very recently, the only standard the industry had with regards to heavy metal impurities is the World Health Organisation Standards for agricultural products. These maximum limits are outlined as followed:

- ✓ Arsenic: maximum allowable level = 5 ppm
- ✓ Lead: maximum allowable level = 250 ppm
- ✓ Mercury: maximum allowable level = 5 ppm
- ✓ Cadmium: maximum allowable level = 5 ppm

We have (over the years) tested numerous copper products, and have come up with some results which are of concern:

Product Sample	Lead Content	Cadmium Content	Arsenic Content
Product 1	7,427ppm	Less than 5ppm	Less than 5ppm
Product 2	6,090ppm	25.6ppm	Less than 5ppm
Product 3	720ppm	6.6ppm	Less than 5ppm
Product 4	172ppm	7ppm	9ppm

The results of such contamination on the final product have not been fully investigated yet, although this issue is attracting attention from major organisations such as the Australian Wine Research Institute.

The following is an article which I believe outlines the worst-case scenario if such un-checked contamination continues to occur:

Imported Chinese tea contaminated with lead, insecticides

Author: Yonhap Korea

Date: 30/09/2005

Words: 246

Source: YON

Publication: Yonhap Korea

SEOUL, Sept. 29 (Yonhap) -- A sizeable portion of Chinese tea for sale in South Korea is contaminated with lead and insecticides, a report by the Korea Consumer Protection Board said Thursday.

The state-run consumer protection agency said that about one in 10 products on the market contains lead residue in excess of government permitted levels.

The findings came after food safety tests were conducted on 30 imported Chinese tea products and 29 local brands that are sold at supermarkets and over the Internet.

Lead residue levels for Chinese Yongjung tea reached 117.22 parts per million (ppm), 23.4 times more than the permitted 5.0 ppm.

Cholgwaneum, another Chinese import, was found to contain insecticide residue that can cause convulsion and vomiting if consumed in large quantities.

Five other types of Chinese tea contained 0.05-0.47 ppm of the **heavy metal** Cadmium, a dangerous element that can cause kidney and bone problems if enough accumulates in the body.

The consumer board also said one local green tea product has been found to have lead residue level reaching 5.4ppm or 1.1 times what is permitted.

"Because lead consumed through food and beverages lasts a long time in the body, drinking tea contaminated with it can lead to people suffering prolonged side effects," an expert said.

The latest findings showed that of the 30 imported tea products, 18 or 60 percent had inaccurate labelling or no labels at all.

(THROUGH ASIA PULSE)

The export market is competitive. We are one of many suppliers to the international market, and Australia has a good, clean image. Such residues could well threaten us as a reputable supplier of quality produce.

Recently, Melpat have been lobbying the APVMA to tighten the controls, and I'm pleased to report that they have now called for submissions regarding the presence of heavy metal impurities in copper products. The aim is to establish legal (and therefore enforceable) guidelines and limits for these Heavy Metal Impurities.

The deadline for comment was 30 April, and we are yet to hear the outcome.

In summary: the issue of heavy metal impurities in any agricultural product is one that is become of more importance to the consumer.

This has now been recognised by our regulatory authority, and minimum levels of HMI's in agricultural products are being introduced.

In the meantime, our recommendation would be to always request information on the product you are using – a certificate of analysis is always available from the manufacturer upon request.

I can certainly assure you that all formulations of Coppox – both the Wettable powder (WP) and Wettable granule (WG) formulation – have minimal heavy metal impurities, and are manufactured to the highest quality standards.

I would be happy to discuss any of the above issues, and can be contacted as follows

Melanie Turner
Tel: 08 9414 9920
Mob: 0402 310 854
E-mail: melaniet@melpat.com.au