

What are *Heavy Metals*? *by Jeremy O'Brien*

HEAVY METALS DEFINED

As I began to research the information for this article, it quickly became apparent that there is some confusion as to what exactly the term *heavy metals* means. According to Wikipedia "a heavy metal is a member of an ill-defined subset of elements that exhibit metallic properties, which would mainly include transition metals, some metalloids, lanthanides, and actinides. Many different definitions have been proposed—some based on density, some on atomic number or atomic weight, and some on chemical properties or toxicity."

The term *heavy metal* has been called "meaningless and misleading" in a IUPAC technical report due to the contradictory definitions and its lack of a "coherent scientific basis".

Depending on context, *heavy metals* can include elements lighter than carbon and can exclude some of the heaviest metals. One source defines *heavy metal* as common transition metals, such as copper, lead, and zinc. Heavy metals are natural components of the Earth's crust. They cannot be degraded or destroyed. To a small extent, they enter our bodies via food, drinking water, and air. As trace elements, some heavy metals (e.g. copper, selenium, zinc) are essential to

maintain the metabolism of the human body. However, at higher concentrations they can lead to poisoning. Heavy-metal poisoning could result from drinking water contamination (eg. from lead pipes), or intake via the food chain (fruits and vegetables in our case).

WHY ARE THEY DANGEROUS?

Heavy metals are dangerous because they tend to bioaccumulate. This means that there is an increase in the concentration of a chemical in a biological organism over time, compared to the chemicals concentration in the environment. Compounds accumulate in living things any time they are taken up faster than they are broken down (metabolized) or excreted.

WHO REGULATES HEAVY METALS IN FERTILIZER?

The *Association of American Plant Food Control Officials (AAPFCO)* established the rules and standards in regards to heavy metals in fertilizer. According to the Uniform State Fertilizer Bill, fertilizers that contain guaranteed amounts of phosphates and/or micronutrients are adulterated when they contain metals in amounts greater than the levels of metals established in Table 1.

TABLE 1. MAXIMUM HEAVY-METAL LEVELS ALLOWED IN FERTILIZER

Metals	ppm per 1% P205	ppm per 1% Micro-nutrients
Arsenic	13	112
Cadmium	10	83
Cobalt	136	2228
Lead	61	463
Mercury	1	6
Molybdenum	42	300
Nickel	250	1,900
Selenium	26	180
Zinc	420	2,900

PRODUCT REGISTRATION

The State Departments of Agriculture of California, Oregon, Washington require this heavy-metal testing to be performed before product registration is granted. The results from these tests are made available to the public at the following web address: <http://www.aapfco.org/metals.htm>.

HEAVY-METAL LEVELS IN METALOSATE® PRODUCTS

The heavy-metal levels, if any, in the Metalosate® products are well below the levels established by AAPFCO. This is another reason that the Metalosate® products are so safe and beneficial to use in your farming operation. For more specific information regarding the crops specific to your area, please contact your local Albion Plant Nutrition representative. ☞