Extremely Low Heavy Metal Levels in PittMoss® Potting Soils

By: Charles L. Bethke pH.D.
Horticultural Soils & Nutrition Consulting
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TABLE OF CONTENTS

BACKGROUND

Concern over the heavy metal content of potting soils is reaching new heights, as the quantity of produce from crops grown in container medium is being consumed at greater rates than ever before. Recently, it has been noted that some crops tend to absorb and accumulate heavy metals at a greater rate than others. It is important that the vegetables, herbs, and medicines we consume remain low in heavy metals to avoid adverse health effects. When ingested or absorbed, heavy metals can produce distortions of normal bodily functions. Repeated and long-term exposure to many heavy metals can lead to physical and neurological degeneration and muscular problems. Disorders like autism, multiple sclerosis, muscular dystrophy, and Alzheimer's have often been correlated to excessive and repeated exposure and ingestion of heavy metals. For these reasons, it is imperative that crops be produced in growing media low in the critical heavy metal levels discussed below.

Extremely Low Heavy Metal Levels in PittMoss® Potting Soils

Table 1 presents the maximum tolerance levels established by a number of state, national, and international agencies. Arsenic, cadmium, cobalt, chromium, nickel, lead, selenium, and mercury are of primary concern for crop production. The limits for the described metals, as shown in the table below, are presented using international terms applying to manufactured or processed growing medium (compost/substrate). Each agency has established maximum levels suitable for use in production of food crops. The Organic Materials Review Institute (OMRI) limits are for organic production, and the Rodale Institute levels refer to vegetable production. The limits set by Washington State appear to be the most restrictive in the United States. The listed limits by the United States (EPA) are for municipal sludge that is intended for application to agricultural land. The Canadian levels are more restrictive than most US states, and in Europe, the most restrictive standards are in the Netherlands. An array of those limits is presented in Table 1.

Table 1: ESTABLISHED UPPER LIMITS FOR COMPOST BY AGENCY *

Heavy Metal	Symbol	OMRI Potting Soil Limits	Rodale Institute	Washington State	US Standards EPA CFR40/503 Sludge Rule	Canada	Netherlands	German for Growing Vegetables	USA Average in Field Soils
Arsenic	As	10	10	20	41	13	15	n/a	5.2
Cadmium	Cd	20	4	10	39	3	1	0.75	
Cobalt	Co	n/a*	n/a	n/a	n/a	34	n/a	n/a	0.2
Chromium	Cr	n/a	100	n/a	n/a	210	70	75	
Nickel	Ni	n/a	50	210	420	62	20	30	13
Lead	Pb	90	150	210	300	150	120	75	16
Selenium	Se	n/a	n/a	n/a	n/a	2	n/a	n/a	
Mercury	Hg	n/a	0.5	8	5	0.8	0.7	0.5	0.06

* (mg/kg - dry weight)
* (n/a = No Limit Established)

DATA COLLECTION AND ANALYSIS

The heavy metal levels for four PittMoss growing blends are presented in Table 2, with a detailed analyses performed by MicroMacro Analytical Laboratories of Athens, GA. The data is presented on a dry mass basis as parts per million (mg/kg). It is apparent that all four blends are extremely clean, consisting of some of the lowest heavy metals content available. Note that no mercury or cadmium could be detected at levels as low as 0.2 and 0.1 ppm. Little to no lead, arsenic, selenium, and cobalt could be detected in all four PittMoss blends, with chromium and nickel levels greatly below the established tolerance levels. With these very low heavy metal levels, PittMoss growers can be assured that their crops will be clean, safe, and healthy.

Table 2: PITTMOSS BLEND LAB RESULTS*

Heavy Metal	Symbol	Prime	Performance	Plentiful	Coco Complete
Arsenic	As	0.0	1.1	0.0	0.3
Cadmium	Cd	0.0	0.0	0.0	0.0
Cobalt	Co	0.0	0.6	0.6	0.0
Chromium	Cr	2.9	2.3	6.3	6.9
Nickel	Ni	10.6	9.8	16.7	6.9
Lead	Pb	0.5	0.1	0.0	0.0
Selenium	Se	0.0	0.0	0.9	0.0
Mercury	Hg	0.0	0.0	0.0	0.0

* (mg/kg - dry weight)

APPENDIX

PITTMOSS® GENERAL DESCRIPTION

PittMoss® is comprised of formatted ligno-cellulosic fibers. The fibers are formatted into particles through a patented process that granulates the fibers to maximize internal pore spaces within an individual particle.The particles are slightly ridged, spherical to semi-spherical,and occasionally flattened or elongated.The material is hydrophilic. The total aggregate serves to hold and absorb air, water,and other fluids. It has primary applications in agriculture,horticulture,and where a naturally carbon rich substrate is desirable

RAW MATERIALS

PittMoss® is made of cellulose, hemicellulose, lignin, and proprietary natural additives.It is primarily derived from recycled newspaper and/orother cellulose basedmaterials.