

Bioavailability 101: Arsenic in Soil

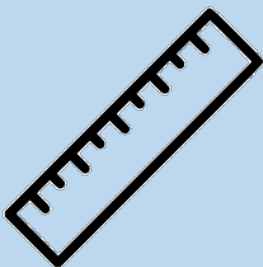
Developed by the EPA Superfund Technical Review Workgroup

What is soil arsenic bioavailability?



Arsenic poisoning can happen when too much arsenic gets into the blood. This process of arsenic moving from the environment into the blood is called absorption. Most people get arsenic from different sources, like drinking water, food, dust, and air. In places where the soil has high levels of arsenic, the soil can get on hands and faces and be swallowed, which is a big risk for children. However, not all of the arsenic in the soil is absorbed into the body. The part of arsenic in the soil that does get absorbed into the body is called the bioavailable part. The bioavailability is the percentage of arsenic that gets absorbed. If the bioavailability is 0%, no arsenic is absorbed. If the bioavailability is 100%, all the arsenic is absorbed. Scientists can measure how much arsenic is bioavailable in soil using lab tests.

Why measure soil arsenic bioavailability?



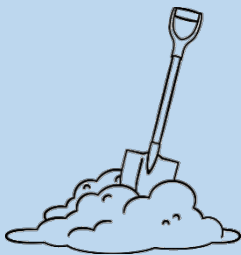
Measuring how much arsenic is bioavailable in soil can help EPA decide if action needs to be taken to prevent arsenic poisoning. The decision to act is usually based on comparing the amount of arsenic in the soil to an action level. This is the amount of arsenic in the soil that could cause harmful effects if too much is absorbed. If the bioavailability is low, the action level is higher because less arsenic is absorbed. If the bioavailability is high, the action level is lower because more arsenic is absorbed.

For example, if the action level for arsenic with 30% bioavailability is 20 parts per million (ppm), then for arsenic with 15% bioavailability, the action level would be 40 ppm.

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How is soil arsenic bioavailability measured?



Scientists measure bioavailability compared to a standard form of arsenic that is easy to dissolve in water and is highly bioavailable. This is called relative bioavailability. This can be measured using lab animals or test tubes. Tests with test tubes are preferred because they are faster and cheaper, so more soil samples can be tested in different places. Testing more soil helps scientists see if arsenic bioavailability changes in different areas, especially if the soil has arsenic from different sources.

The EPA uses a special test called the IVBA test (Method 1340) to measure arsenic bioavailability in soil, and they also have an animal method for testing.

Where can I obtain more information on soil arsenic bioavailability?



Additional information and assistance on soil arsenic bioavailability can be found on the EPA Office of Superfund Remediation and Technology Innovation bioavailability webpages:

<https://www.epa.gov/superfund/soil-bioavailability-superfund-sites>, or by emailing the EPA Superfund Technical Review Workgroup Bioavailability Committee hotline (bahelp@epa.gov).