

BayCEER Kolloquium

Lectures in Ecology and
Environmental Research

Summer 2024



UNIVERSITÄT
BAYREUTH

Thursday

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12:15 in H6, GEO

Prof. Dr.

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Dimethylated thioarsenates: potentially dangerous hidden arsenic species in rice and rice products

Arsenic (As) is a ubiquitously present environmental pollutant that negatively affects the health of plants, animals, and humans. It is one of ten “chemicals of major public health concern” according to the WHO. Globally around 200 million people are threatened by exposure to potentially toxic levels of As. Both natural and anthropogenic processes release As into groundwater and soils. Chronic human exposure occurs predominantly via drinking water and the consumption of rice (*Oryza sativa*), which is far more likely than other crops to accumulate As in edible organs.

Several forms of As exist in soils depending mostly on redox conditions and microbial activities. Recently we discovered that among the As species in rice paddy soil pore water are inorganic and organic thioarsenates. They had escaped detection by routine analytical methods. Thioarsenates are taken up by plants, are mobile within plants and can accumulate even in grains. One As species in particular, dimethylmonothioarsenate, raises serious food safety concerns because of its known toxicity to human and other mammalian cells. The talk will present the pathways of thioarsenates from the soil into rice seeds, covering geochemistry as well as molecular plant physiology. Also, we will discuss the implications of our findings for food safety and the regulation of tolerable As levels in rice.

