

## **Abstract**

Arsenic (As) exposure is a global public health concern affecting millions worldwide and stems from drinking water and foods. Here, we assessed how agronomic and postharvest techniques influence As concentrations in rice bran, and calculated health risks from consumption of three rice bran-As concentration scenarios. Total As and speciation were quantified in 53 rice bran samples. Inorganic As (iAs) concentrations in rice bran were used to calculate Target Hazard Quotient (THQ) and Lifetime Cancer Risk (LCR) across the lifespan. Mean iAs was highest in Thailand rice bran samples (0.619 mg/kg ) and lowest in Guatemala (0.017 mg/kg ) rice bran samples. When comparing monosodium-methanearsonate (MSMA) treated and Native-soil counterpart under the irrigation technique Alternate Wetting and Drying (AWD) management, the MSMA treatment had significantly higher total As (  $p= 0.022$ ), and iAs (  $p= 0.016$ ). No significant differences in As concentrations were found between conventional and organic production, nor between fermented and non-fermented rice bran. Health risk assessment calculations for the highest iAs-rice bran scenario for adults, children and infants exceeded THQ and LCR thresholds, and LCR was above threshold for median iAs-rice bran. This investigation provides novel information with food safety relevance as an emerging food ingredient.

*Key Words:* Arsenic, inorganic arsenic, speciation, health risk assessment.