

Arsenic Toxicity: Chinese Mystery Snail (CMS) Bioaccumulation and Periphyton Biotransformation Genes.

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Arsenic (As) is a metalloid contaminant that disrupts many physiological pathways resulting in neurotoxic, cytotoxic, and mutagenic effects. The south-central Puget Sound has been contaminated with As from 100 years of ASARCO smelter activity and eventual demolition of the facility in Ruston, WA. The Chinese Mystery snail (CMS) is a primary consumer within lake ecosystems that feeds directly on periphyton, a polymicrobial biofilm, that hyperaccumulates As up to 600 ppm. This study aimed to determine whether or not As bioaccumulates differently in various tissue regions of CMS collected from Lake Killarney (20 ppb As in water) and Trout Lake (<1 ppb As in water). To test this, head/foot, mantle, gut, and remaining viscera from male CMS from Lake Killarney and Trout Lake were prepared and analyzed using inductively coupled plasma-mass spectrometry (ICP-MS). Significantly higher As concentrations were observed in the CMS gut from Lake Killarney. The next part of this study aimed to identify the presence of arsenic biotransformation genes (*arrA*, *aioA*, *arsC*, and *arsM*) in periphyton collected from Trout Lake, Steel Lake (1 ppb As in water), and Lake Killarney using PCR and gel electrophoresis. Results indicated the presence of *arsM* gene in periphyton from all three lakes, which encodes for arsenite methylation. This guides future research to examine other arsenic biotransformation genes and their expression within the CMS gut microbiome. We ultimately seek to understand how host-gut microbiome interactions influence the biotransformation and metabolism of arsenic in CMS.