

# Effectiveness of the Preservation Protocol within EPA Method 200.8 for Soluble and Particulate Lead Recovery in Drinking Water

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Lead (Pb) is a toxic trace metal that is regulated in drinking water. The U.S. Environmental Protection Agency (USEPA) issued the Lead and Copper Rule (LCR), which defines the action level (AL) for lead at the tap as 0.015 mg/L. Researchers and drinking water utilities typically employ EPA Method 200.8 to quantify lead and other trace metals in drinking water and wastewaters, using Inductively Coupled Plasma-Mass Spectrometry (ICP-MS). EPA method 200.8 instructs how to properly preserve and analyze a water sample after collection. Recently, researchers have raised concerns about the preservation protocol, and its effectiveness in recovering actual concentrations of particulate lead in water samples. Specific concerns with the acidification protocol include bottle types, and occurrence of lead particulates in water samples. To investigate these concerns, a two-phase study was performed. Phase One investigated the recovery of dissolved lead in water samples by using the standard preservation protocol of the method and varying the water source, bottle type, and preservation pH. Phase Two investigated the recovery of three lead particulates in water samples, by comparing the standard preservation protocol of the method to the more rigorous acid digestion of the method and to an alternative pre-filtration process. Results of Phase One indicated large losses of soluble lead onto glass bottles in unpreserved samples, while very little loss was observed in unpreserved samples collected in HDPE bottles. Proper eventual acid preservation rapidly recovered most of the "lost" lead, in water samples collected in both bottle types. The particulate findings of Phase Two indicated that the method's acid digestion procedure was effective, but difficult to consistently implement with some lead particulates. These findings aid in determining the effectiveness of the EPA sample preservation protocol detailed in Method 200.8.



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