ADVANCES IN MERCURY SPECIATION METHODOLOGY

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ABSTRACT

Information on mercury species is of utmost importance to understanding the present and future toxicity, solubility and mobility of mercury in any given ecosystem. While there is increasing awareness in the scientific community of the need to investigate actual mercury species as opposed to just total mercury, appropriate analytical methods and technologies have lagged behind. Many analytical methods for mercury speciation were developed in the late 1980s and early 1990s, but had limitations including reliance on complex knowledge and restraints from the technology of that era.

Currently methods are being developed or improved for accurate measurement of a variety of mercury species in the environment. Volatile mercury species, including elemental and dimethyl mercury, can now readily be measured in water samples at sub part per trillion levels. Method development is underway for the measurement of these volatile mercury species in sediment and soil samples and progress will be discussed. Robust methods for the analysis of methyl mercury in a variety of matrices have existed for some time, but recent improvements in these methods has improved the quality, and lessened the time and expense for these tests. New method development on analysis for more exotic mercury species including ethyl mercury and phenyl mercury compounds shall also be presented.

KEYWORDS

Mercury, speciation, analytical methods, methyl mercury, mercury species, trace metals.

INTRODUCTION

Fifteen years ago most environmental scientists had little idea what metals speciation meant, let alone the importance of measuring metals species. Today, however, there is great awareness of the importance of measuring various metal species to assess toxicity, solubility and mobility within the environment. Understanding the concentrations of differing valence states of metals and various compounds in which particular metals exist, has led to better scientific decision making. Of particular concern and interest is mercury speciation. As a persistent bioaccumulative toxin (PBT), methyl mercury is of prime importance, but the complex biogeochemical cycle of mercury makes the ability to speciate other forms of mercury very important as well.