

WER & Biotic Ligand Model Testing

EnviroScience biologists have extensive experience with culturing and examining many different species of freshwater, saltwater, and sediment organisms. Our toxicologists can customize study plans to meet numerous requirements for specialty projects meeting the needs of each individual client. Contact our Bioassay Laboratory about developing a special toxicity test for you.

Water Effect Ratio

EnviroScience's Bioassay Laboratory performs Water Effect Ratio (WER) evaluations. Water Effect Ratios may be used to derive site-specific limits for certain metals from national and state aquatic life criteria that were originally developed using laboratory toxicity data.

The USEPA established federal guidelines to derive site-specific criteria for certain metals including arsenic, cadmium, chromium(III), chromium(VI), copper, lead, mercury, nickel, selenium, silver, and zinc. A number of physical and chemical characteristics of site water and a metal can affect the toxicity of that metal to aquatic organisms in particular surface water. When deriving site-specific aquatic life criteria for a metal, the difference between the toxicity of the metal in laboratory water and site water may be adjusted with a site water effect ratio.

Toxicity differences of site water and synthetic laboratory water are compared in the laboratory, and evaluated for differential lethal concentrations. The toxicity endpoints from these two tests are used to calculate the WER, which is then multiplied by the national or state aquatic life criterion to calculate the site-specific limit.

Biotic Ligand Model

The Biotic Ligand Model (BLM) is a tool that predicts the toxicity of metals in specific environments. It is currently accepted for usage in determining environmentally protective levels of copper by the USEPA and several state agencies. The model provides an estimate of the relative toxicity of copper based on the specific site water chemistry. Models are currently in development for other metals such as aluminum, nickel, and zinc.

The traditional hardness-based criteria generate a range of protective values, but do not consider some of the most important factors that affect metal bioavailability. The BLM goes further and calculates metal toxicity to aquatic organisms as a function of simultaneous concentrations of additional chemical parameters in the water. For example, other ions can either complex with copper and render it biologically unavailable, or they may compete with copper for binding sites at the point of entry into a vulnerable organism. The addition of these ions may reduce the overall toxicity of the copper in the water.

Our Services

EnviroScience provides high quality environmental services to hundreds of satisfied municipal, industrial, and private sector clients throughout the Midwest and Northeast. We have clients in Ohio, Pennsylvania, West Virginia, Illinois, New York, Michigan, Indiana, Tennessee, and many other states. Our company has an excellent reputation with regulatory agencies on both the state and federal level. Our confidence in our methodology and the professionalism of our experienced biologists allows us to guarantee that our procedures and reported data will meet all acceptance criteria.

In Action





Need help with your project?

Our experts are here to discuss your needs and how we can help you move your project forward. Fill out the form below for more information on our services or to request a quote and we'll get back to you within 24 hours. If you need a response within an hour or less, please call us at 888-866-8540.

Your Name (required)

Your Email (required)

Subject

Your Message