



TECHNICAL NOTE

Method Detection Limits and Your Work

What does a '<' result mean?

When you receive your report, it may include one or more results that have a '<' (less than) in front of them, for example, 'Lead' reported as < 0.01 mg/kg.

This means the result for the lead is less than the laboratory's detection limit; 0.01 mg/kg in the example given. The detection limit is the concentration below which the laboratory cannot accurately analyse the lead, or say whether it is present or not.

Why can't the laboratory say that there is nothing in my sample?

It is actually impossible to definitely say something is not present at all. There are limitations to how low any testing method can detect and measure a particular analyte.

As an example, consider your kitchen scales. A good set of scales will measure from a few kilograms down to 1 gram. When weighing 50 grams of sugar, the scales are fine for the purpose. You will have weighed somewhere between 49.5 and 50.5 grams, when the scales are showing 50. When weighing 1 gram of sugar however, you will have somewhere between 0.5 and 1.5 grams on the pan. This illustrates that as you head towards the limit of the scales (or any instrument), the measurement becomes more uncertain.

Now consider if you put 0.2 grams of sugar on the scales. The reading will be 0. In this case, you know something is there as you can clearly see the sugar on the pan. The scales however can't measure that low. In other words, you are trying to measure below the lowest limit (i.e. the detection limit) of the scales. If you want to accurately weigh 0.2g, you will need a different set of scales.

In the laboratory, we measure things at levels far below this example, and we don't have a visual check. We have to trust our methods and instrumentation to tell us whether something is there or not and if present, at what level.

What Detection Limit is Suitable for my Work?

When testing a sample, there is often a need for a requested analyte to either meet a certain minimum level, or to assess the result against a specified limit.

Choosing the right method for the purpose is important as it ensures that the most appropriate results are obtained at the best price. Typically, the lower the detection limit, the more difficult, complex and therefore expensive the testing is. When testing against a regulatory or critical limit, the detection limit needs to be sufficiently lower than this value to ensure that a meaningful and valid result can be obtained; ideally ten-fold below the regulatory limit..

The laboratory provides testing at a variety of levels for many tests (e.g. testing at screen, trace, or ultra-trace levels), and also provides reporting to regulatory or critical limits. For this reason, it is important to talk to the laboratory, and inform us of the background to your testing requirements so that we can choose the most appropriate test for your samples.

Our Aim is to make your Job Easier

If you have any further questions about detection limits, please don't hesitate to contact the laboratory. We are eager to understand your testing needs and ensure that they are met consistently at all times, so that your decision-making is easier and more meaningful. We hope you are satisfied with the additional information available to you and find it useful when interpreting your results.

Contact Details

For further information contact one of our Client Services Managers:

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