

## Sample Submission FAQs:

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### 1. What volume is needed for analysis?

The volume needed depends on the type of analysis required. Single-element ICP-OES and ICP-MS require a minimum of 3 mL per analysis. We request a minimum of 5 mL for duplicate analysis. Multi-element ICP-OES and ICP-MS require a minimum of 4 mL; please submit a minimum of 6 mL for replicate measurement.

### 2. What type of sample matrix do you accept?

For accurate quantitative analysis, the sample matrix must match the standard matrix—generally, this means 2% nitric acid. Samples should be submitted in dilute acid, be free of particulates, and have a low (< 0.1%) total dissolved solid (e.g. salts) content. Solutions containing particulates will not be analyzed. Samples requiring filtration or centrifugation will be assessed an additional fee. Please do not submit samples in concentrated acid, as we will not accept these. Additionally, we are currently not equipped to analyze samples in hydrofluoric acid and will not accept samples in HF. Please identify contents of sample matrix (e.g. type of acid and concentration, water) in the Sample Submission Form.

### 3. What is the difference between ICP-OES and ICP-MS?

Please check out our ICP-OES Background and ICP-MS Background pages. There you will find a great deal of useful information on theory and operation.

#### 4. Which instrument should I request for analysis?

Selecting the best technique requires consideration of detection limits, analytical working range, interferences, and cost. ICP-OES operates with higher detection limits than ICP-MS. For the majority of elements, either instrument may be used. In these cases, selecting the appropriate instrument depends primarily on the analyte concentration and the presence of interferences. While ICP-MS can identify concentrations in the sub-ppb to ppb range, ICP-OES is ideal for the sub-ppm to ppm range. Therefore instrument and technique selection requires some insight into the approximate concentration range. Another important consideration when selecting the appropriate analytical method is that of interferences. Please read our ICP-OES Background and ICP-MS Background sections for information on types of interferences in these techniques. A literature search can help you identify how previous researchers have analyzed similar samples and how to best deal with the shortcomings of each analytical method.

#### 5. How do I prepare my samples? Can I submit unprepared samples?

The best method for sample preparation is dependent on the sample matrix and your research goals. Please see our Sample Preparation Examples for more information. If you prepare your own samples, you will also need to submit a blank sample that has been processed identically to your other samples. Samples that are not digested or prepared accordingly will not provide accurate data. We can prepare samples, if requested, for an additional fee (please see our Price Sheet for more information).

#### 6. My samples precipitate out of solution if acidified, what should I do?

If your sample precipitates out of solution, the sample has not been thoroughly digested. The sample should be digested before analysis. If the sample is not digested, you may not get accurate quantitative results. This is particularly true for protein solutions that are unstable at various pH levels. Please see our Sample Preparation Examples section and Acid Matrices section for more information.

#### 7. How much will it cost to analyze my samples?

Please see our Price Chart for more information.

#### 8. Which elements are identified by ICP-MS or ICP-OES?

Please see our Instrumentation Periodic Tables section for more information.

9. How much protein should I submit for ICP-MS or ICP-OES analysis?

This is a tricky question and depends on the analyte of interest and the interaction between the analyte and the protein. If you know the stoichiometry between the analyte and the protein—based on previous studies or a literature search—you can calculate the concentration of protein solution required for either ICP-OES or ICP-MS analysis, depending on which technique is best suited to answer your research question (please see #4 above). If you do not have any information on the stoichiometry, it's best to submit various concentrations.

10. Can ICP-MS or ICP-OES identify the oxidation state of an element?

Unfortunately neither instrument will provide information on the oxidation state of the element.