What to Verify on Peptide Certificates of Analysis

Research peptides are used in experiments where consistency and purity directly affect results. A certificate of analysis (CoA) is the document that tells you what is actually in the vial. But not all CoAs are equal, and knowing what to check can save you from wasted time or misleading data.

A good CoA should report more than just a single purity percentage. It documents the methods used, the results obtained, and the conditions under which the batch was tested. For anyone working with custom or commercial peptides, understanding these details is essential for trust in the product.

Identity Confirmation

The first thing to verify is that the peptide is what it claims to be. Identity confirmation typically relies on mass spectrometry. The CoA should report the observed molecular weight and show that it matches the theoretical value within an acceptable tolerance. A mismatch here means the wrong peptide was synthesized or the sequence was incorrect.

Look for the mass spectrum itself or at least a summary of the major peaks. If the CoA only states "passed" without data, there is no way to judge the quality of the confirmation. Some suppliers provide the actual spectrum image, which allows you to see if there are unexpected peaks that could indicate impurities or degradation.

Purity by HPLC

High-performance liquid chromatography (HPLC) is the standard method for determining peptide purity. The CoA should list the purity as a percentage, usually at 220 nm or 214 nm. A typical research-grade peptide might be offered at 95% or 98% purity, but the exact number matters less than the conditions under which it was measured.



Check the HPLC trace for any signs of fronting or tailing peaks, which can indicate column overload or poor separation. The CoA should also report the column type, mobile phase, and gradient used. Without these details, you cannot compare results between batches or suppliers. A clean, symmetrical main peak with small baseline impurities is a good sign.

It is also worth noting whether the purity is reported as area percent or weight percent. Area percent is common but can be misleading if the peptide absorbs differently than its impurities. Weight percent requires a reference standard, which is less common for custom sequences.

Batch Testing and Traceability

Every CoA should be tied to a specific batch number. This batch number links the analytical data back to the synthesis and purification records. If the CoA lacks a batch number, there is no way to connect the document to the actual material in your hands.

Traceability also includes the date of analysis and the name of the analyst or the laboratory that performed the testing. Some suppliers use in-house labs, while others send samples to independent third-party testing services. Third-party testing adds an extra layer of objectivity, especially for purity and identity.

When you receive a peptide vial, check that the batch number on the CoA matches the lot number on the label. A mismatch could mean the wrong document was included, or worse, that the product was swapped.

Solvent and Counterion Information

Peptides are often supplied as lyophilized powders that contain residual solvents, salts, or counterions. The CoA should report the net peptide content, not just the gross weight. For example, a peptide may contain acetate or trifluoroacetate counterions from the purification process. If the CoA only states the total weight, you may be using less peptide than you think.

Look for a section that lists the residual solvent content, such as water or acetonitrile, and the counterion percentage. Some CoAs provide a re-calculated purity that accounts for these factors. This is particularly important when the peptide is used in quantitative assays where molar concentration matters.



If the CoA does not mention counterions or residual solvents, consider contacting the supplier for clarification. Many reputable suppliers, including those like spbpeptides.bio, include this data as part of their standard quality control documentation.

Storage and Handling Recommendations

A good CoA will include storage conditions that preserve peptide stability. Typical recommendations are storage at -20 °C or -80 °C, away from light and moisture. While this may seem basic, the CoA can also note whether the peptide is susceptible to oxidation or deamidation. If the CoA mentions these risks, you know the supplier has tested for stability under stress conditions.

Also check whether the CoA includes a recommended reconstitution solvent. Some peptides dissolve best in water, while others need a small amount of organic solvent or dilute acid. The CoA might note the solubility behavior observed during testing, which can save you from wasting material on the first try.

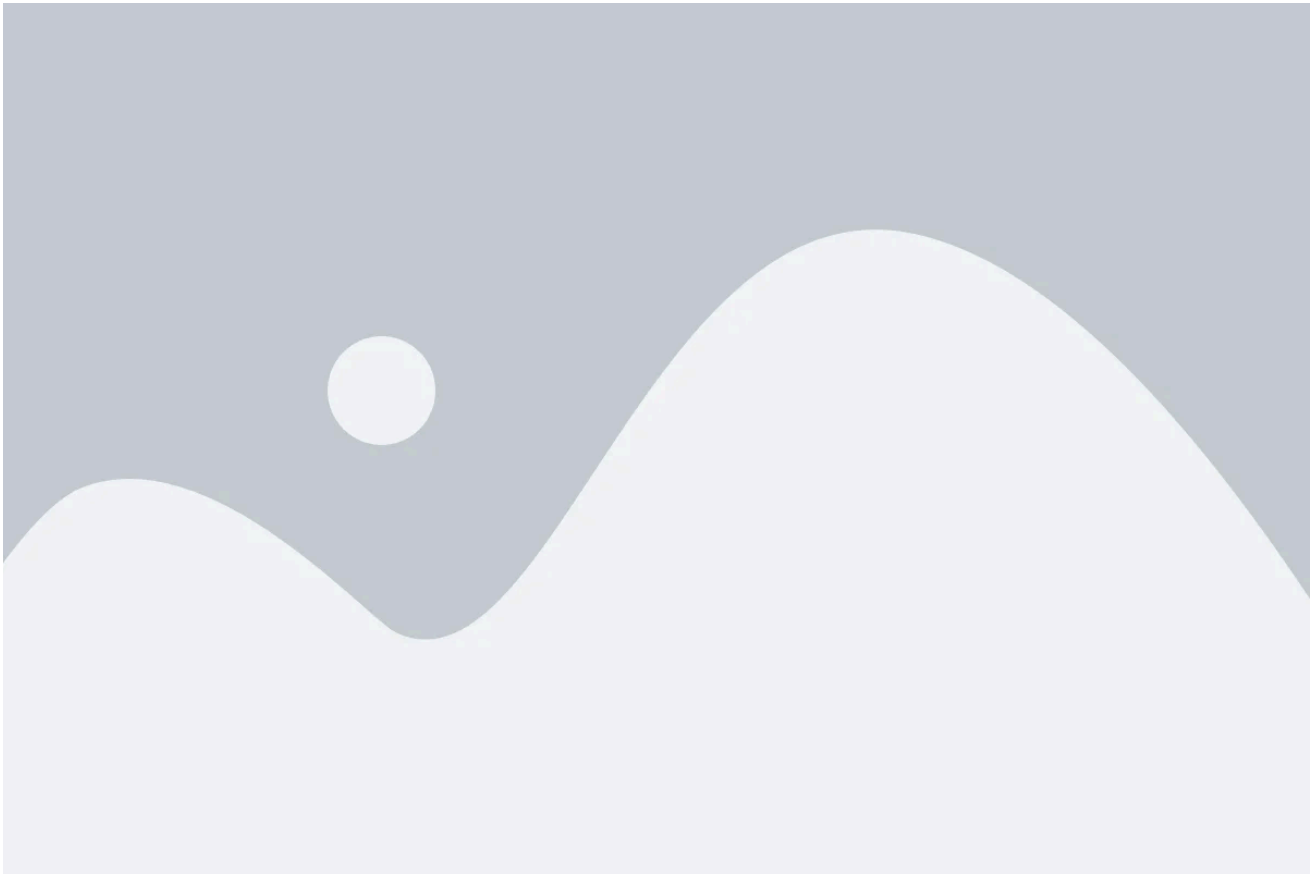
How to Use the CoA in Practice

When you receive a new batch, take a few minutes to scan the CoA before opening the vial. Confirm the peptide name, sequence, and molecular weight match your order. Check the purity

percentage and decide if it meets your experimental requirements. If the purity is lower than expected, contact the supplier before using the material.

Keep a copy of the CoA with your lab records. If your experiment produces unexpected results, you can refer back to the CoA to rule out peptide quality issues. Over time, you will develop a sense for which suppliers consistently provide clear, thorough documentation.

Suppliers that prioritize quality control typically offer CoAs that are easy to read and complete. For researchers who value this transparency, working with a supplier like spbpeptides.bio can provide confidence in the peptide material before it ever reaches the lab bench.



Common Red Flags

Some CoAs lack essential details. Watch for documents that only state "pass" without numerical data, or that omit the analytical method used. A CoA that does not include a batch number or date is essentially useless for traceability. Also be cautious if the purity percentage seems too round, like exactly 100.0%, which is rarely achievable with real analytical measurements.

Another red flag is a CoA that looks identical for every batch. Consistent formatting is fine, but the data should vary with each batch. If the same numbers appear repeatedly, the document may be a template rather than a real analysis.

Finally, check whether the CoA is signed or stamped by the quality control department. While not always required, a signature adds accountability. It also shows that someone has reviewed the data before the product was released.