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How to verify a peptide before anything else

A Certificate of Analysis is the single document that tells you what is actually in a vial. This guide walks through every field, what an accredited lab must provide, and the red flags of a faked certificate.

1 • Read the COA field by field

A serious Certificate of Analysis reports the following. If a field is missing, treat the gap as information.

FIELD	WHAT IT SHOULD SHOW
PRODUCT / SEQUENCE	Full name and, ideally, amino-acid sequence — matching what was ordered.
BATCH (LOT) NO.	A unique lot number that matches the label on the vial.
MFG / RETEST DATE	Manufacture date and a retest/expiry; analysis date contemporary with manufacture.
APPEARANCE	Physical description of the material (e.g. white lyophilized powder).
PURITY BY HPLC	≥98% target, with the chromatogram attached showing the main peak and area %.
IDENTITY BY LC-MS	Found mass ([M+H] ⁺) matching the expected monoisotopic mass.
WATER (KARL FISCHER)	Residual water content — lowers the true net peptide mass.
ENDOTOXIN (LAL)	Bacterial endotoxin in EU/mg or EU/mL, for cell-culture or in-vivo research.
STORAGE	Conditions under which the certified values hold (e.g. −20 °C, protect from light).

2 • Judge the laboratory

A seller cannot objectively certify its own product. Look for an independent lab, ideally ISO/IEC 17025 accredited. An accredited lab should provide:

- ☐ A verifiable **ISO/IEC 17025 accreditation number** from a recognised body.
- ☐ A named **laboratory** with a physical address.
- ☐ An **HPLC report** with the original chromatogram, not just a number.
- ☐ An **LC-MS report** with the mass spectrum.
- ☐ The **exact lot number** tested, tying the analysis to your material.
- ☐ An **analyst signature or stamp** and an analysis date.

3 • Confirm purity and identity together

HPLC quantifies purity as a percentage. **LC-MS** confirms the molecule's identity by mass. You need both: HPLC alone can report 98% of the wrong molecule, and MS alone does not quantify purity. A complete analytical section shows the chromatogram, the purity value, and the mass spectrum with the expected $[M+H]^+$.

4 • The hidden fields

Two fields are often quietly omitted and materially change the picture: **Karl Fischer** water content and **endotoxin (LAL)**. Residual solvents and counter-ion content (e.g. TFA/acetate) may also be relevant. Their absence means the composition and safety picture is incomplete.

5 • Spot a faked COA

NINE RED FLAGS

1. No lot number, or a lot number that does not match the vial.
2. The COA is issued by the vendor, not an independent lab.
3. No chromatogram image attached to the HPLC result.
4. No LC-MS spectrum or mass value.
5. The same COA (identical values/dates) reused across batches.
6. No verifiable ISO/IEC 17025 accreditation number.
7. Impossible or suspiciously round purity (e.g. "100.0%").
8. Missing Karl Fischer or endotoxin fields.
9. Editable PDF metadata, mismatched fonts, or no analyst signature.

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