

Computational / Statistical Methods

Linear Regression

Used to quantify relationships and build calibration curves in analytical chemistry.

Analysis of Variance (ANOVA)

Used to compare means and assess significant differences between experimental groups.

Principal Component Analysis (PCA)

Used to reduce data dimensionality and identify patterns in complex datasets.

Partial Least Squares Regression (PLS)

Used for quantitative prediction in spectroscopy and chemometrics.

Limit of Detection (LOD)

Used to determine the lowest detectable concentration of an analyte.

Limit of Quantification (LOQ)

Used to define the lowest concentration that can be quantified accurately.

Signal-to-Noise Ratio

Used to evaluate sensitivity and detection capability.

Standard Deviation

Used to assess precision and variability of measurements.

Relative Standard Deviation (RSD)

Used to express precision as a percentage in analytical results.

Software for Statistics & Analytical Calculations

Microsoft Excel

Used for basic statistical analysis, calibration curves, and data processing.

OriginPro

Used for curve fitting, regression, and advanced data visualization.

SPSS

Used for statistical testing such as ANOVA, regression, and data analysis.

MATLAB

Used for advanced data analysis, modeling, and custom algorithm development.

R

Used for advanced statistics, chemometrics, and data visualization.

Python

Used for statistical analysis and chemometrics (e.g., NumPy, pandas, scikit-learn).

Minitab

Used for quality control, design of experiments (DOE), and statistical analysis.

GraphPad Prism

Used for statistical analysis and graphing in experimental sciences.