Robust Statistics applied to the Validation of Analytical Methods

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1 Abstract

The use of the arithmetic mean and of the standard deviation is well known to describe the central value and the dispersion associated to one dataset. Their use mainly relies on the fact that the underlying distribution of the data is normal and that the dataset does not contain outliers. In the event there are outliers or there is a slight deviation from the normal distribution, the previous mentioned estimators may not be efficient to estimate the central tendency and the dispersion.

Analytical data are often subject to outliers. Causes for outliers are multiple: measurement error, inhomogeneity of the analyzed sample... Calculation of the mean and standard deviation may therefore be inaccurate and actions taken on their basis may be inappropriate.

This is particularly true when aiming to validate a method. Method validation is a mandatory requirement for ISO 17025 and is the process of proving that a method is suitable for its intended purpose, mainly in terms of trueness and precision.

In this paper, through the analysis of analytical data coming from Nestlé laboratories, methods validation characteristics, obtained using classical and robust statistics, are compared. This paper aims to show that robust statistics are valuable for that particular treatment of analytical data.