

amc technical brief

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Is my calibration linear?

Examining a calibration function for linearity is an everyday task in both validating analytical methods and routine analytical operations. Linearity is an important and desirable feature of an analytical method. For example, if a calibration function is linear, then it is easier to estimate the equation, and evaluation errors (errors in estimating unknown concentrations from the calibration function) are likely to be smaller. Moreover, the assumption of calibration linearity is implicit for the valid use of the method of standard additions. Given the importance of linear calibration, it is strange that most analytical chemists are willing to use the correlation coefficient as an indicator of linearity.

anding. Certainly it is true that, if the calibration points are tightly clustered around a straight line, the experimental value of r will be close to unity (Figure 1, Dataset A). e out

come of a linear relationship but could, for example, result from points clustered around a readily visible curve (Fi

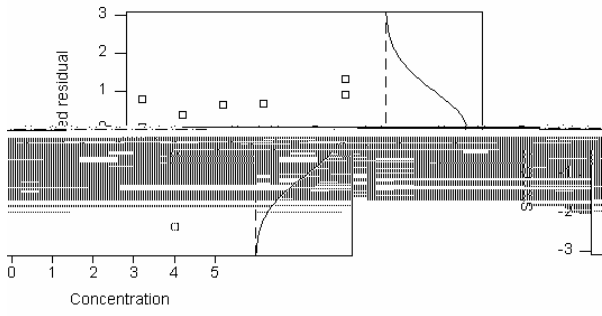


Figure 3. Standardised residuals from linear regression using Dataset A. There is no convincing pattern in the residuals.

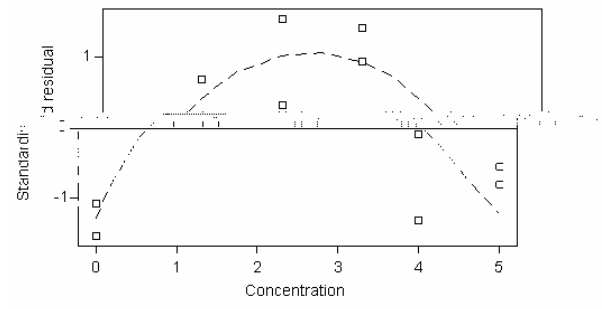


Figure 4. Standardised residuals from linear regression using Dataset B. The residuals show a clear parabolic pattern, indicating a non-linear relationship.