## amc technical brief

Editor: M Thompson

Analytical Methods Committee

AMCTB No 3

**Revised December 2005** 

## Is my calibration linear?

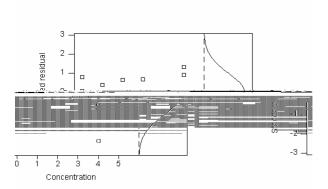
Examining a calibration function for linearity is an everyday task in both validating analytical methods and routine analytical operations. Linearity is an important and desirable feature of an analytical method. For example, if a calibration function is linear, then it is easier to estimate the equation, 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 staight line, the experimental value of r will be close to unity (Figure 1, Dataset A). e out

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

be achieved by replicating the measurements at each calibration point. This gives us information about the inherent variability of the response measurements (called the 'pure error'). So we could see in Figure 4, for example, that the systematic deviation of the residuals from zero was reasonably large in relation to the differences between the duplicated measurements, and therefore probably statistically significant.



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

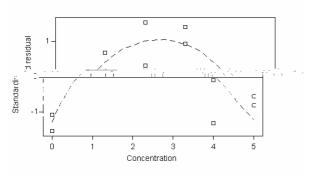


Figure 4. Standardised r

