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Standard addition with internal standardisation as an alternative to using stable isotope labelled internal standards to correct for matrix effects– Comparison and validation using liquid chromatography-tandem mass spectrometric assay of vitamin D

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Highlights:

- Introduction of a new standard addition calibration method for multi-step analysis
- This method corrects for procedural errors as well as matrix effects in LC-MS
- Validation of the new method using recovery and comparison with current method
- Comparable results to stable isotope labelled internal standard calibration
- Application of the proposed method for a multi-component LC-MS/MS assay (vitamin D)

Abstract

With mass spectrometric detection in liquid chromatography, co-eluting impurities affect the analyte response due to ion suppression/enhancement. Internal standard calibration method, using co-eluting stable isotope labelled analogue of each analyte as the internal standard, is the most appropriate technique available to correct for these matrix effects. However, this technique is not without drawbacks, proved to be expensive because separate internal standard for each analyte is required, and the labelled compounds are expensive or require synthesising. Traditionally, standard addition method has been used to overcome the matrix effects in atomic spectroscopy and was a well-established method. This paper proposes the same for mass spectrometric detection, and demonstrates that the results are comparable to those with the internal standard method using labelled analogues, for vitamin D assay. As conventional