

Novel absorptivity centering method utilizing normalized and factorized spectra for analysis of mixtures with overlapping spectra in different matrices using built-in spectrophotometer software

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Abstract

A novel, simple, rapid, accurate, and economical spectrophotometric method, namely absorptivity centering (a-Centering) has been developed and validated for the simultaneous determination of mixtures with partially and completely overlapping spectra in different matrices using either normalized or factorized spectrum using built-in spectrophotometer software without a need of special purchased program. Mixture I (Mix I) composed of Simvastatin (SM) and Ezetimibe (EZ) is the one with partial overlapping spectra formulated as tablets, while mixture II (Mix II) formed by Chloramphenicol (CPL) and Prednisolone acetate (PA) is that with complete overlapping spectra formulated as eye drops. These procedures do not require any separation steps. Resolution of spectrally overlapping binary mixtures has been achieved getting recovered zero-order (D0) spectrum of each drug, then absorbance was recorded at their maxima 238, 233.5, 273 and 242.5 nm for SM, EZ, CPL and PA, respectively. Calibration graphs were established with good correlation coefficients. The method shows significant advantages as simplicity, minimal data manipulation besides maximum reproducibility and robustness. Moreover, it was validated according to ICH guidelines. Selectivity was tested using laboratory-prepared mixtures. Accuracy, precision and repeatability were found to be within the acceptable limits. The proposed method is good enough to be applied to an assay of drugs in their combined formulations without any interference from excipients. The obtained results were statistically compared with those of the reported and official methods by applying t-test and F-test at 95% confidence level concluding that there is no significant difference with regard to accuracy and precision. Generally, this method could be used successfully for the routine quality control testing.

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