

Spectral analysis of overlapped absorption bands of binary mixture-an application on combination of Pseudoephedrine Sulfate and Loratadine mixture

Sara El-Hanboushy, Mohamed Mohamed, Hayam Lotfy, Yasmin M. Fayez

Abstract

Background

Simple, specific, accurate, and precise spectrophotometric methods are progressed and validated for concurrent analysis of pseudoephedrine sulphate (PSE) and loratadine (LOR) in their combined dosage form depending on spectral analysis procedures. In this binary mixture, pseudoephedrine (PSE) could be determined by using its resolved spectrum of zero-order absorption at 256.8 nm after subtraction of the spectrum of LOR, and also it could be determined in existence of the spectrum of LOR by different methods including absorption correction method (AC) at 256.8 nm and 280 nm, dual wavelength method (DW) at 254 nm and 273 nm, induced dual-wavelength method (IDW) at 230 nm and 263 nm, and ratio difference method (RD) at 256.8 nm and 270 nm. Loratadine (LOR) in the binary mixture could be determined either by direct analysis at 280 nm without any contribution from the spectrum of PSE or through its recovered spectrum of zero-order absorption via constant multiplication method (CM) using plateau region (277–326 nm). Also, concurrent determination for PSE and LOR in their overlapped binary mixture could be achieved by applying induced amplitude modulation (IAM) method.

Results

Specificity of the proposed spectrophotometric methods was examined by the analysis of prepared mixtures in laboratory and was applied successfully for pharmaceutical dosage form analysis which has the cited drugs without additive contribution. The proposed spectrophotometric methods were also validated as per the guidelines of ICH. Statistical comparison was performed between the obtained results with those from the official methods of the cited drugs, using one-way ANOVA, F test, and Student's t test, and the results exhibit insignificant difference concerning precision and accuracy.

Conclusions

The previously proposed spectrophotometric methods could be easily used accurately and precisely for simultaneous determination of the studied binary mixture with simple manipulation procedures.

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