Univariate versus Multivariate Spectrophotometric Methods for Simultaneous Determination of Complex Binary Mixtures with Overlapped Spectra: A Comparative Study

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Abstract

Two novel simple and accurate univariate spectrophotometric methods were described for the determination of a binary mixture of Sodium cromoglicate (SCG) and Fluorometholone (FLU) namely; ratio subtraction coupled with extended ratio subtraction (RS-EXRSM) and constant center (CCSM) spectrophotometric methods. The methods were able to recover the zero order absorption spectra of both drugs from their binary mixture through simple mathematical calculations. The linearity ranges were found to be (2.5–25 µg/mL) and (4- 25 µg/mL) for SCG and FLU, respectively. A comparative study was conducted between the proposed univariate methods versus multivariate ones, based on using principle component regression (PCR) and partial least squares (PLS-2). Upon applying the methods for the determination of SCG and FLU in laboratory prepared mixtures, the (CCSM and PLS-2) proved to be of higher predictive ability rather than (RS-EXRSM and PCR) in prediction of mixtures containing low concentration of one of the components. The proposed methods were validated in compliance with the ICH guidelines. These methods could be alternative to different HPLC techniques in quality control laboratories lacking the required facilities for those expensive techniques.

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