

Simultaneous determination of mebeverine hydrochloride and chlordiazepoxide in their binary mixture using novel univariate spectrophotometric methods via different manipulation pathways

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Abstract

Smart, sensitive, simple and accurate spectrophotometric methods were developed and validated for the quantitative determination of a binary mixture of mebeverine hydrochloride (MVH) and chlordiazepoxide (CDZ) without prior separation steps via different manipulating pathways. These pathways were applied either on zero order absorption spectra namely, absorbance subtraction (AS) or based on the recovered zero order absorption spectra via a decoding technique namely, derivative transformation (DT) or via ratio spectra namely, ratio subtraction (RS) coupled with extended ratio subtraction (EXRS), spectrum subtraction (SS), constant multiplication (CM) and constant value (CV) methods. The manipulation steps applied on the ratio spectra are namely, ratio difference (RD) and amplitude modulation (AM) methods or applying a derivative to these ratio spectra namely, derivative ratio (DD1) or second derivative (D2). Finally, the pathway based on the ratio spectra of derivative spectra is namely, derivative subtraction (DS). The specificity of the developed methods was investigated by analyzing the laboratory mixtures and was successfully applied for their combined dosage form. The proposed methods were validated according to ICH guidelines. These methods exhibited linearity in the range of 2–28 $\mu\text{g/mL}$ for mebeverine hydrochloride and 1–12 $\mu\text{g/mL}$ for chlordiazepoxide. The obtained results were statistically compared with those of the official methods using Student t-test, F-test, and one way ANOVA, showing no significant difference with respect to accuracy and precision.

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