Testing the purity of spectral profiles: Finger-print resolution of complex matrices and extraction of absorbance signals

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Abstract

The application of spectrophotometric techniques has shown a tremendous development over the past few years, where it is possible to determine the concentrations of several components in complex matrix. A new feature will be introduced in this work where the application of spectrophotometric techniques will be enhanced to resolution and checking the purity of signals. The finger-print resolution ñratio subtraction methodò (RSM) was coupled with the novel complementary method ñunified constant subtractionò (UCS); in addition to the methods: extended ratio subtraction method (EXRSM), constant multiplication (CM) or ñspectrum subtractionò (SS). These techniques were applied for the determination of the complex matrix of the binary mixture of chloramphenicol and dexamethasone. By applying official spectrophotometric methods, direct determination of the components was allowed with no need for validation procedures. The spectrophotometric techniques were successfully applied to the laboratory prepared mixtures and the combined dosage form where the purity of the extracted signals were tested by calculating the spectral contrast angle (ḋ) and the spectral ratio factor (SRF) where the results were compared to show the capability to recover pure spectral profiles and detect the presence of impurities. The proposed methods proved that spectrophotometric techniques can be used for identification and separation of signals, similar to chromatographic techniques

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