

Comparison of infrared attenuated total reflection and Raman spectroscopy in the quantitative analysis of diclofenac sodium in tablets.

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Streszczenie

The quantification of diclofenac sodium (DS) in tablets was performed using partial least squares (PLS) models based on FTIR ATR (Fourier transform infrared attenuated total reflection) and FT-Raman spectra. Separate calibration models were built for two groups of tablets, standard and sustained release, containing different excipients. To compare the predictive ability of these models the relative standard errors of prediction (RSEP) were calculated. In the case of DS determination from the Raman data, RSEP error values in the range of 2.4–2.8% (2.7–2.9%) for the calibration (validation) data sets were obtained. For ATR models constructed using spectra registered three times for each sample, RSEP errors in the range of 3.6–3.7% (4.2–4.3%) were found. These errors decreased to 2.8% (3.0%) when spectra collected six times were applied. Five commercial products containing 25, 50, 75 and 100 mg of DS per tablet were quantified. Concentrations derived from the elaborated models correlated strongly with the results of reference analyses and gave recoveries of 99.1–101.3% and 99.1–101.7% for the ATR and Raman data, respectively. Although both spectroscopic techniques can be used as fast and convenient alternatives to the standard pharmacopeial methods of DS quantification in solid dosage forms, in the case of the ATR technique, it is necessary to repeat measurements at least a few times to obtain acceptable quantification errors.

Słowa kluczowe

ATR spectroscopy, Raman spectroscopy, Quantitative analysis, Diclofenac sodium, Standard release tablets, Sustained release tablets

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