

The influence of sample area on diclofenac sodium quantification by diffuse reflectance IR spectroscopy.

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Streszczenie

A procedure for the quantitative determination of diclofenac sodium (DS) in commercial capsules and tablets based on Partial Least Squares (PLS) treatment of diffuse reflectance FTIR spectroscopic (DRIFTS) data is described. Two DRIFTS accessories, a Collector II (Spectra-Tech) and a Seagull (Harrick Scientific), were used to collect the spectra. The spectrometer beam area on the surface of the sample was approximately sevenfold smaller for the Collector II accessory compared to the Seagull accessory. Spectra collection using the smaller beam spot resulted in significantly higher quantification errors for the single measurements. To reduce the errors associated with the Collector II accessory spectra were collected seven times while randomly changing the sample position. The mean spectra were used in the analysis. To compare the predictive ability of the constructed models, the relative standard errors of prediction (RSEP) were calculated. The RSEPs were 1.3-2.9% and 2.0-2.6% using the Collector II accessory and 1.0-1.5% and 1.1-1.7% using the Seagull accessory, for calibration and validation data sets, for the different PLS models. Three commercial preparations containing 20.5, 23.2 and 34.5% DS were successfully quantified using the developed models. The proposed procedure can be used as a fast, precise and economic method for DS quantification in tablets and capsules.

Słowa kluczowe

DRIFTS spectroscopy, Quantitative analysis, Quantification error reduction, Diclofenac sodium

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