

Determination of Tetracyclines by Near-Infrared (NIR) Spectroscopy and Partial Least-Squares (PLS) Regression Method

by Edward Szlyk*, Agnieszka Kowalczyk-Marzec and Izabela Koter

*Faculty of Chemistry, Nicolaus Copernicus University,
ul. Gagarina 7, 87-100 Toruń, Poland*

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Oxytetracycline hydrochloride (OTC), tetracycline hydrochloride (TC), and chlortetracycline hydrochloride (CTC) were determined in aqueous solutions by NIR spectroscopy and partial least-squares (PLS) regression. For absorption bands selected from the range 6200–5500 cm^{-1} , chemometric models were elaborated applying principal component analysis (PCA). Thirty aqueous calibration solutions of tetracyclines covering the concentration range of 1.0–6.1 mg mL^{-1} were prepared. For quantitative analysis of the analytes, NIR-PLS models were used. Detection limits (DL) of OTC, TC, and CTC were 0.20, 0.25, 0.29 mg mL^{-1} , and quantification limits (QL) were 0.61, 0.74, 0.87 mg mL^{-1} , respectively. The estimated purities of OTC, TC, and CTC were compared to these obtained by the reference HPLC method. No statistically significant differences between the results obtained in both methods were found. According to the regulations in Pharmacopoeias (USP, EP, BP), the developed method was considered applicable to the determination of antibiotics in aqueous solutions.