

Chemometric assisted solid-phase extraction for the simultaneous determination of some anti-inflammatory drug residues in pharmaceutical industrial wastewater

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Abstract

Development of analytical methods capable of selective determination and quantification of chemical compounds in industrial wastewater have become essential as these compounds lead to alteration of the ecosystem causing serious effects on public health; thereby, development of a sensitive and selective method for the simultaneous determination of four commonly used non-steroidal antiinflammatory drugs, namely; paracetamol, diclofenac sodium, ibuprofen and indomethacin in wastewater. Solid phase extraction (SPE) was carried out for the selective extraction and preconcentration of the drugs from the water samples. Multivariate calibration of spectrophotometric absorbance data using Partial Least Squares (PLS) regression analysis. As per the multilevel multifactor design, calibration and validation sets were fabricated and the model was constructed using mean centered data of the calibration set, leaving out one mixture at a time for cross-validation, then, the method was applied blindly for determination of the four drugs in the validation set. The method was validated according to the ICH guidelines, and the mentioned chemometric method were successfully applied for the selective determination of the four mentioned drugs in real wastewater samples. Prior to the application of chemometric technique the actual wastewater samples were subjected to SPE for pretreatment and preconcentration.

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