DETERMINATION OF PARACETAMOL FROM PARACETAMOL-IBUPROFEN MIXTURES USING ZERO, FIRST AND SECOND DERIVATIVE OF UV-VIS SPECTRA

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Abstract
Ibuprofen, 2-(4-isobutylphenyl)-propionic acid, an AINS drug, available in a variety of preparations, is commonly used in the treatment of pain and inflammation in rheumatoid arthritis and other musculoskeletal disorders [1]. Paracetamol, acetaminophen, is a worldwide used drug with analgesic and antipyretic activity [2]. There are several pharmaceuticals that contain both substances, along with several excipients. Thus, simple, rapid and low-cost methods for quantitative determination of such compounds in mixtures are needed.
The aim of the present study was to determine the conditions for quantitative analysis of paracetamol in mixtures with ibuprofen using the UV-VIS spectrophotometric method. Optimizing the conditions and validating the developed analytical procedure will allow the determination of the active substance content in pharmaceutical preparations. Based on the zero, first and second derivative of UV-Vis spectra [3], the paracetamol content of different synthetic mixtures with ibuprofen and also of some commercial available drugs (Synocam, Paduden Duo) was determined. When using first and second derivative spectra for synthetic mixtures, small amounts of paracetamol (2.5-5 μg/mL) could be accurately quantified compared with zero derivative spectra. Also, good recoveries with small standard deviations (100.12±3.69 – for first derivative spectra; 100.81±3.93 – for second derivative spectra) were obtained which indicated the high repeatability and accuracy of the two proposed methods. In the case of the analysis of the selected pharmaceutical preparations, the determined active ingredient content varies from the value declared by the manufacturers, depending on the applied method.
The presented techniques are fast and economical method for the quantitative determination of selected drugs and can be successfully applied in laboratories.

References
[1] S.S. Adams, P. Bresloff, C.G. Mason, J. Pharm. Pharmacol. 28 (1976) 256.
[2] M.J. Hamm, Crit. Care Nurse 20 (2000) 69.
[3] Y.M. Issa, S.I.M. Zayed, I.H.I. Habib, Arab. J. Chem. (2011) 4, 259–263.