ORIGINAL ARTICLE

The Simultaneous Determination of Ibuprofen and Paracetamol in Pharmaceutical Formulations by High-performance Liquid Chromatography with Ultraviolet Detection

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HIGHLIGHTS

- A new method of estimating ibuprofen and paracetamol in pharmaceutical formulations.
- Use of high-performance liquid chromatography- ultraviolet technology for LC100 in the estimation of ibuprofen and paracetamol in pharmaceutical formulations.
- Study the stress degradation for ibuprofen and paracetamol in pharmaceutical formulations in the neutral, acid, and base media.
- Studying the relative stability of ibuprofen and paracetamol in pharmaceutical formulations during the experimental estimation process.
- Perform different applications for the purpose of validating the chromatographic method in the estimation of the Ibuprofen and paracetamol in pharmaceutical formulations.

Abstract

Context: In this manuscript, high-performance liquid chromatography technology equipped with ultraviolet detector has been developed that it has the sensitivity, accuracy, and high reliability for the simultaneous identification of the ibuprofen (IB) and paracetamol (PA). **Methods:** Chromatographic separation was achieved on Ion Pac column; Arcus EP-C18 (5 µm, 4.6 mm × 250 mm) by a mobile phase consisted of acetonitrile and water (30:70, v/v)+40 mmol/L phosphate buffer at pH 6.0 with a flow rate of 1.0 mL/min. The detection wavelength was set range at 300–330 nm. The IB and PA were subjected to different forced degradation conditions. In all the conditions, the degradation products were well obtained from the peaks of IB and PA. The method was linear at a concentration range of 5–25 µg/mL (R^2 = 0.9987) and 1–5 µg/mL (R^2 = 0.9989) for the IB and PA, respectively. **Results:** The limit of detection (LLOD) was 0.0133 µg/mL and limit of quantitation (LLOQ) was 0.0420 µg/mL for IB and the LLOD was 0.0213 µg/mL and LLOQ was 0.0521 µg/ml for PA, respectively. The precision of the method was satisfactory; the relative standard deviations values did not exceed 1%. The accuracy of the method was proved; the mean recovery was in the range of 99.88%–100% for the IB and in the range 98.99–101.0% for the PA. **Conclusion:** The developed and validated method was applied successfully for the assay of the IB and PA in combined tablet dosage with good precision and accuracy.

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