

Two Novel Microwell-Based Spectrophotometric Methods with High Throughput for Determination of Ciprofloxacin in its Dosage Forms

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SUMMARY. Two novel microwell-based spectrophotometric methods with high throughput have been developed and validated for the determination of ciprofloxacin (CIP), a fluoroquinolone antimicrobial agent. These methods were based on the formation of colored condensation products upon reaction of CIP with each of 1,2-naphthoquinone-4-sulphonic acid sodium salt (NQS) and the oxidized pyrocatechol (OPC). These reactions were carried out in a 96-microwell plate and the absorbance of the colored-product was measured by a microwell plate absorbance reader at 460 and 510 nm for NQS and OPC, respectively. The variables affecting the reactions were carefully investigated and the conditions were optimized. The stoichiometry of the reaction was determined, and the reactions pathways were postulated. The proposed reactions were found to be highly selective for CIP among many fluoroquinolone members. Under the optimum conditions, good linear relationships were obtained between the absorbances and the concentrations of CIP in the ranges of 25–200 and 40–450 µg/mL with limits of detections of 3.66 and 8.79 mg/mL for the methods based on NQS and OPC, respectively. The robustness and ruggedness of the methods were satisfactory. The methods were successfully applied to the bulk drug and pharmaceutical dosage forms; the percentage recoveries were 98.0-101.5 (0.45 ± 1.63%). The results were compared favorably with those obtained by a pre-validated reference method; no significant difference in accuracy and precision as revealed by the accepted values of t- and F-tests, respectively.

KEY WORDS: Ciprofloxacin, High analysis throughput, Microwell-based methods, 1,2-naphthoquinone-4-sulphonic acid sodium salt, Oxidized pyrocatechol, Spectrophotometry.

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