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Extended Abstract

Spectrofluorimetric Analyses of Ciprofloxacin and Norfloxacin †

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The fluoroquinolones (FQ) ciprofloxacin (CIP) and norfloxacin (NOR) are used as broad-spectrum antibacterial agents [1]. CIP is an antibiotic to which most gram-negative bacteria are highly susceptible in vitro and to which many gram-positive bacteria are susceptible or moderately susceptible. Unlike most broad-spectrum antibacterial drugs, ciprofloxacin is effective after oral or intravenous administration [2]. NOR is an antibacterial agent with activity against most gram-negative pathogens, and which is also active against *Pseudomonas aeruginosa* and some gram-positive organisms [3]. There has been an increase in the use of FQs in animal production, which has inevitably generated residues in animal origin foodstuff. These residual drugs cause an in vivo-accumulation, and in the long-term they may determine drug tolerance and have carcinogenesis, teratogenesis, and mutagenesis potential. This work presents a simple, sensitive, and accurate spectrofluorimetric method for CP and NOR assessment, using Al (III) as an enhancer.

The CIP and NOR solutions were obtained by dissolving the needed quantity in water to prepare solutions of 200 ppm, and Al (III) 44×10^{-3} M and Ce (III) 10^{-5} M solutions were used as reagents. Measurements were carried out on a spectrofluorimeter (FP–6500, Jasco, Japan) with a working range of 220–750 nm for excitation and emission wavelength.

After performing a spectrometric study, the optimum wavelength for excitation of CIP and NOR solutions was set at 275 nm, for which both CIP and NOR have a maximum emission at 445 nm. The study of the influence of pH on the fluorescence of the analytes did not produce any improvement of the fluorescence signal. The presence of metal ions can increase the intensity of the fluorescence radiation and improve the shape of the signals in the fluorescence spectrum, as observed in the presence of the Al (III) ion for both CIP and NOR. The Ce (III) ion brings an improvement to the fluorescence signal for CIP, while its presence in a NOR solution does not greatly influence the signal intensity or shape. The method is linear in the range of 0.05–1 ppm, and has a detection limit of 4.48 ppb for CIP and 0.78 ppb for NOR, with a relative standard deviation below 1.01% for CIP, whereas for NOR it is below 0.3%.

The experiment indicates that Al (III) could enhance the fluorescence intensity of CIP and NOR under optimum complexation reaction conditions. The proposed method has the advantages of simplicity, sensitivity, and reproducibility, and can be applied for FQs stability tests.

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