

Photoinduced-Fluorescence (PIF) Determination of Fluoroquinolones in Pharmaceuticals and Urine

by A. Espinosa-Mansilla*, A. Muñoz de la Peña, D. González Gómez and F. Cañada-Cañada

Department of Analytical Chemistry, University of Extremadura, 06071 Badajoz, Spain

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Irradiation of fluoroquinolones for a few minutes using a high-power UV lamp drastically increased their fluorescence quantum yield. Photodegradation of particular fluoroquinolone depended on the irradiation time, solvent composition, and solution pH. The best signals were obtained when aqueous-ethanolic mixture (50/50, v/v) was used. Within only 5 min, enoxacin (ENO), norfloxacin (NOR), ciprofloxacin (CIPRO), and enrofloxacin (ENRO) were converted into the fluorescent photoproducts, which were formed preferably from the protonated parent fluoroquinolones (pH = 6.5). Under the applied conditions, only ofloxacin (OFLO) was not affected by irradiation. Chromatographic studies indicated that for each fluoroquinolone, except for ENRO, only one photoproduct was obtained. pK values and luminescent properties of the photoproducts were established. The highest fluorescence intensity of the photoproducts was measured in acidic medium (pH = 4). The linear dependence between the intensity of fluorescent emission of the photoproducts and concentrations of fluoroquinolones was found. Limits of detection were 23, 17, 14, 14, and 26 ng mL⁻¹ for ENO, NOR, OFLO, CIPRO, and ENRO, respectively. The method was successfully applied to the determination of the above drugs in pharmaceuticals. Moreover, ENO was determined in human urine.