Spectrophotometric and Spectrodensitometric Determination of Sparfloxacin and Besifloxacin Hydrochlorides in Presence of Their Peroxide Degradation Products

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Abstract

Three sensitive, selective and precise stability indicating methods were developed and validated for the determination of sparafloxacin hydrochloride (SPAR) and besifloxacin hydrochloride (BESI) in presence of their peroxide degradation products in bulk and pharmaceutical formulations. The first method, SPAR and BESI were determined using the first derivative (D1) spectrophotometric method by measuring the peak amplitudes at 283.5 nm and 258.6 nm for SPAR and BESI, respectively. Linear relationships were obtained in the ranges of 1.25-50 mg/mL and 2.5-80 mg/mL with mean recovery values of 99.79 ± 0.776 and 100.6 ± 0.550 for SPAR and BESI, respectively. The second method, the first derivative of the ratio spectra (DD1) was used to determine SPAR and BESI by measuring the peak amplitude at 390.8 nm and 353 nm for SPAR and BESI, respectively, over the same concentration range used in the first method with mean recovery values of 99.95 ± 0.992 and 99.91 ± 0.986 for SPAR and BESI, respectively. The third method, SPAR and BESI were determined using TLC-densitometric methods through the separation on silica gel plates using methanol: chloroform: ammonia (8.5:1:0.5 v:v:v) and methanol: chloroform: ammonia: toluene: water (8:2:2:2:2 v:v:v:v:v) for SPAR and BESI, respectively. These were followed by quantitative densitometric measurement at 290 nm and 275 nm for SPAR and BESI, respectively. Linear relationship were obtained in the concentration ranges of 0.5-8 µg/spot and 1-10 µg/spot with mean recovery values of 100.1 ± 0.772 and 100.2± 0.981 for SPAR and BESI, respectively. The proposed methods have been successfully applied to the analysis of SPAR and BESI in their pharmaceutical formulations without interference from other additives and the results were statistically compared with official methods