Spectrophotometric Method for Determination of Certain Cephalosporins Using 4-Chloro-7-nitrobenzo-2-oxa-1,3-diazole (NBD-Cl)

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Abstract:

A simple, accurate and precise spectrophotometric method has been proposed for the determination of eleven cephalosporins, namely; cefaclor monohydrate, cefadroxil monohydrate, cefalexin anhydrous, cefradine anhydrous, cefotaxime sodium, cefoperazone sodium, ceftriaxone sodium, ceftazidime penthydrate, cefazolin sodium, cefixime and cefpodoxime proxetil in bulk drug and in pharmaceutical formulations. The method depends on hydrolysis of the studied drugs using 0.5M NaOH at 100°C and subsequent reaction of the formed sulfide ions with NBD-Cl (4-chloro-7-nitrobenzo-2-oxa-1,3-diazole) to form a yellow-colored chromogen measured at 390 nm. Different variables affecting the reaction (e.g. NaOH concentration, hydrolysis time, NBD-Cl concentration and diluting solvent) were studied and optimized. Under the optimum conditions, linear relationships with good correlation coefficients (0.9990-0.9999) were found in the range of 5-160 μg mL⁻¹ for all studied drugs. The limits of assay detection and quantitation ranged from 0.289 to 5.867 and from 0.878 to 17.778 μg mL⁻¹, respectively. The accuracy and precision of the proposed method were satisfactory. The method was successfully applied for analysis of the studied drugs in their pharmaceutical formulations and the recovery percentages ranged from 96.6 to 103.5%.

Published In:

Natural Science , Vol. 2, No. 8 , PP. 828-840