

Validated stability-indicating chromatographic methods for the determination of chlordiazepoxide and clidinium bromide in the presence of its alkali-induced degradation product.

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Abstract

Accurate, simple and selective stability-indicating reversed phase HPLC and TLC-densitometric methods with UV detection have been developed and validated for simultaneous determination of chlordiazepoxide (CDZ) and clidinium bromide (CDB) in the presence of its alkali-induced degradation product (DEG). Successful separation of the drugs from the degradation product was achieved. For the RP-HPLC method, the mobile phase containing a mixture of 25 mM ammonium acetate (pH 5.4): acetonitrile in the ratio of (20:80, v/v), at the flow rate of 1.0 mL min⁻¹ and UV detection was performed at 254 nm. For the TLC-densitometric method, the separation was performed using a stationary phase of precoated Silica Gel G/UV254 and mobile phase composed of a mixture of ethyl acetate: methanol: ammonia (8:3:1, v/v/v) and UV detection was performed at 254 nm. The linearity graphs for CDZ and CDB, respectively, were found to be linear over 10-100 µg mL⁻¹ and 10-100 µg mL⁻¹ with mean square errors of 0.0001 and 0.0001, respectively. The obtained results were statistically compared with those of the official and reported methods; using Student's t test, F test and one-way ANOVA, showing no significant difference with high accuracy and good precision. The proposed RP-HPLC method was also used to study the kinetics of the alkaline hydrolysis of clidinium bromide that was found to follow pseudo-first order kinetics. The t_{1/2} was 8.5729 min while k (the degradation rate constant) was 0.0808353 min⁻¹.

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