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HIGH PERFORMANCE LIQUID CHROMATOGRAPHIC DETERMINATION OF DICLOFENAC DIETHYLAMMONIUM IN GELS

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ABSTRACT

A simple and precise liquid chromatographic method was developed for the estimation of Diclofenac Diethylammonium from gels. The drug was chromatographed on a reverse phase C18 column. The eluants were monitored at a wavelength of 282 nm utilizing a mixture of 0.01 M disodium hydrogen orthphosphate and acetonitrile (50 : 50).

The method was statistically validated for its accuracy, precision, reproducibility. The linearity was found to be in the range of 0 - 500 mcg/ml.

Due to its simplicity and accuracy the authors were of the firm opinion that the method can be used for routine Quality Control analysis. The method do not require any specific sample preparation except for use of a gaurd column before the analytical column and a suitable prefilter attached to syringe prior to injection.

INTRODUCTION

Diclofenac Diethylammonium is a prostaglandin synthetase enzyme inhibitor and is used in the treatment of local pain, inflammation in the locomotar apparatus due to non-penetrating injuries, soft tissue

rheumatism and degeneration of inflammatory lesions of the tendons, ligaments and joints. It is basically an anti-inflammatory analgesic provided as aqueous or cream based gel formulations (1 - 6).

Literature survey was conducted to locate the analytical methods reported (if any). However there were no analytical methods reported in the literature for the analysis of Diclofenac Diethylammonium. This led the authors to work on several aspects of the analytical method including stability of the drug in aqueous, alkaline medium and finalize on the method reported here.

EXPERIMENTAL

Reagents and Materials :

The authentic working standard for Diclofenac Diethylammonium was developed indeginously using crystallization technique. The reagents were of "Gauraunteed reagent" grade and the solvents were of HPLC grade. Distilled water obtained from "Mill-Q" and finally passed through 0.45 micron membrane filter was used through out.

Chromatographic Instrumentation :

The HPLC component system consisted of a dual piston reciprocating pump (Model 510), LC spectrophotometer (Model 486) and a computing integrator (Model 746), all from Waters Associates, a Rheyodyne injector (7125) with a 20 microlitre fixed loop. A 30 cm X 3.9 mm microbondapak C18 column was used. Other typical operating conditions were as follows : flow rate 1.5 ml/min ; sensitivity 1.0 AUFS; chart speed 0.25 cm/min ; wavelength 282 nm.

The mobile phase consisted of 0.01 M disodium hydrogen orthophosphate and Acetonitrile (50 : 50). The pH was adjusted to 3.5 $\pm$ 0.1 with orthophosphoric acid (85 %).

Standard and Sample Preparation :

Stock standard of Diclofenac Diethylammonium of 1 mg/ml concentration was prepared in mobile phase. The stock was further suitably diluted to obtain a final concentration of 100 mcg/ml with mobile phase.

TABLE-1 :

Product	Code	Declared Amount	% Recovery (of the declared amount)
Diclofenac Diethylammonium Emulgel	A	1.0 %	99.3
	B	1.0 %	101.2
Diclofenac Diethylammonium Gel	C	1.0 %	98.9
	D	1.0 %	99.4

Sufficient quantity (equivalent to 50 mg of the drug) of the gel was transfered to a 50 ml volumetric flask. To it 30 ml of mobile phase was added and the preparation was vortexed for 10 minutes. The volume was made up with mobile phase and stirred for 10 minutes. The preparation was filtered and the filterate was diluted suitably to obtain a concentration of 100 mcg/ml, with mobile phase.

A suitable prefilter was attached to the syringe prior to the injections of the standard and sample in the HPLC system, as an additional precaution.

Precision ; Linearity and Recovery Study :

The method precision was evaluated by repeated assay of the commercial formulations (Table-1) over separate periods of one day and one week. The within day precision was determined by performing five consecutive assays within a period of eight hours. The day to day repeatibility of the method was determined by analysing the same sample (single operator) on the consecutive days.

Under the described chromatographic conditions, a linear response was demonstrated for Diclofenac Diethylammonium in the range of 0 - 500 mcg/ml.

The accuracy of the procedure was evaluated by adding known amount of the drug to the commercial formulations and were analysed by the proposed method. The recovery data obtained from this study was in the range of 98.9 % to 101.2 %. The relative standard deviation was 0.97 % (Table-2).

TABLE-2

Amount added (mg)	Amount Recovered (mg)	% Recovered
2	1.978	98.90
4	3.960	99.00
6	6.070	101.20
8	8.010	100.13
10	9.930	99.30

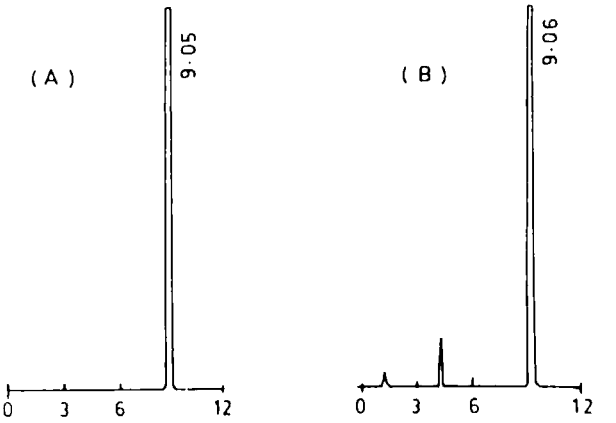

FIG : 1 : CHROMATOGRAMS OF DICLOFENAC DIETHYL-AMMONIUM (A) AND DICLOFENAC DIETHYL-AMMONIUM GEL (B)

Results and Discussion :

The proposed method is very simple and precise. The recovery in the range of 98.9% to 101.2 % indicate good precision of the method and non-interference of the pharmaceutical excipients used there in.

The typical chromatograms of Diclofenac Diethylammonium standard and from gel is depicted in (Figure 1).

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