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Development and validation of dissolution test for cyclobenzaprine hydrochloride pellets

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ABSTRACT

A Simple and rapid dissolution test method for Cyclobenzaprinehydrochloride Pellets 10% W/W has been developed and validated. Based on the stability and basic nature of the drug, dissolution experiments were conducted in 0.1N hydrochloride medium with paddle stirring at 50 RPM (resolution per minute). Dissolution was found in between 30-50% over a period of 2nd hour, 4th hour in between 50-70%, 8th hour in between 65-85%, 12th hour NTL (not less than) 75% and 16th hour NTL (not less than) 85%. The quantitative recovery of the drug from semi formulations was established indicating the non interference of excipients. The dissolution profiles for pellets were considered satisfactory and can be applied for quality control analysis of Cyclobenzaprinehydrochloride Pellets 10% W/W.

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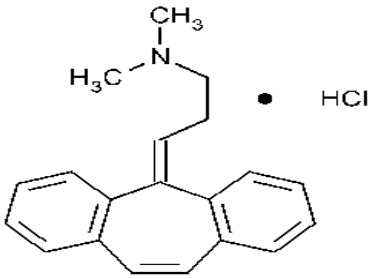
INTRODUCTION

Cyclobenzaprinehydrochloride is chemically known as 3-(5*H*-dibenzo [*a*,*d*] cyclohepten-5-ylidene)-*N*,*N*-dimethyl-1-Propanamine hydrochloride. Molecular formula is $C_{20}H_{21}N.HCl$. It is an important tricyclic antidepressant like amitriptyline and imipramine and is sold in the market under trade names flexeril and flexiban as muscle relaxant, may be helpful for sleep and pain control in fibromyalgia. It is useful for quick and lasting symptoms relief (back pain, neck pain, and muscle spasms. A survey of literature reveals that HPLC methods [1-3] are reported for the quantitative determination of Cyclobenzaprine in Human Plasma and urine. HPLC method is time consuming in terms of sample preparation, elution and relatively more expensive. Hence a simple and easy method of analysis is preferred. In this connection we have developed a U.V method for the determination of the Cyclobenzaprine hydrochloride in commercial dosage forms [4,5].



Structure of CYCLOBENZAPRINE HYDROCHLORIDE

METHOD

Instrument: UV-VIS spectra, Shimadzu 2010. LC solution computer based data station.

Chemicals and Reagents

Reference standard Cyclobenzaprinehydrochloride is procured from M/S.RA Interchem, Water (Distilled water), Hydrochloric acid AR grade.

Standard Preparation

Weigh and transfer accurately 50 mg of Cyclobenzaprine hydrochloride working standard (WS) into a 100 ml volumetric flask. Add 70 ml of methanol. Sonicate for 10 minutes and dilute with methanol to volume. Mix and filter. Transfer 2 ml of this solution to a 100 ml volumetric flask , dilute with 0.1N Hydrochloric acid to the volume and mix.

Drug release

Apparatus: 2; 50 rpm
Medium: 900ml 0.1N Hydrochloric acid in water
Time: 2, 4, 8 ,12 and 16th hours
Place the stated volume of dissolution medium in the vessel of apparatus specified in the individual monograph, assemble the apparatus. Equilibrate the dissolution medium to 37

±0.5°C, and remove the thermometer. Place the 6 samples equivalent to 10mg of Cyclobenzaprinehydrochloride in the apparatus, taking care to exclude air bubbles from the surface of dosage-form unit, and immediately operate the apparatus at the rate specified in the individual monograph. with in the time interval specified, withdraw a 10ml of specimen from a zone midway between the surface of dissolution medium and the top of rotation blade, not less than 1cm from the top of the rotation blade, not less than 1 cm from the vessel wall. Replace the aliquots withdrawn for analysis with equal volumes of fresh dissolution medium at 37°C. Determine the amount of Cyclobenzaprinehydrochloride, dissolved using the following procedure.

Procedure

Measure the absorbance of Standard and sample preparations in 1cm cell on suitable U.V spectrometer at 290 nm. Using 0.1N hydrochloricacid as blank. Record the absorbance.

Calculation

$$\frac{AT \times WS \times 2x\ 900 \times P \times 100}{AS \times 100 \times 100x\ WT \times \text{Label claim in\%}} = \%$$

Where

AT=Absorbance of cyclobenzaprine hydrochloride in sample solution
AS= Absorbance of cyclobenzaprine hydrochloride in standard solution
WS=Weight of Cyclobenzaparine hydrochloride Working standard Taken in mg
WT=Weight of sample taken in mg
P=Purity of Cyclobenzaparine hydrochloride Working standard used.

Calculation for correction factor

Calculate the correction factor (CFn) at each time point by using the following formula

$$CFn = \frac{Dn}{900} \times 10$$

Dn = % Labeled amount of Cyclobenzaparine hydrochloride dissolved at respective times.

Calculation for correction results;

For 2^{nd} Hour = D2, For 4^{th} Hour = D4+CF2, For 8^{th} Hour = D8+CF4+ CF2
For 12^{th} Hour = D12+CF8+CF4 + CF2, For 16^{th} Hour = D16+CF16+CF8+CF4 + CF2

The results are tabulated as follows:

Title: Dissolution profile of the drug with respect to time

Semi	Media	Time	Bowl	Release	Average	Limits	S.D	RSD

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formulations		interval	no's					
PELLETS	0.1N HCl 900ml	2nd Hour	1,2,3, 4,5 and 6	45.1%,45.3%45.2%,45.4% 45.2%,45.3%	45.25%	30-50%	0.1048	0.2317
		4th hour	1,2,3,4,5 and 6	65.7%,65.6 65.5%,65.4%65.6%,65.4%	65.51%	50-70%	0.1169	0.1784
		8th hour	1,2,3,4,5 and 6	77.8%.77.6%77.7%,77.5% 77.6%,77.4%	77.6%	65-80%	0.1414	0.1822
		12th Hour	1,2,3,4,5 and 6	82.4%,82.3% 82.5%,82.6% 82.5%,82.4%	82.45%	NLT 75% NLT 80%	0.1048	0.1272
		16th Hour	1,2,3,4,5 and 6	86.7%,86.9% 86.6%,86.5% 86.8%.86.7%	86.7%		0.1414	0.1631

Recovery Studies

To study the linearity, accuracy and precision of proposed method , recovery experiments were carried out .Known quantities of standard at two different levels were added to the pre-analyzed sample, the recovery was estimated to be more than 99%.

RESULT AND DISCUSSION

Linearity: The linearity of Cyclobenzaprine hydrochloride is established by plotting a graph of absorbance of standard solution versus concentration. The linearity is found between 5-25 mg / ml.

Concentration	Absorbance
5	0.1745
10	0.349
15	0.523
20	0.698
25	0.827

The reproducibility and reliability of method has been tested by performing recovery studies which showed good results.

Title: Recovery studies of the drug,

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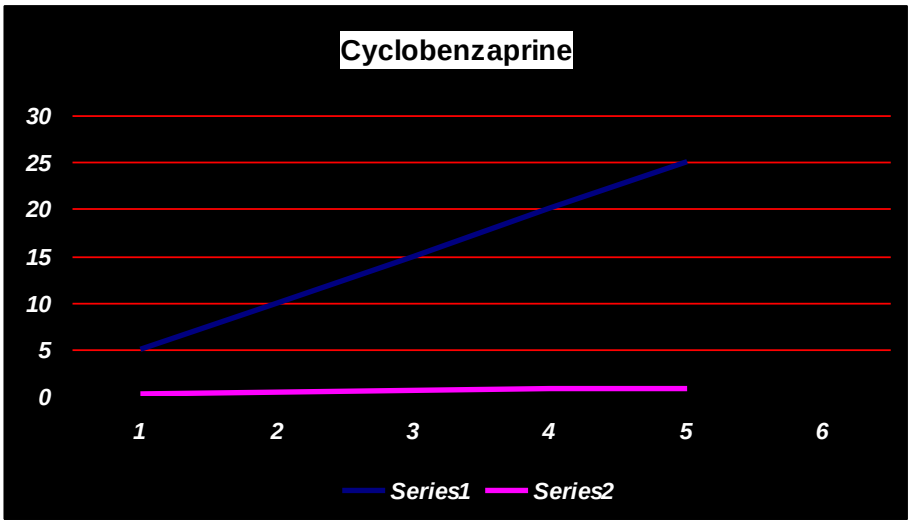

Units; X axis------ Absorbance, Y axis------Concentration

CONCLUSION

The proposed method is very simple, rapid and involves use of easy sample preparation. High percentage of recovery shows that the method is free from interference of the excipients used in the semi formulations. There fore the method can be useful in routine quality control analysis.

REFERENCES

[1] Philip TR Hwang, David A Young, Arthur B Straughn, Marvin C Meyer. J Liq Chrom & Rel Technol 1993;16(5):1163-1171.
[2] JC Spell, JT Stewart. J Pharm Biomed Anal 1998; 18 (3): 453-460.
[3] M Constanzer, C Chavez and B Matuszewski. J Chrom B: Biomed Sci and Appl 1995;666(1): 117-126.
[4] Timothy W Ryan. J Liq Chrom & Rel Technol 1993; 16(7):1520-5129.
[5] Nicole M Van Hoey. The Ann Pharmacother 39(7):1314-1317.