Research Article

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COMPARITIVE IN-VITRO EVALUATION OF DIFFERENT BRANDS OF CLONAZEPAM TABLETS

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Abstract

This study was concerned to assess the quality of different brands of Clonazepam tablets by evaluating & comparing the physico-chemical properties such as uniformity of weight, crushing strength, friability, disintegration, in-vitro dissolution of the drug along with drug content(assay). All the evaluated brands of Clonazepam tablets compiled with USP specifications for uniformity of weight, friability, crushing strength & disintegration. The amount of drug obtained & % purity was found to be less when compared to that of label claim. Among the five brands, 0.25mg & 0.5mg of Clonazepam tablets i.e., A_1 & B_4 was found to have more amount of drug. In the assay of Clonazepam tablets the UV method used was followedwhich is an simple, reproducible & economical method especially in the absence of high technology equipments that are not easily available in small scale laboratories.

Keywords: Clonazepam , Disintegration, Dissolution, Crushing strength, Friability.

Introduction

Clonazepam is chemically 5-(2-chlorphenyl)-1,3-dihyro-7-nitro-2H-1,4-benzodiazepine-2-one. Clonazepam is an anti-convulsant drug used in the therapy of absence seizures as well as myoclonic seizures.The most important drug delivery route is oral route. Drugs that are administered orally, solid dosage forms (tablets) in particular represent the preferred class of product. Tablet is the most popular among all dosage forms existing today because of its convenience of self administration, compactness, easy manufacturing, easy portability & they offer greater patient compliance & effective dosages .Variable clinical response to thesame dosage form of a drug product supplied by different manufacturers has been reported therapeutic in equivalences i.e., the variation in the observed dissolution profiles.

The main objective of this study was to evaluate & compare different brands of commercially available Clonazepam tablets, through the use of analytical methods, which are easy to use, simple & inexpensive with results, which compare favourablywith established official methods.

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Clonazepam tablets are available in 0.25mg, 0.5mg &1.5mg doses in the market.In the present study a comparision study between 0.25mg & 0.5mg tablets of different brandsof clonazepam was carried out. The physical parameters weight variation, thickness, hardness, friability, disintegration, dissolution &assay were considered during this study.

Materials and methods

Instrumentation

EI Double beam UV-Visible Spectrophotometer model no:1372, USP Disintegration apparatus, USP type II Dissolution apparatus, Roche friabilator, High precision balance, pHmeter, Monsanto hardness tester.

Materials & reagents

Reference Clonazepam drug & tablet is a gift sample from Reddy's laboratories. Four brands of clonazepam tablets were obtained from retail pharmacy.

Uniformity of weight

Carried out as per the procedure specified inUSP twenty tablets were randomly selected and weighed individually and their average weight was calculated, Percentage deviation from the average was then calculated. Same was done for each brand.

Hardness test

This is also known as crushing strength. The force required to crush clonazepam tablets was measured using monsanto hardness tester for 5 tablets. The average hardness of the tablets was determined.

Friability test

Twenty tablets were randomly selected & weighed. They were subjected to abrasion using Roche friabilator at 25 rpm/min for 5min. The % friability for each brand was calculated.

Disintegration test

This test was carried out using USP disintegration apparatus by taking six tablets which were individually placed in each tube of the basket rack. Distilled water is used as an disintegration medium & it was set at $37^0C \pm 2^0C$ and the average disintegration time was calculated.

Dissolution test

The dissolution study was carriedout using USP typeII dissolution apparatus(paddle type). 900ml of 0.1N Hcl (p^H 1.2) is used as dissolution medium & it is maintained at a temperature 37 ± 0.5°C ,the basket was rotated at 100 r.p.m. for 1hr. The samples were withdrawn for every 5min, filtered & are analyzed using UV-visible Spectrophotometer at 273nm using 0.1N Hcl as blank. 5ml of fresh dissolution medium was replaced after each sampling.

Assay

0.5mg of standard drug was dissolved in 25ml of methanol. Similarly Clonazepam of each brand were powdered & the powder equivalent to 2.5mg was taken and both standard & sample were dissolved in about 25ml of methanol. The above stock solutions, were diluted to obtain a concentration of 10µg/ml. Both the standard & sample solutions were analysed by measuring the absorbance using UV-Visible Spectrophotometer at 273nm against methanol as blank. The % purity was determined by using calibration curve method.

Results

Table No. 01: Physical Parameter values for different brands (A_1, A_2, A_3, A_4, A_5) of Clonazepam 0.25mg Tablets.

S.No	Physical parameter	A_1	A_2	A_3	A_4	A_5
1.	Weight variation	±0.92	±0.89	±0.99	±0.90	±0.85
2.	Hardness	4.5Kg/sq.Cm	4.2Kg/sq.Cm	4.9Kg/sq.Cm	5Kg/sq.Cm	4.7Kg/sq.Cm
3.	Friability	0.12%	0.14%	0.18%	0.17%	0.15%
4.	Disintegra-tion time	15Sec	14Sec	16Sec	14Sec	15Sec

Table No. 02: Physical Parameter values for different brands(B_1, B_2, B_3, B_4, B_5) of Clonazepam 0.5mg Tablets

S.No.	Physical parameter	B_1	B_2	B_3	B_4	B_5
1.	Weight variation	±0.84	±0.88	±0.83	±0.82	±0.86
2.	Hardness	4.7Kg/sq.Cm	4.5Kg/sq.Cm	5.0Kg/sq.Cm	4.8Kg/sq.Cm	4.3Kg/sq.Cm
3.	Friability	0.14%	0.12%	0.15%	0.13%	0.16%
4.	Disintegration time	15sec	13sec	16sec	14sec	15sec

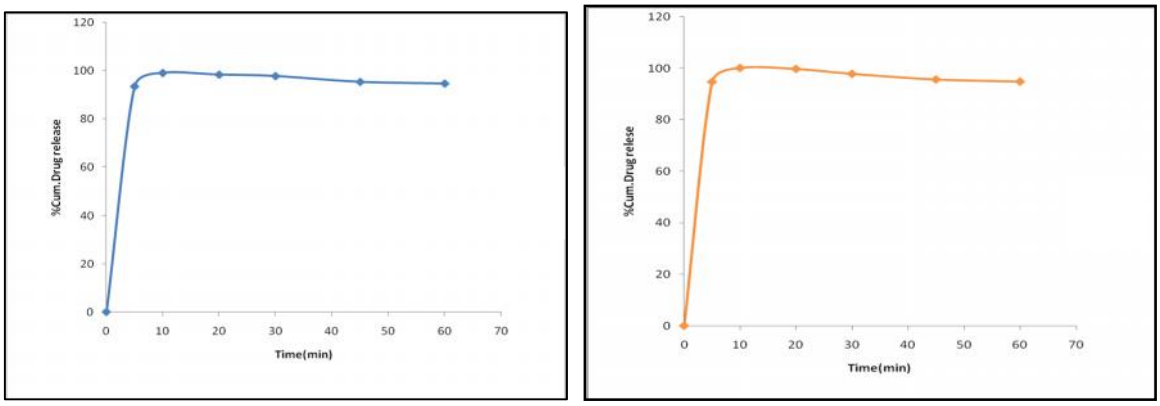
Table No. 03: Dissolution data for Clonazepam 0.25mg Tablets (A_1, A_2, A_3, A_4, A_5) in 0.1N HCl

Time(min)	Cumulative % drug release				
	A_1	A_2	A_3	A_4	A_5
0	0.00	0.00	0.00	0.00	0.00
5	93.6±0.12	92.9±0.42	93.5±0.21	93.0±0.13	92.5±0.33
10	99.2±0.28	98.8±0.14	98.9±0.36	97.7±0.42	97.1±0.34
20	93.6±0.12	97.2±0.39	96.8±0.45	96.2±0.31	96.2±0.23
30	97.9±0.32	95.6±0.43	96.4±0.15	95.8±0.22	94.6±0.30
45	95.5±0.40	94.5±0.20	95.6±0.37	94.8±0.27	93.8±0.19
60	94.8±0.21	93.2±0.38	94.7±0.35	94.1±0.41	93.2±0.29

Table No. 04: Dissolution data for Clonazepam 0.5mg (B_1, B_2, B_3, B_4, B_5) tablets in 0.1N HCl

Time(min)	Cumulative % drug release				
	B_1	B_2	B_3	B_4	B_5
0	0	0	0	0	0
5	92.8±0.12	92.2±0.20	94.7±0.69	94.7±0.32	92.1±.36
10	99.1±0.23	97.4±0.13	99.2±0.67	100.1±0.35	98.2±0.68
20	97.9±0.19	96.5±0.24	97.5±0.33	99.7±0.21	97.5±0.12
30	96.9±0.47	95.7±0.32	96.4±0.25	97.8±0.14	96.2±0.22
45	94.9±0.31	94.1±0.46	95.2±0.18	95.6±0.26	95.2±0.15
60	93.8±0.27	93.6±0.48	93.9±0.24	94.8±0.17	93.8±0.27

Figure No. 05 & 06 Dissolution profile of clonazepam 0.25mg(A1) & 0.5mg(B4) tablets at 273nm



Discussion

All the brands passed all the official tests as prescribed by the Pharmacopoeia. All the brands were within the limit when tested for thickness, weight variation, hardness, friability and disintegration. All the brands of Clonazepam tablets showed acceptable uniformity of weight as none had percentage deviation in weight greater than 5% as stipulated by the pharmacopoeia.

All the brands have passed the disintegration test as per the official specifications with time of not more than 15 minutes for uncoated tablets.The amount of drug obtained and percentage purity is less when compared to that of labelled claim. Among the five brands 0.25mg and 0.5mg of clonazepam tablets i.e.A_1 and B_4 was found to have more amount of the drug. The UV-Spectrophotometric method for the assay of Clonazepam tablets used in this study is Simple, Inexpensive, Reproducible and Easy to use and could be used in routine monitoring of the quality control studies of the Clonazepam tablets, especially in the absence of high technology equipment.

Conclusion

These techniques can be used for quality control studies of Clonazepam in pharmaceutical dosage forms.

References

1. R.B.KakdeSpectrophotometric method for simultaneous estimation of Escitalopram Oxalate andClonazepam in tablet dosage form,Indian Journal of Pharmaceutical Sciences , 71(60);Nov –Dec 2009, 702-705.
2. Chauhan BLComparitivebioavalibility study of Clonazepam after oral administration of two tablet formulations, 48(10), Oct 2000. 985-7.
3. OA Adegbolagun, OA Olalade and SE Osumah, comparative evaluation of biopharmaceutical and chemical equivalence of some commercially available brands of Ciprofloxacin hydrochloride tablets , Tropical Journal of Pharmaceutical Research , Sept 2007; 6(3): 737-745.
4. Mu'az,J; Gazali,Comparitive In-vitro evaluation of the Pharmaceutical and chemical equivalence of multisource generic Ciprofloxacin Hcl tablets ,Nigerian Journal of Pharmaceutical Sciences, vol 8 No:2 Oct 2009.
5. Remington: The science and practice of Pharmacy 21st addition vol-2 , 1503-1504.
6. Kimura S Orally fast disintegrating tablets: Developments, technologies, taste masking and clinical studies, A Critical review in therapeutic drug carrier system, 2004 , 433-76.
7. Bhardwaj S, Jain .V Orally Disintegrating Tablets; A review , Drug Invention Today, 2010; 2(1) , 81-88.
8. Velmurugan's and Sundar Vinushitha International Journal Of Chemical and Pharmaceutical Sciences.
9. Rangasamy Manivannan, Oral Disintegrating Tablets, Indian Journal Pharmaceutical Sciences, vol-1, issue-10, Dec 2005.