Journal of Pharmacreations

PharmaCreations

Pharmacreations | Vol.3 | Issue 2 | Apr - Jun - 2016
Journal Home page: www.pharmacreations.com

Research article ***Open Access***

Formulation and evaluation of chewable tablets of carbamazapine

Sowmya Ch*, C. Pavani

Sushrut Institute of Pharmacy, Taddanapally village, Pulkal madal, Medak, Sangareddy

***Corresponding Author: Sowmya Ch**

Email Id: chsowmya005@gmail.com

ABSTRACT

In the present work, chewable release tablets of Carbamzepine were prepared by wet granulation method. All the tablets were subjected to weight variation, drug content uniformity, and hardness, and friability, water absorption ratio, wetting time, dissolution, drug excipients interaction and short-term stability studies. Tablets prepared by wet granulation method were found to be good without any chipping, capping and sticking[1]. The hardness of the prepared tablets was found to be in the range of 5 to 6.5kg/ cm^2. The friability values were found to be in the range of 0.50 to 0.72%. Disintegration time was found to be in the range of 1-3min. Formulation F6 showed good results than rest of the 10 formulations in pre and post compression studies. IR-spectroscopic studies indicated that there are no drug–excipients interactions. The optimised formulation follows first order kinetics[2].

Key words: Carbamzepine, wet granulation method and stability studies.

INTRODUCTION

Oral solid dosage forms[1]

An Oral Dosage Form is the physical form of a dose of a chemical compound used as a drug or medication intended for administration or consumption by oral route. Common oral dosage forms are tablets or capsules. Tablets are solid preparations each containing a single dose of one or more active substances with or without excipients usually obtained by compressing uniform volumes of particles. Tablets are intended for oral administration[3]. Some are swallowed whole, some after being chewed, some are dissolved or dispersed in water before being administered and some are retained in the mouth where the active substance is liberated. The excipients can include binders, glidants and lubricants to ensure efficient tabletting; disintegrants to promote tablet break-up in the digestive tract; sweeteners or flavors to enhance taste; and pigments to make the tablets visually attractive. These are included in the formulations to facilitate easy handling, enhance the physical appearance, and improve stability and aid in the delivery of the drug to the blood stream after administration. A polymer coating is often applied to make the tablet smoother and easier to swallow, to control the releaserate of the active ingredient, to make it more resistant to the environment (extending its shelf life), or to enhance the tablet's appearance[4].

"In 1843, the first patent for a hand operated device used to form a tablet was granted." Tablets are defined as solid preparations each containing a single dose of one or more active ingredients and obtained by compressing uniform volumes of particles. They are intended for oral administration, some are swallowed whole, some after being chewed. Some are dissolved or dispersed in water before being

administered and some are retained in the mouth, where the active ingredient "liberated". Tablets are used mainly for systemic drug delivery but also for local drug action. For systemic use drug must be released from tablet that is dissolved in the fluids of mouth, stomach and intestine and then absorbed into systemic circulation by which it reaches its site of action[6]. Tablets remain popular as a dosage form because of the advantages, afforded both to the manufacturer [e.g. simplicity and economy of preparation, stability and convenience in packing, shipping and dispensing] and the patient[10] [e.g. accuracy of dosage, compactness, portability, blandness of taste and ease of administration].

They may differ greatly in size and weight depending on the amount of drug substance present and the intended method of administration. They may have lines or break-marks and may bear a symbol or other markings. Tablets may be coated [8,9].

AIM AND OBJECTIVE

Aim

To formulate and evaluate tablets Carbamezapine chewable tablets using different excipients and selecting best of them.

Objective

- To design the formula for chewable Release tablet.
- To incorporate selected model drug candidates in the formula and prepare tablets.
- To evaluate the formulated tablets.
- By physical parameters and
- By *in-vitro* dissolution profile of prepared tablets.

METHODOLOGY

Formulation of carbamazepine 250 mg tablets

Table No 1: Formulations

Ingredients	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
Carbamazepine	100	100	100	100	100	100	100	100	100	100
SLS	3	3	3	3	3	3	3	3	3	-
CP	10	15	20	-	-	-	-	-	-	-
CCS	-	-	-	10	15	20	-	-	-	20
SSG	-	-	-	-	-	-	10	15	20	-
Mg.stearate	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Aerosol	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Mannitol	q.s	q.s	q.s	q.s	q.s	q.s	q.s	q.s	q.s	q.s

Formulation Planning

The fast dissolving tablets containing 100mg carbamazepine were prepared with a total tablet weight of 250mg.

Manufacturing Procedure

Mannitol, cross Carmellose sodium/sodium starch glycolate/cross povidone, sodium lauryl Sulphate were weighed and sifted through 40 mesh.To the above blend carbamazepine was added and sifted through 18 mesh.The sifted material was placed in poly bag and mixed for 5 min.the above blend add mg.stearate and Aerosil, and this lubricated blend was added and placed in poly bag and mixed for 2-3 min.The lubricated blend was compressed using 9 mm round punches.

RESULTS

Preformulation Study

Organoleptic Properties (Color, odor, taste and appearance)

Table No 2: Results of identification tests of drug

S.NO	Parameter	Drug
1	Color	White to off White color
2	Odor	Odorless
3	Taste	Tasteless
4	Appearance	Crystalline powder

Melting point determination: Drug: Carbamazepine

Table No 3: Results of Melting point determination test of drug

Reported Melting Point	Observed Melting Point
190.2ºC	**190-192ºC**

Determination of solubility

Easily Soluble in chloroform, methanol, soluble in glacial acetic acid, benzene, acetone, ethanol, slightly soluble in water, ether.

Evaluation of Blend

Table No 5: Bulk density, Tapped density, % Compressibility index, Hausner ratio and Angle of repose. (Precompression studies)

Table No 4: Micromeritic properties

FORMULATION	BULK DENSITY gm/ml	TAPPED DENSITY gm/ml	CARR'S INDEX %	Hausner ratio	Angel of repose	Property
F1	0.453	0.689	34.252	1.520	55	POOR
F2	0.489	0.710	31.126	1.451	52	POOR
F3	0.710	0.873	19.714	1.251	31	FAIR
F4	0.721	0.870	17.126	1.206	32	FAIR
F5	0.718	0.871	18.513	1.223	36	FAIR
F6	0.410	0.483	15.113	1.178	29	FAIR
F7	0.420	0.482	15.010	1.131	32	FAIR
F8	0.541	0.691	21.62	1.276	38	PASSIBLE
F9	0.484	0.615	21.30	1.270	44	PASSIBLE
F10	0.450	0.585	23.07	1.300	41	POSSIBLE

Evaluation of Tablets

Table No 5: Post compression studies

Formulation code	Weight variation	Hardness (kg/cm^2)	Friability (%)	Thickness (mm)	Content uniformity	Disintegration Time (min)
F1	249	6.5	0.65	3.41mm	99.28	2min
F2	250	6.3	0.67	3.43mm	99.16	48sec
F3	249	6.0	0.68	3.45mm	101.1	27sec
F4	248	6.4	0.64	3.42mm	98.68	1min 20 sec
F5	247	6.1	0.64	3.44mm	99.41	44 sec
F6	249	6.0	0.65	3.42mm	99.28	20 sec
F7	250	6.2	2.3	3.4mm	102.6	15sec
F8	249	6.5	1.8	3.4mm	99.5	18sec
F9	248	6.3	0.68	3.43mm	99.6	35sec
F10	246	6.0	0.69	2.60mm	100.4	1min 24sec

In -vitro drug release study

Paddle method Dissolution data of chewable dosage formulations of Carbamazepine by Paddle method (USP II) are reported in Table6.

Table No 6: Dissolution Values

Time in min	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
5	36	40	48	39	46	**54**	42	45	48	32
10	68	73	76	72	78	**86**	59	76	79	50
15	79	81	85	80	87	**91**	76	88	87	72
20	85	92	90	89	93	**98**	85	94	93	88
30	93	97	96	93	97	**98**	90	98	96	95
45	98	97	96	98	97	**98**	96	98	98	98
60	98	97	96	98	97	**98**	96	98	98	98

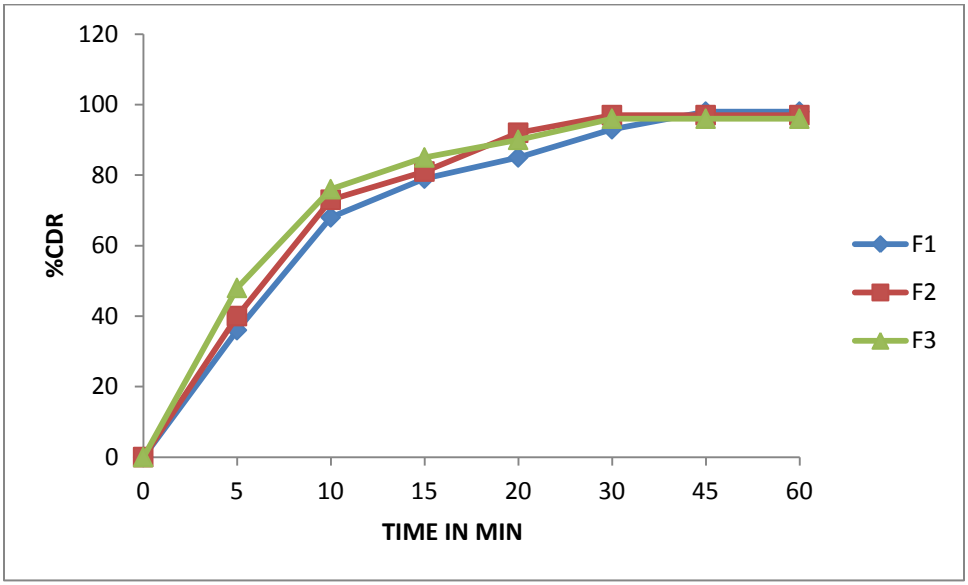


Figure No 2: Cumulative % drug released for formulations F1-F3

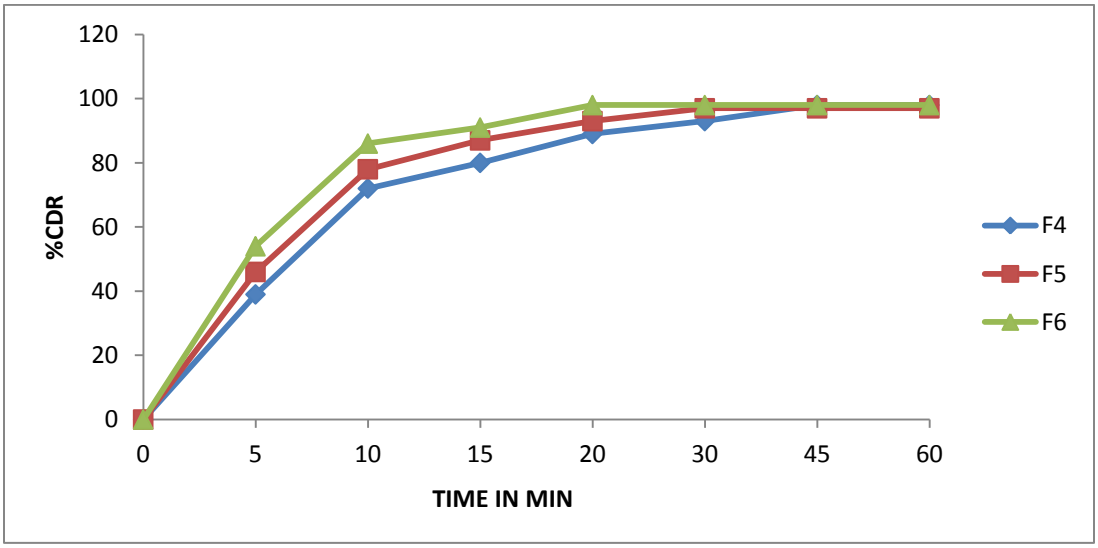


Figure No 3: Cumulative % drug released for formulations F4-F6

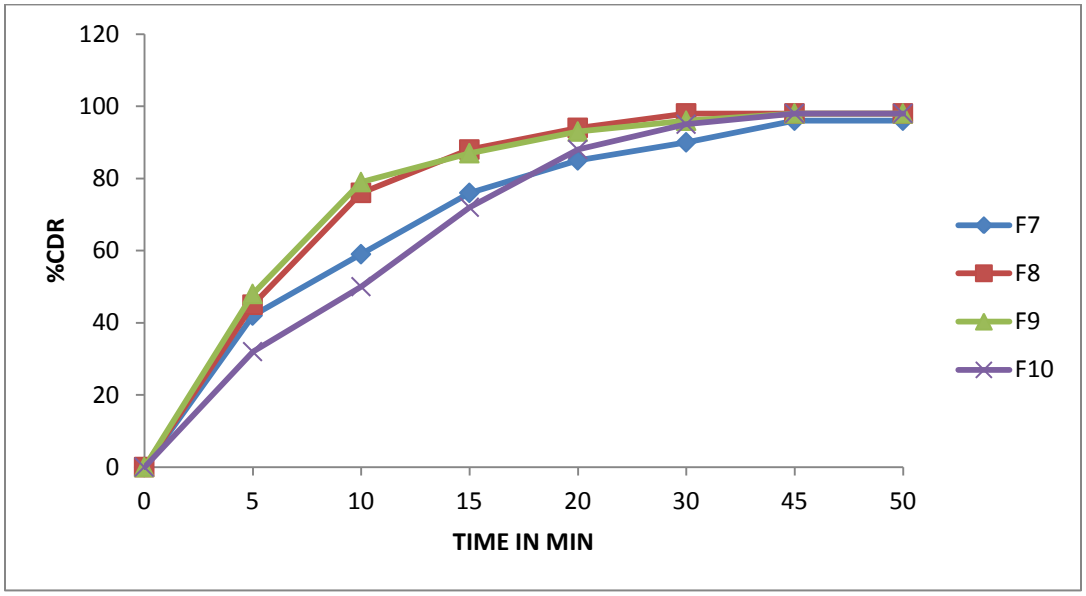
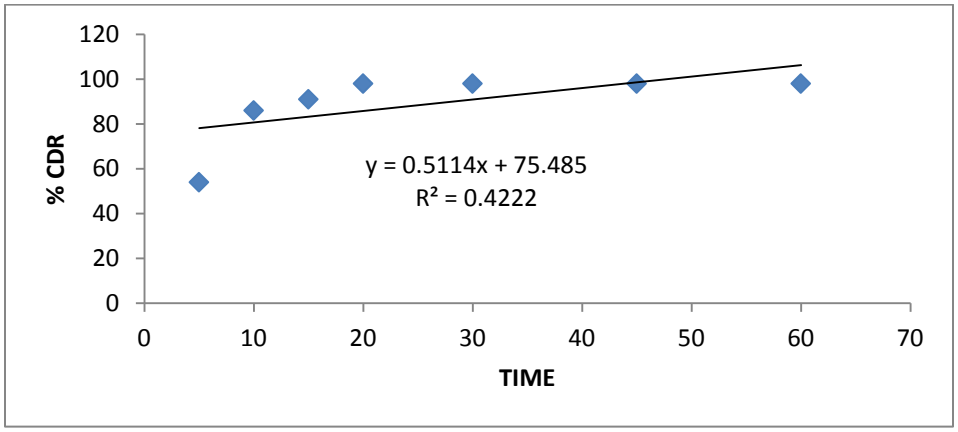
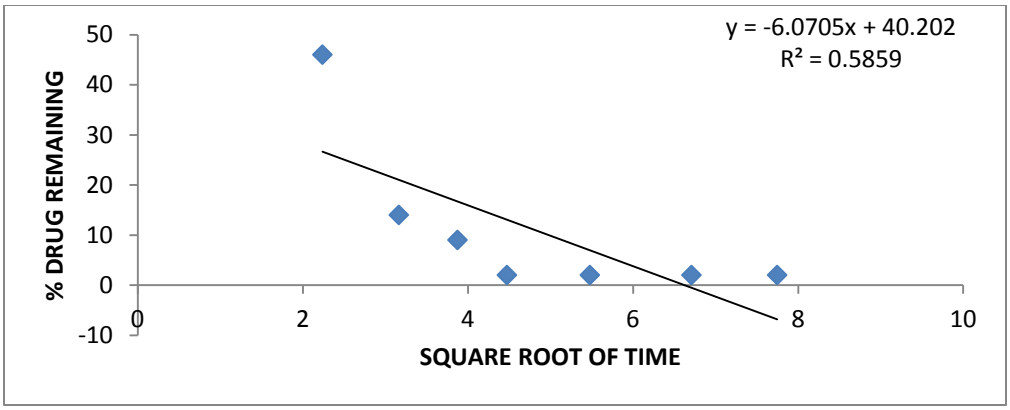


Figure No 4: Cumulative % drug released formulations F7-F11

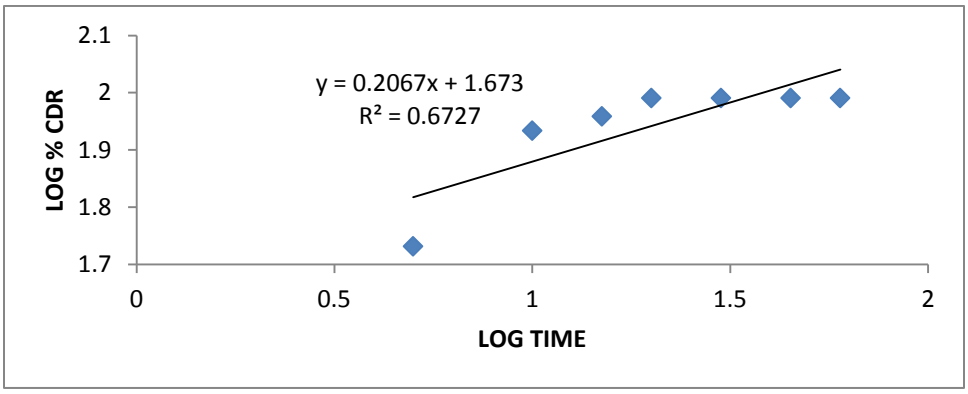
ZERO ORDER KINETICS



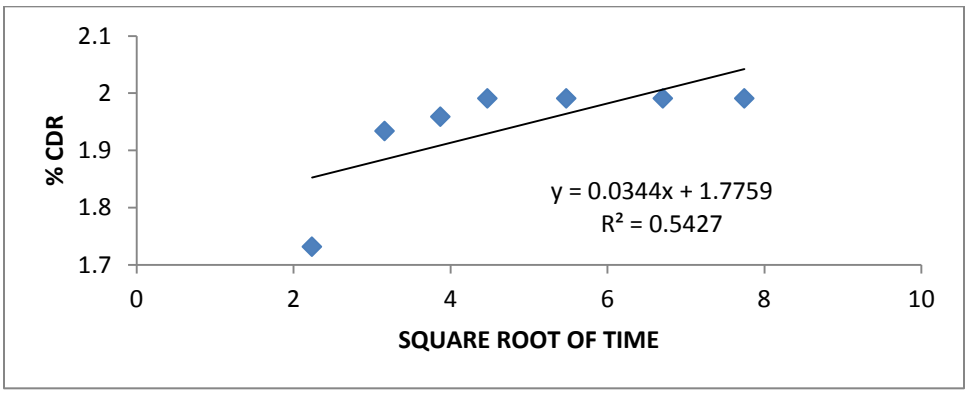
FIRST ORDER



PEPPAS MODEL



HIGUCHIS MODEL



	RELEASE KINEITCS			
	ZERO	**HIGUCHI**	**PEPPAS**	**FIRST**
	1	**2**	**3**	**4**
	Q Vs T	**Q Vs √T**	**Log C Vs Log T**	**Log % Remain Vs T**
Slope	1.0938	6.0707	0.2065	-0.0313
Intercept	52.5798	59.7959	1.6735	3.4952
Correlation	0.6498	0.7367	0.8202	-0.7654
R 2	0.4222	0.5427	0.6727	0.5859

DISCUSSION

The hardness of the prepared tablets was found to be in the range of 5 to 6.5kg/ cm^2. The friability values were found to be in the range of 0.50 to 0.72%. Disintegration time was found to be in the range of 1-3min. Formulation F6 showed good results than rest of the 10 formulations in pre and post compression studies. The average weight and drug content of the prepared tablets indicate weight and drug content uniformity within the batches prepared. Formulation F6 (98) displayed maximum drug release which shows similar drug release as that of F7,F8, but F7 and F8 was failed in hardness and friability.

CONCLUSION

In the present study an attempt has been to formulate and evaluate chewable release tablets of Carbamazepine by dry granulation technique. The procured drug sample of Carbamazepine was tested for its identification by means of organoleptic properties, melting point, UV spectra and FTIR spectrum. The drug sample showed similar results as reported in literature. In vitro dissolution studies were performed in 6.8pH phosphate buffer on the above promising formulation, namely, formulation 6. In the dissolution studies, the maximum drug release was found to be with formulation F6 of maximum drug release (98%). The F6 formulation followed first order kinetics where it depends on concentration of drug and followed peppas model of drug release where it showed erosion type of release mechanism followed up by matrix type of diffusion higuchis mechanism.

REFERENCES

[1]. Leon Lachmann , Herbert A , Liberman , Joseph L.Kaing , The theory and practice of Industrial Pharmacy; 293-303.

[2]. Ansel`s Pharmaceutical dosage forms & drug delivery systems, eighth edition;227-260 Aulton`s Pharmaceutics, The design & manufacture of medicines, Biopharmaceutics and pharmacokinetics, A Treatise, second edition, Valabh Prakashan, 315-384

[3]. Abdelbary G, Prinderre P, Eouani C, Joachim J, Reynier JP and Piccerelle P. The preparation of orally disintegrating tablets using a hydrophilic waxy binder, Internatinal Journal of Pharmaceutics. 2004; 278: 423-33.

[4]. Tanmoy ghosh, Amitava ghosh and Devi prasad, A review on new generation orodispersible tablets and its future prospective, International Journal of Pharmacy and Pharmaceutical Sciences I. 2011, 3(1): 24-29

[5]. Fast Dissolving Tablet: An Overview, Journal of Chemical and Pharmaceutical Research, 2009, 1(1): 163-177.

[6]. Liang AC, Chen, Li-Lan H, Fast-dissolving Intra oral drug delivery systems, Expert Opinion, 2001, 11(6), 981-986.www. ElanNanoCrystal_Technology.htm.

[7]. Handbook of excipients, --- Rowe.R.C, shestey P.J, Weller P.J Hand book of pharmaceutical excipients, 4th edition, london, Chicago:Pharmaceutical press, American pharmaceutical association;2003.

[8]. Kuno Y, Kojima M, Ando S and Nakagami H. Evaluation of rapidly disintegrating tablets manufactured by phase transition of sugar alcohols. Journal of Control Release. 2005; 105: 16-22.

[9]. Allen LV, Wang B and Davis JD. US patent. 1998; 5: 807 & 567.

[10]. CIMA Labs, Inc. CIMA--Technologies. 25 May 2001 http://www.cimalabs.com/tech.htm

[11]. Susijit Sahoo, Mishra .B, Biswal .P, Omprakash Panda, Satosh Kumar Mahapatra, Goutam Kumar Jana, Fast Dissolving Tablet: As A Potential Drug Delivery System. Drug Invention Today. 2010, 4(2): 130-133

[12]. Reddy.L.H et al., "Fast dissolving drug delivery systems: A review of the literature, International journal of pharmaceutical Sciences. 2002: 5(2): 331-336.

[13]. Fu Y, Yang S, Jeong SH, Kimura S, Park K, Orally fast disintegrating tablets: Developments, technologies, taste-masking and clinical studies. Critical Reviews in Therapeutic Drug Carrier Systems 2004; 21:433-76.