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Formulation and Evaluation of Extended Release Floating Matrix Tablet of Eperisone Hydrochloride by Direct Compression Method

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ABSTRACT

Increased complications and costs of marketing of innovative drugs focused greater attention to the development of sustained release (SR) or controlled release (CR) drug delivery systems. Delivery systems extended release or controlled release rate can achieve predictable and reproducible, the extended duration of activity for the short time of life - drugs, reduced toxicity and dose reduction request, the optimized therapy and better patient compliance. It is controlled primarily by the type and the proportion of the polymers used in the preparation. Eperisone hydrochloride is a centrally acting muscle relaxant acting through poly and mono-synaptic reflexes in the spinal cord, exhibits vasodilator effect, increases blood flow and inhibits the pain reflex pathway. The objective of present work was to develop and evaluated oral extended release floating matrix tablet of eperisone HCl prepared by the method of direct compression, using hydroxy propyl methyl cellulose (HPMC K15, HPMC K4) and PVP K30 as matrix formation polymers. Sodium bicarbonate and citric acid was used as gas generating agents. The FTIR spectra of the eperisone HCl and other excipients alone and in combination show the compatibility of the drug and excipients. Nine formulations of different polymer percentages were formulated (F1-F9). Pre-compression parameters were evaluated. The influence of matrix forming agents and binary mixtures of them on eperisone HCl release was investigated. The formulated tablets were characterized by thickness and diameter, drug content, hardness, friability, uniformity of weight, *In vitro* buoyancy studies and dissolution rate studies. The formulated tablets had acceptable physicochemical characters. The data obtained from the *in-vitro* dissolution studies of optimized batch F7 were fitted in different models. The optimized formulation F7 showed 99.45±0.45% drug content and floating lag times of 65±4 sec. Drug release mechanism was found to be first order kinetics. Eperisone HCl floating tablets exhibited increased gastric residence time, there by improved bioavailability and therapeutic effect of the drug.

Keywords: Sustained release, Eperisone hydrochloride, Direct compression, Pre and post compression parameters

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INTRODUCTION

Oral controlled drug delivery system provides the continuous oral delivery of drugs at predictable and reproducible kinetics for a predetermined period throughout the course of Gastro Intestinal (GI) transit. Conventional oral controlled dosage forms suffer from mainly two adversities the short gastric retention time and unpredictable gastric emptying time[1]. A relatively short GI transit time of most drug products impedes the formulation of single daily dosage forms. Altering the gastric emptying can overwhelm these problems. Therefore it is desirable, to formulate a controlled release dosage form that gives an extended GI residence time. One of the most feasible approaches for achieving a prolonged and predictable drug delivery profiles in the gastrointestinal tract is to control the gastric residence time using gastro retentive dosage forms that offer a new and better option for drug delivery[2]. Dosage forms that can be retained in the stomach are called gastro retentive drug delivery systems. Gastro retentive systems can remain in the gastric region for several hours and hence significantly prolong the gastric residence time of drugs. Prolonged gastric retention improves bioavailability, reduces drug waste and improves solubility for drugs that are less soluble in a high pH environment[3]. Gastro retentive floating tablets have been emerged as an efficient means of enhancing the bioavailability of many drugs. Rapid gastro-intestinal transit could result in incomplete drug release from the drug delivery system above the absorption zone leading to diminished efficacy of administered dose[4]. In this present

formulation, dual benefits of buoyancy as well as sustained action are achieved with an intention to maintain the steady state of drug release[5]. Hydrophilic matrix system is one of the easiest approaches for developing modified and sustained release dosage forms. A polymer like hydroxyl propyl methyl cellulose (HPMC) function as a pH independent gelling agent and drug release is shown by swelling and erosion mechanism occurring simultaneously contributing to overall drug release[6].Matrix system is the commonly used method for modulating the drug release[7]. The manufacture of matrix tablets by direct compression is cheaper, simpler process, broad regulatory acceptance and allows flexibility in obtaining desirable release profiles[8]. Eperisone hydrochloride which is chemically known as 4'-ethyl-2-methyl-3-piperidino propiophenone hydrochloride, has chemical formula C17H25NO and belongs to the class of muscular relaxants, having molar mass 259.387g/mol[9]. The drug acts by acting on central nervous stem cells providing relaxation of both skeletal and vascular smooth muscles[10]. Oral eperisone is effectively used three times daily (t.i.d) at dosage regimen of 100 mg. It is well known for use in the treatment of muscular spasm, lower back pain, cervical spondolysis and in spastic paralysis in terms of cerebrovascular disease. The drug is well tolerated at doses of with mild GI symptoms involving nausea; abdominal cramps, headache and dizziness are the commonly observed adverse effects[10-12]. The drug is rapid absorption after oral administration. It has biological half-life of about 1-4.3 hour, its rapid elimination rules out risk of accumulation[13]. The present study is to develop a floatable drug delivery system of eperisone hydrochloride using hydroxy propyl methyl cellulose, PVP K30 for sustained drug delivery and gastric retentive property. Thus the study aims to improve the oral bioavailability of the drug and to achieve extended retention in the stomach which may result in prolonged absorption.

MATERIALS AND METHODS

Materials

Eperisone hydrochloride was obtained as a gift sample from Macleod's Pvt Ltd. (India). Hydroxy propyl methyl cellulose (HPMC K4 &K15) was procured from Colorcon Asia Bio limited. (India). PVP K30, Citric acid, Magnesium stearate, Sodium bicarbonate, Talc, Lactose, were procured from S. D. Fine Chem. Ltd, Mumbai, India. All other chemicals and solvents used were analytical grades.

Methods

Preformulation studies

Standardization of eperisone HCl by UV-Visible spectrophotometry

Preparation of standard stock solution

10mg of eperisone HCl was weighed accurately and transferred to 10 ml volumetric flask, and the volume was adjusted to the mark with the 0.1 N HCl to give a stock solution of 1000 ppm or µg/ml. This solution was suitably diluted with 0.1 N HCl to obtain a concentration of 15µg/ml. The resultant solution was scanned in the range of 200-400 nm using UV double beam spectrophotometer (Labindia U.V. 3000 +).

Standard calibration of eperisone HCl in 0.1N HCl

100 mg of eperisone HCl was accurately weighed and dissolved in100 ml of 0.1N HCl to obtain a concentration of 1000µg/ml. From the above 10 ml was withdrawn and diluted to 100 ml to obtain a concentration of 100µg/ml. From this stock solution aliquots of 0.5, 1.0, 1.5, 2.0 and 2.5 ml were diluted in 10 ml volumetric flask with water to give concentrations in the range of 5-25µg/ml, respectively, absorbance was measured at 276 nm.

Identification eperisone HCl by IR

Identification of eperisone HCl was done by FTIR spectroscopy with respect to marker compound. Eperisone HCl was obtained as white crystalline powder. It was identified from the result of IR spectrum as per specification.

Preparation of floating matrix tablets of eperisone HCl

Eperisone HCl matrix floating tablets were prepared by direct compression method employing sodium bicarbonate and citric acid as gas-generating agent. HPMC and PVP K30 were used as rate controlling polymers. The concentrations of the excipients were optimized as showed in table 1. The drug was mixed with the rate retarding polymers and other excipients in ascending order of their weights. The powder mix was blended for 20 min to have uniform distribution of drug in the formulation. Then magnesium stearate and talc were added. About 280 mg of the powder mix was weighed accurately and fed into the die and compressed using 10 mm round surface punches[14]. The composition of formulation was given in table 1.

Table 1 Composition of SR matrix floating tablet of eperisone HCl

Excipients(mg)	F1	F2	F3	F4	F5	F6	F7	F8	F9
Eperisone HCl	50	50	50	50	50	50	50	50	50
HPMC K 15	80	100	120	-	-	-	40	50	60
HPMC K 4	-	-	-	80	100	120	40	50	60
PVP K30	20	20	20	20	20	20	20	20	20
Citric acid	10	10	10	10	10	10	10	10	10
$NaHCO_3$	20	20	20	20	20	20	20	20	20
$Mg(C_{18}H_{35}O_2)_2$	5	5	5	5	5	5	5	5	5
Talc	5	5	5	5	5	5	5	5	5
Lactose	90	70	50	90	70	50	90	70	50
Total Weight	280	280	280	280	280	280	280	280	280

Evaluation of eperisone HCl floating matrix tablets

Pre-compression parameters

Angle of repose

The angle of repose of blends was determined by the funnel method. The accurately weighed blend was taken in the funnel. The height of the funnel was adjusted in such a way that the tip of the funnel just touched the apex of the heap of the blend. The blend was allowed to flow from the funnel on the surface. The diameter and height of the heap formed from the blend were measured. The angle of repose was calculated using the following formula[15].

$$\text{Tan } \Theta = h/r$$

Where, "h" is the height of the heap and "r" is the radius of the heap of granules.

Bulk density (BD)

An accurately weighed powder blend from each formula was lightly shaken to break any agglomerates formed and it was introduced in to a measuring cylinder. The volume occupied by the powder was measured which gave bulk volume. The BD of powder blends was determined using the following formula[16].

$$\text{Bulk density} = \frac{\text{Total weight of powder}}{\text{Total volume of powder}}$$

Tapped bulk density (TBD)

An accurately weighed powder blend from each formula was lightly shaken to break any agglomerates formed and it was introduced into a measuring cylinder. The measuring cylinder was tapped until no further change in volume was noted which gave the tapped volume. The TBD of powder blends was determined using the following formula[17].

$$\text{TBD} = \frac{\text{Total weight of powder}}{\text{Total volume of tapped powder}}$$

Carr's compressibility index

The Carr's compressibility index was calculated from bulk density (BD) and tapped density of the blend. A quantity of 2 g of blend from each formulation, filled into a 10 ml of measuring cylinder. Initial bulk volume was measured, and cylinder was allowed to tap from the height of 2.5 cm. The tapped frequency was 25±2/min to measure the tapped volume of the blend. The BD and tapped density were calculated by using the bulk volume and tapped volume.

Carr's compressibility index was calculated using the following formula[18,19].

$$\text{Carr's compressibility index (\%)} = \frac{\text{Tapped density} - \text{Bulk density}}{\text{Tapped density}} \times 100$$

Hausner's ratio

It is the measurement of frictional resistance of the drug. The ideal range should be 1.2-1.5, it was determined by the ratio of tapped density and bulk density.

$$\text{HR} = \text{Tapped Density} / \text{Bulk Density}$$

Post-compression parameters

All the tablets were evaluated for following different parameters which includes;

General appearance

Ten tablets from different batches were randomly selected and organoleptic properties such as color, shape, were evaluated. Appearance was judged visually. Very good (+++), good (++), fair (+) poor (-), very poor (- -).

Thickness and diameter

Thickness and diameter of tablets were determined using Vernier caliper. Five tablets from each batch were used and an average value was calculated.

Drug content

Twenty tablets were taken and amount of drug present in each tablet was determined. The tablets were crushed in a mortar and the powder equivalent to 100mg of drug was transferred to 100ml standard flask. The powder was dissolved in 50 ml of 0.1 N HCl and made up to volume with of 0.1 N HCl. The sample was mixed thoroughly and filtered through a 0.45µ membrane filter. The filtered solution was diluted suitably and for drug content by UV spectrophotometer at λ max of 276 nm using of 0.1 N HCl as blank.

Hardness

For each formulation, the hardness of five tablets was determined using the Monsanto hardness tester (Cadmach).

Friability

From each batch, ten tablets were accurately weighed and placed in the friability test apparatus (Roche friabilator). Apparatus was operated at 25 rpm for 4 minutes and tablets were observed while rotating. The tablets were then taken after 100 rotations, dedusted and reweighed. The friability was calculated as the percentage weight loss.

% friability was calculated as follows

% Friability = (W1 – W2) x 100/W1

Where W1 = Initial weight of the 10 tablets, W2 = Final weight of the 10 tablets after testing.

Friability values below 0.5-1% are generally acceptable

Uniformity of weight

Twenty tablets were randomly selected from each batch individually weighed, the average weight and standard deviation of 20 tablets was calculated.

In vitro buoyancy studies

In vitro buoyancy was determined by floating lag time as per the method described by Rosa *et al.* The tablets were placed separately in a 100 ml glass beaker containing simulated gastric fluid (SGF), pH 1.2 as per USP. The time required for the tablet to rise to the surface and float was determined as floating lag time[20].

Dissolution rate studies

In vitro drug release of the sample was carried out using USP- type II dissolution apparatus (Paddle type). The dissolution medium, 900 ml 0.1N HCl was placed into the dissolution flask maintaining the temperature of 37±0.5^{0}C and rpm of 75. One eperisone HCl tablet was placed in each basket of dissolution apparatus. The apparatus was allowed to run for 10 hours. Sample measuring 5 ml were withdrawn after every 1 hour up to 10 hours using 10ml pipette. The fresh dissolution mediums (37^{0}C) were replaced every time with the same quantity of the sample and take the absorbance at 276.0 nm using spectroscopy.

Mathematical treatment of *in-vitro* release data

The quantitative analysis of the values obtained in dissolution/release tests is easier when mathematical formulas that express the dissolution results as a function of some of the dosage forms characteristics are used.

1. Zero-order kinetics: The pharmaceutical dosage forms following this profile release the same amount of drug by unit of time and it is the ideal method of drug release in order to achieve a pharmacological prolonged action. The following relation can, in a simple way, express this model:

$$\mathbf{Q_t = Q_o + K_o t}$$

where Q_t is the amount of drug dissolved in time t, Q_o is the initial amount of drug in the solution (most times, Q_o=0) and K_o is the zero order release constant.

2. First-order kinetics: The following relation expresses this model:

$$\log Q_t = \log Q_o + \frac{K_1 t}{2.303}$$

where Q_t is the amount of drug dissolved in time t, Q_o is the initial amount of drug in the solution and K_1 is the zero order release constant.

In this way a graphic of the decimal logarithm of the released amount of drug versus time will be linear. The pharmaceutical dosage forms following this dissolution profile, such as those containing water-soluble drugs in porous matrices, release drug in a way that is proportional to the amount of drug remaining in its interior, in such way, that the amount of drug released by unit of time diminish.

3. Higuchi model: Higuchi developed several theoretical models to study the release of water-soluble and low soluble drugs in semi-solid and/or solid matrixes. Mathematical expressions were obtained for drug particles dispersed in a uniform matrix behaving as the diffusion media.

The simplified Higuchi model is expressed as:

$$Q = K_H . t^{1/2}$$

Where Q is the amount of drug released in time t and K_H is the Higuchi dissolution constant. Higuchi model describes drug release as a diffusion process based in the Fick's law, square root time dependent. This relation can be used to describe the drug dissolution from several types of modified release pharmaceutical dosage forms such as transdermal systems and matrix tablets with water-soluble drugs.

4. Korsmeyer-Peppas model: Korsmeyer *et al.* used a simple empirical equation to describe general solute release behaviour from controlled release polymer matrices:

$$\frac{M_t}{M_\infty} = a\, t^n$$

Where M_t/M_∞ is fraction of drug released, a is kinetic constant, t is release time and n is the diffusional exponent for drug release. 'n' is the slope value of log M_t/M_∞ versus log time curve. Peppas stated that the above equation could adequately describe the release of solutes from slabs, spheres, cylinders and discs, regardless of the release mechanism. Peppas used this n value in order to characterize different release mechanisms, concluding for values for a slab, of *n* =0.5 for fickian diffusion and higher values of *n*, between 0.5 and 1.0, or *n* =1.0, for mass transfer following a non-fickian model. In case of a cylinder *n* =0.45 instead of 0.5, and 0.89 instead of 1.0. This equation can only be used in systems with a drug diffusion coefficient fairly concentration independent. To the determination of the exponent *n* the portion of the release curve where M_t/M_∞ < 0.6 should only be used. To use this equation it is also necessary that release occurs in a one-dimensional way and that the system width-thickness or length-thickness relation be at least 10. A modified form of this equation was developed to accommodate the lag time (*l*) in the beginning of the drug release from the pharmaceutical dosage form:

$$\frac{M_{t-l}}{M_\infty} = a\,(t-l)^n$$

When there is the possibility of a burst effect, b, this equation becomes:

$$\frac{M_t}{M_\infty} = at^n + b$$

In the absence of lag time or burst effect, l and b value would be zero and only at^n is used. This mathematical model, also known as *Power Law*, has been used very frequently to describe release from several different pharmaceutical modified release dosage forms[21-23].

RESULTS AND DISCUSSIONS

Eperisone HCl was found to be white crystalline powder in appearance, odourless and tasteless. Solubility of eperisone HCl was freely soluble in methanol, ethanol and water, soluble in chloroform and 0.1N HCl, Slightly soluble in 0.1N NaOH and Insoluble in 7.2 phosphate buffer. The melting point of eperisone HCl was 169-171°C and percentage of loss on drying, moisture content of eperisone HCl was found to be 0.25%, 0.13% respectively. The λ_{max} of eperisone HCl was found to be 276 nm by using U.V. spectrophotometer (Labindia-3000+) in linearity range 5-25 µg/ml Fig.1. Identification of eperisone HCl was done by FTIR spectroscopy with respect to marker compound. It was identified from the result of IR spectrum as per specification Fig.2.

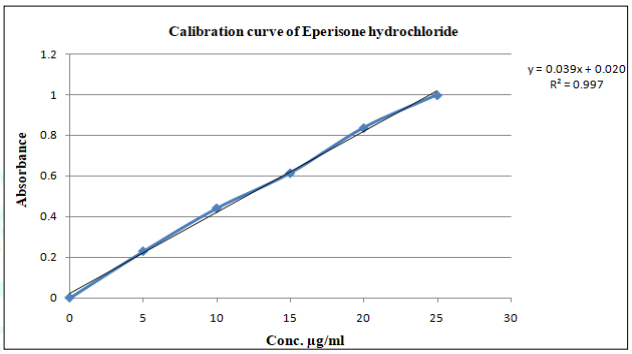

Figure 1 Calibration curve of eperisone hydrochloride

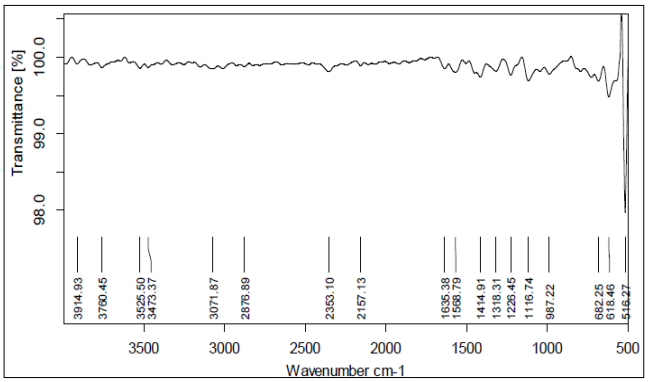

Figure 2 IR Spectra of eperisone hydrochloride

Tablet powder blend was subjected to various pre-compression parameters Table 2. The angle of repose values indicates that the powder blend has good flow properties. The bulk density of all the formulations was found to be in the range of 0.515±0.25 to 0.565±0.45 (gm/ml) showing that the powder has good flow properties. The tapped density of all the formulations was found to be in the range of 0.596±0.74 to 0.636±0.32 showing the powder has good flow properties. The compressibility index and Hauser's ratio of all the formulations were found to be ranging between 9.364±0.45 to14.869±0.21 and1.103±0.10 to1.175±0.15 respectively which show that the powder has good flow properties.

Table 2 Result of pre-compression properties of eperisone hydrochloride tablets blend

F. Code	Angle of repose (θ)	Bulk density(gm/ml)	Tapped density(gm/ml)	Compressibility index	Hausner's ratio
Eperisone hydrochloride					
F1	36.56±0.25	0.515±0.25	0.598±0.32	13.879±0.12	1.161±0.45
F2	36.45±0.36	0.526±0.32	0.599±0.25	12.186±0.25	1.139±0.36
F3	35.65±0.45	0.545±0.14	0.605±0.45	9.917±0.36	1.110±0.25
F4	35.65±0.25	0.521±0.36	0.612±0.65	14.869±0.21	1.175±0.15
F5	36.12±0.45	0.532±0.45	0.605±0.14	12.066±0.35	1.137±0.47
F6	36.45±0.36	0.536±0.36	0.615±0.45	12.845±0.45	1.147±0.98
F7	36.45±0.58	0.565±0.45	0.636±0.32	11.163±0.74	1.126±0.12
F8	36.45±0.69	0.542±0.12	0.598±0.48	9.364±0.45	1.103±0.10
F9	36.45±0.78	0.536±0.32	0.596±0.74	10.067±0.47	1.112±0.32

The results of post-compression parameters such as the thickness and diameter, drug content, hardness, friability, uniformity of weight, *In vitro* buoyancy studies and dissolution rate studies of the tablets are given in Table 3. All the tablets of different batches complied with the official requirements of uniformity of weight. The hardness of the tablets ranged from 5.1±0.1to 5.8±0.3 kg/cm^2 and the friability values were less than 0.8% indicating that the matrix tablets were compact and hard. The thickness of the tablets ranged from 3.12±0.06 to3.61± 0.05mm. All the formulations satisfied the content of the drug as they contained 98.69±0.23 to 99.45±0.45 % of eperisone HCl and good uniformity in drug content was observed. Thus all the physical attributes of the prepared tablets were found be practically within control.

Table 3 Results of post compression properties of eperisone hydrochloride floating matrix tablets

F. code	Thickness* (mm)	Hardness* (kg/cm2)	Weight variation* (mg)	Friability* (%)	Drug content* (%)
F1	3.56±0.05	5.2±0.1	280±5	0.856±0.12	98.89±0.21
F2	3.54± 0.10	5.6±0.2	285±6	0.812±0.15	98.69±0.23
F3	3.52± 0.05	5.1±0.1	284±7	0.865±0.25	98.78±0.15
F4	3.45± 0.05	5.6±0.3	286±4	0.878±0.32	99.12±0.47
F5	3.54± 0.10	5.4±0.2	289±9	0.842±0.25	98.45±0.58
F6	3.58± 0.06	5.8±0.3	287±5	0.896±0.45	99.12±0.65
F7	3.59± 0.05	5.3±0.2	284±4	0.845±0.47	99.45±0.45
F8	3.61± 0.05	5.4±0.3	286±3	0.812±0.52	98.78±0.32
F9	3.12±0.06	5.6±0.1	289±3	0.856±0.45	98.78±0.45

*n=3

Table 4 Results of *in-vitro* buoyancy study of eperisone HCl

Formulation Code	Floating lag times (sec) n=3	Total Floating Time (hrs)
F1	60±3	>12
F2	65±2	>12
F3	63±5	>12
F4	64±6	>12
F5	65±4	>12
F6	68±5	>12
F7	55±6	>12
F8	63±7	>12
F9	64±2	>12

In vitro buoyancy was determined by floating lag time and total floating time. Results were given in table 4.

The tablets were evaluated for in vitro dissolution studies in 0.1N HCl for 12 hours. The results of in-vitro drug release revealed that the eperisone HCl was released in a controlled manner from all the formulations where formulation F7 showed maximum drug release i.e. 99.89±0.32 % at the end of 12th hour. The results of release studies of formulations F1 to F9 are shown in Table 5 and Figure 3.

Table 5 *In-vitro* drug release study of GRF tablets

Time	% Cumulative Drug Release (n=3) (Mean ± S.D.)								
(hrs.)	F1	F2	F3	F4	F5	F6	F7	F8	F9
0.5	36.56±0.25	35.65±0.32	33.25±0.21	30.21±0.32	28.98±0.32	26.65±0.36	25.56±0.12	20.25±0.32	15.45±0.32
1	45.89±0.23	42.56±0.15	40.45±0.14	39.98±0.45	35.45±0.15	30.35±0.45	36.45±0.19	29.98±0.21	22.12±0.15
1.5	65.54±0.15	60.25±0.54	58.98±0.32	55.45±0.41	51.15±0.45	40.56±0.54	48.98±0.21	45.58±0.41	41.45±0.45
2	89.32±0.12	85.59±0.65	65.45±0.41	62.14±0.23	60.25±0.65	61.25±0.36	55.65±0.32	50.25±0.47	46.65±0.74
3	98.78±0.25	96.65±0.12	89.98±0.21	86.65±0.14	82.12±0.42	70.25±0.25	69.98±0.45	61.15±0.65	50.45±0.56
4		99.89±0.15	95.45±0.32	93.12±0.25	91.65±0.14	83.25±0.45	75.65±0.32	70.25±0.45	55.65±0.65
6			99.12±0.45	99.45±0.36	99.45±0.65	93.56±0.36	86.69±0.41	75.65±0.32	64.45±0.14
8						98.78±0.45	95.56±0.25	80.25±0.25	78.89±0.32
12							99.89±0.32	89.98±0.45	85.23±0.25

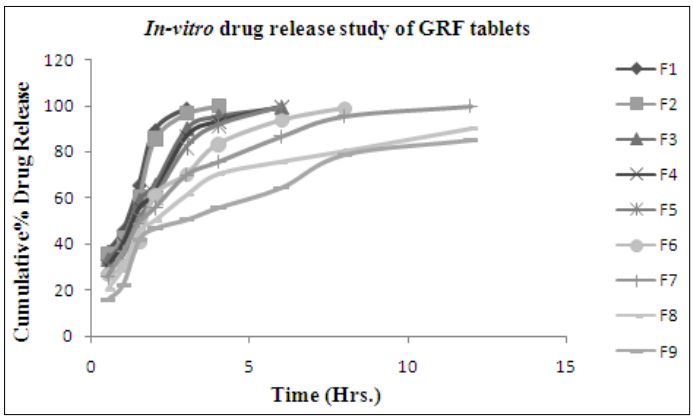

Figure 3 *In-vitro* drug release study of GRF tablets

The *in vitro* drug release data of the optimized formulation F7 was subjected to goodness of fit test by linear regression analysis according to zero order, first order kinetic equation, Higuchi's and Korsmeyer's models in order to determine the mechanism of drug release. When the regression coefficient values of were compared, it was observed that 'r' values of first order was maximum i.e. 0.931hence indicating drug release from formulations was found to follow first order release kinetics Table 6, 7 & Fig. 4,5.

Table 6 *In-vitro* drug release data for optimized formulation F7

Time (h)	Square Root of Time(h)$^{1/2}$	Log Time	Cumulative*% Drug Release	Log Cumulative % Drug Release	Cumulative % Drug Remaining	Log Cumulative % Drug Remaining
0.5	0.707	-0.301	25.56	1.408	74.44	1.872
1	1	0	36.45	1.562	63.55	1.803
1.5	1.225	0.176	48.98	1.690	51.02	1.708
2	1.414	0.301	55.65	1.745	44.35	1.647
3	1.732	0.477	69.98	1.845	30.02	1.477
4	2	0.602	75.65	1.879	24.35	1.386
6	2.449	0.778	86.69	1.938	13.31	1.124
8	2.828	0.903	95.56	1.980	4.44	0.647
12	3.464	1.079	99.89	2.000	0.11	-0.959

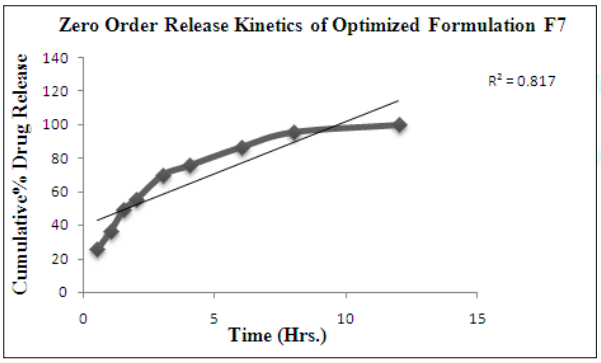

Figure 4 Cumulative % drug released Vs Time

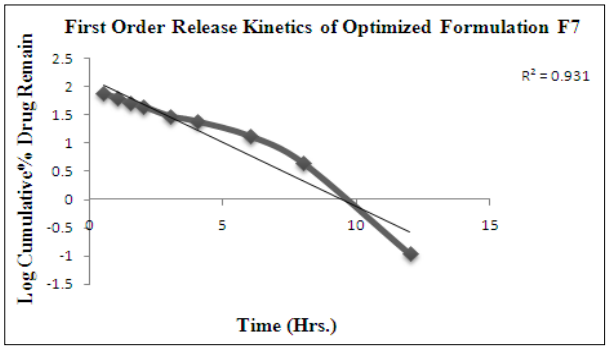

Figure 5 Log cumulative % drug remaining Vs Time

Table 7 Regression analysis data of eperisone hydrochloride floating matrix tablets

Batch	Zero Order	First Order
	R^2	R^2
F7	0.817	0.931

CONCLUSION

The present research work was successful in improving the efficacy of eperisone HCl oral therapy as the drug release was extended for 12 hours thus reducing dosing frequency thereby improving patient compliance. The sustained release floating matrix tablets of eperisone HCl were prepared by direct compression method. FTIR spectra indicated the absence of probable chemical interaction between the drug and polymers. Eperisone HCl SR floating matrix tablets were formulated with HPMC, PVP K30 and citric acid, $NaHCO_3$. Among 9 formulations, F7 is optimized based on the cumulative % drug release is 99.89 in 12 hrs. The *in vitro* drug release data was plotted for various kinetic models. The R^2 value for optimized formulation F7 for first order was found to be 0.931. It is evident from the results that a matrix tablet of eperisone HCl is a better system for twice daily sustained release dosage regimen. Furthermore the *in-vivo* and pharmacokinetic study have to carry out.

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