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FORMULATION AND EVALUATION OF FLOATING-PULSATILE DRUG DELIVERY OF ENALAPRIL

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ABSTRACT

Enalapril is almost like a angiotensin-converting enzyme (ACE) inhibitor that is used to treat hypertension, heart failure, and heart attacks. It belongs to BCS class III, with a half-life of 12 hours and a bioavailability of 25%. The goal of this study was to create a floating-pulsatile medication delivery device that was presscoated. The superdisintegrants crosprovidone and croscarmellose sodium were used to make the core tablet. Carrageenan, xanthan gum, HPMC K4M, and HPMC E15LV were all found in a press-coated tablet (barrier layer). HPMC K100M, sodium bicarbonate, and citric acid were used to maximise the buoyant layer. Physical properties, floating lag time, swelling index, FTIR, DSC, and in vitro and in vivo behaviour were all assessed. The 5% superdisintgrant yielded positive results. No chemical interactions between the medication and the excipients were anticipated by the FTIR and DSC studies. Drug retention was demonstrated in the xanthan gum-containing formulation, although it did not float. The swelling index of the HPMC K15M pill was high. The in vitro release profiles of Enalapril from PRT prepared with HPMC E15LV as the retarding polymer are characterised by a predetermined lag time (4.10.2 h for K6+F4), the length of which is dependent on the type and amount of the polymeric layer applied to the cores, as well as the type of superdisintegrant in the core tablet. The presented technology provides a simple and unique method for medication pulse release. Based on the findings, we can infer that the PRT we developed could accomplish a quick release with minimal variability after a lag period of 40.2 hours. The tablet's releasing mechanism was based on the Korsmeyer-Peppas equation and a first-order pattern.

Keywords: Floating, Press-coated, HPMC K100M, HPMC E15LV, Pulsatile, Delivery

INTRODUCTION

Because of the apparent advantages of the oral route of drug administration, oral drug delivery systems are the most popular, safe, and convenient. The drug concentration is kept in the therapeutic window in all oral controlled dose forms, allowing the medication to be released for a longer length of time. However, there are some circumstances that necessitate medication release with a delay, such as chrono pharmacotherapy for disorders with circadian cycles in their pathophysiology [1]. Circadian rhythm is disrupted in a number of disorders. Circadiani.e.,24-hour time. Structure is the most common oscillation metina number of diseases such as asthma and osteoarthritis, where the severity of diseases and symptoms are mostly occurring at night, in case of rheumatoid arthritis pain is very severe in the morning, and in duodenal ulcer gastric acid secretion is high at night [2]. Morning capillary resistance and vascular reactivity are greater, while evening capillary resistance and vascular reactivity are lower [3,4]. Because these

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formulations release the medicine whenever the symptoms are severe, they serve an important role in such chrono pathological conditions. Such systems are designed to allow for pulsatile medication release after a predefined off release interval, or lag time, that regulates the chronopathological conditions [5]. The current study focuses on the creation and assessment of pulsatile tablets of the antihypertensive drug enalpril. After a specified lag period, pulsatile tablets spontaneously release a particular quantity of drug molecules in a shorter time [5]. Enalapril is an ACE (angiotensin-converting-enzyme)inhibitor and an antihypertensive drug used to treat hypertension. Enalapril decreases blood pressure and hypertension by lowering peripheral vascular resistance without raising heart rate, contractility, or cardiac output. Enalapril can be used to treat a variety of hypertension in diabetics and individuals with severe renal failure. It is the most effective medication for the treatment of heart failure. Enalapril has a bioavailability of 55% and a half-life of 11 hours; the absorption of enalapril is unaffected by meals [6]. The goal of this study is to create and assess enalapril core in cup tablets using a direct compression technology that distributes the medication in a chronotherapeutic way.

Materials

Cipla Pharmaceuticals, Mumbai, sent an enalapril active pharmaceutical component as a gift sample. S.D. Fine chemicals provided PVPK90, talc, HPMCK4M, cross povidone, cross car mellose sodium, sodium starch glycolate, ethyl cellulose, and MCC. Mumbai. Sigma Aldrich Company provided the magnesium stearate. Galen IQ 720, a directly compressible vehicle supplied from Beneo Palatin It Industry in Germany, was employed. Throughout the investigation, all additional reagents were of analytical grade.

Preparation of the Rapid Release Tablet(RRT)[11]

The direct compression method was used to make the inner core tablets. To fix the concentration of super disintegrant in the tablet, different preliminary batches of core tablets were taken in. The amount of super disintegrants in each pill ranges from 1 to 4 mg. Enalapril, crosscarmellosesodium (Ac-DiSol), KYRON T314, lactose, and other components were dry mixed for 20 minutes, then magnesiumstearate was added. The mixes were then mixed for 10 minutes, and 60 mg of the resulting powder blend (theoretically equivalent to 20 mg of Enalapril) was compacted into the core tablet using a rotary tabletting machine (Cadmach Machinery, Ahmedabad, India

Table1:Formulations of core tablet

Ingredients (mg)	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
Enalapril(mg)	20	20	20	20	20	20	20	20
CCS(mg)	1	2	3	4	-	-	-	-
KYRONT 314(mg)	-	-	-	-	1	2	3	4
Mg-Stearate(mg)	8	8	8	8	8	8	8	8

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Lactose(mg)	31	30	29	28	31	30	29	28
TOTAL(mg)	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**

Evaluation of the Rapid Release Tablet (RRT)Determination of Drug Content

The powder equal to 25 mg of Enalapril was weighed and diluted in methanol, then filtered using Whatman filter paper. Using methanol as a blank, the solution was tested for content using a UV Spectrophotometer at 236nm.

Disintegration test

The tablet was put into 100 ml distilled water at 37 ± 2oC. Time required forcomplete dispersion of a tablet was measured with the help of a digital tablet disintegration test apparatus.

Hardness test

The hardness of tablets was determined using a Pfizer hardness tester. The tablet was placed between the plunger and the handle while the handle was squeezed. The raptured power was recorded.

Friability test

A Ro che friabilator was used to test the friability of all of the tablets examined. In the disinteration time research, two batches, Iand View, were reselected as optimum batches from the previous investigation.

Preparation of the Floating and Pulsatile Release Tablet(FPRT)[11]

PRT and the top cover buoyant layer were created to make up FPRT. PRT was chosen as the pulsatile release layer.

Preparation of the Pulsatile Release Tablet(PRT)

Each erodible outer shell powder, such as HPMC K4, HPMC E15 LV, and carboxymethylcellulose sodium (NaCMC), was passed through a 500m filter. RRT was chosen as the core. Different combinations of polymers were used in the studies, which were referred to as preliminary batches. After conducting a dissolution research on the above batches, it was required to conduct an experiment on individual polymers based on the results.

Table2: Polymer addition for pulsatile release tablet with cross vehicle mellose sodium

Sr No.	**Ingredients**	**Formulation Codes**								
		C1	C2	C3	C4	C5	C6	C7	C8	C9
1	HPMCK4 M	140	160	180	-	-	-	-	-	-
2	NaCMC	-	-	-	140	160	180	-	-	-

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3	HPMCE15LV	-	-	-	-	-	-	230	260	290

Table 3: Addition of polymer for pulsatile release tablet containing KYRONT314

	Ingredients	Formulation Codes					
		K1	K2	K3	K4	K5	K6
1	HPMCK4 M	140	160	180	-	-	-

For HPMC K4, 60 mg of powder was placed in the centre of a die, followed by RRT. The tablet was softly pushed to secure the coatings around and under the core, and then there was softness. Filling and compressing the coatings was done. The remainder of the powders, such as HPMC E15LV and NaCMC, were treated in the same way. For the aforesaid batches, a dissolution research was carried out, from which the best batches were chosen and only those batches were tested further.

Compositions of the Buoyant Layers

Table 6.8 shows the components of the buoyant layer of the FPRT for floating testing. To make a homogeneous immediately compressible powder mix, all powdered excipients were combined for 5 minutes in a mortar and pestle. The influence of fillers on floating time was discovered when different fillers were employed to modify the tablet weight. Batches K3 and K6 were utilised in compression with a buoyant layer to make FPRT tablets.

Table4:Compositions of the Buoyant Layers

Sr No.	Ingredients	Formulation codes				
		F1	F2	F3	F4	F5
1	HPMCK100M	150	150	150	150	150
2	Sodium bicarbonate	20	40	80	40	20
3	Citric acid	20	40	80	40	20
4	Di calcium phosphate	20	-	-	-	-
5	Microcrystalline cellulose	-	20	-	-	-
6	Lactose	-	-	20	20	20

EVALUATION OF FLOATING AND PULSATILE RELEASE TABLET[47-48]

The friability of all the tablets studied was determined using a Roche friabilator.

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Hardness test:

Pfizer hardness tester was used for the determination of hardness of tablets. The tablet was placed in contact between the plungers and handle was pressed. There force off captured was recorded.

Determination of Drug Content:

The powder equal to 20 mg of Enalapril was weighed and diluted in methanol before being filtered using Whatman filter paper. Using a UV Spectrophotometer set at 236 nm and methanol as a blank, the solution was tested for Enalapril content.

In-Vitro Buoyancy Determination[11]

The floating behaviour of the tablet is investigated using the USP dissolving equipment II in 500 ml of 0.1 N HCl at 370.5°C and 50rpm. The overall floating duration as well as the floating lag time are measured.

Swelling Index determination

Individually weighed tablets (marked as W1) were put in a glass beaker with 200 ml of 0.1 N HCl and incubated at 37°C1°C. The tablets were withdrawn from the beaker at regular 1-hour intervals till 24 hours, and the excess surface liquid was carefully cleaned with the paper. After that, the swelled pills were re-weighed (W2) and the swelling index (SI) was computed using the formula below.

formula: $SI=\frac{W2-W1}{W1}X100$ ----------(6.1)

DISSOLUTION STUDIES[11]

Parameters

Hourly for 15 hours, a sample (5 ml) of the solution was taken from the dissolving equipment and replaced with new dissolution media. The materials were filtered through a 0.45-micron membrane filter and diluted with 0.1N HCl to a sufficient concentration. Varian cary-100 double beam UV spectroscopy was used to evaluate the absorbance of these solutions at 236 nm. An equation derived from a standard curve was used to compute cumulative percentage medication release.

RESULTS AND DISCUSSION

CHARACTERIZATION AND PREPARATION OF CALIBRATION

CURVE OF Enalapril

Determination of λmaxandpreparationofstandardcurve

Figure 7.1 depicts the UV spectrum acquired. The wavelength of maximum absorbance (max.) for 0.1 N HCl (Simulated Gastric Fluid) solutions was discovered to be 236 nm. The calibration curve was plotted using absorbance-concentration data, as illustrated in Fig. 7.2. In the

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concentration range of 0 to 50 g/ml, the plot of Absorbance vs Concentration (g/ml) was found to be linear and obeys the Beer Lambert's law in the same ranges.

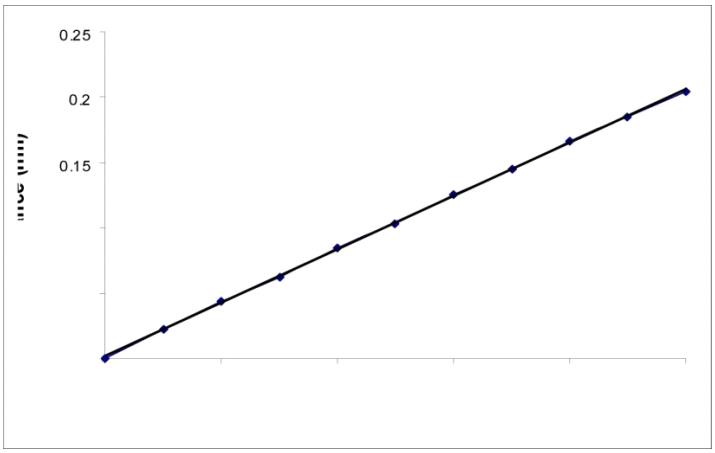

Fig.1:Calibration Curve of Enalapril

Physico chemical parameters of the A.P.I.

Physical characterization of candidate drug

TableNo.5:Physical properties of candidate drug

Bulkdensity(g/ml)	0.235
Tappeddensity(g/ml)	0.423
Carr'sindex(%)	44.44

Compatibility Study by Pure Enalapril DSC-DS C analysis

With a starting temperature of 172.14oC, the drug displayed a sharp endothermat172.41oC. 172.5oC is the recorded temperature. Figure No.7.4 depicts the DSC thermogram.

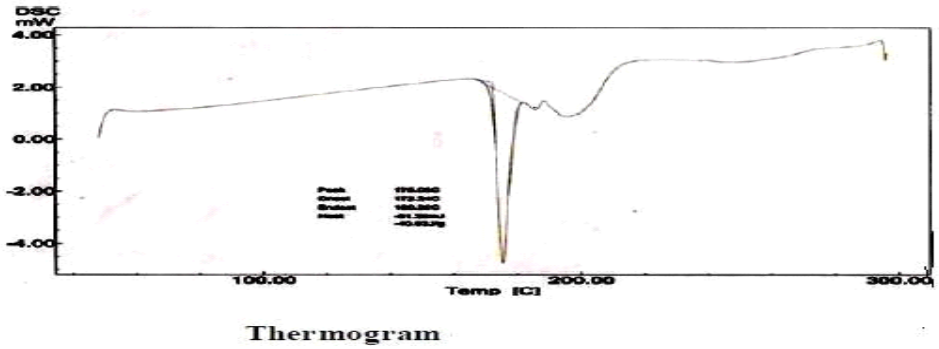

Figure2: DSC analysis of Enalapril

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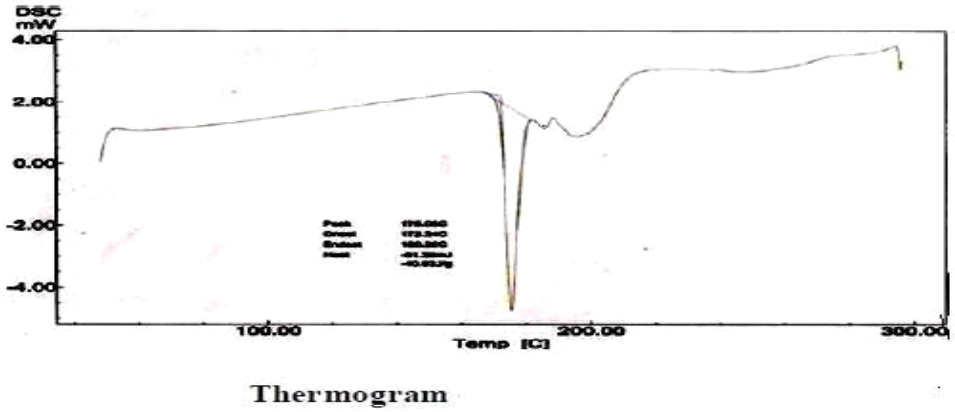

Thermogram

Figure3: The Thermogram obtained using Enalapril and Micro crystaline cellulose using D.S.C technology.

EVALUATION OF RAPID RELEASE TABLET(RRT)

Table6: Evaluation of RRT

Formulation	Hardness Kg/cm^2	Friability (%)	DrugContent (mg%)	Disintegration Time(S)
I	3.8	0.62±0.12	99.22	45
II	3.4	0.69±0.14	98.92	11
III	3.7	0.65±0.11	99.85	30
IV	3.8	0.62±0.11	99.72	28
V	3.6	0.60±0.14	99.35	24
VI	3.2	0.67±0.13	99.97	11
VII	3.9	0.63±0.16	99.65	49
VIII	3.6	0.60±0.11	99.78	10.4

The hardness test demonstrated strong mechanical strength in all formulations, whereas friability was less than 1%, indicating that the tablet had high mechanical resistance. The drug concentration in all mulations tablets was determined to be high (>99.20) and consistent. It was consistent across all pill formulations, ranging from 98.92 to 99.85. The absorption maxima were established by scanning several concentrations of Enalapril solution. In the concentration range of 0 to 50 g/ml, the absorption maxima a was 236nm, and the technique obeyed Beer's law with a satisfactory correlation coefficient (0.9997). Relative error (accuracy) and relative standard deviation (precision) were determined to be 0.72 and 0.93 percent, respectively, when a standard drug solution was tested many times (n=6). The in-vitro disintegration time of the tablets was measured, and it was discovered that the formulation time ranged from 10 to 52 seconds. The time it took to create the product ranged from 10 to 52 seconds. When KYRON T314 was utilised as a disintegrant, the tablet disintegrated quickly due to KYRON T314's easy and strong swelling ability when compared to CCS. The disintegration period of the tablet reduced as the concentration of CCS and KYRON T-314 increased. However, a disintegration research revealed

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that hardness plays a vital effect. To have a burst effect and hence have reduced hardness, the disintegration time for pulsatile release studies must be quick. As a consequence of the results, it was determined that batches II and VI were optimised, which was supported by the dissolution research.

Dissolution Study Of Rapid Release Tablet (RRT)

Table7: Dissolution testing of Batch I-IV

Time (min)	**%DrugRelease**			
	I	**II**	**III**	**IV**
0	0	0	0	0
1	48.84	49.23	53.43	54.78
2	55.67	57.87	62.49	65.98
3	63.87	66.9	69.45	70.1
4	68.93	70.92	74.82	76.9
5	77.68	79.99	82.56	83.76
6	83.56	86.79	88.93	89.92
7	88.94	90.56	92.39	93.44
8	94.69	97.84	98.7	99.45
9	98.95	98.9	99.28	
10	99.87	99.99	100.09	

From the two graphs above, it was evident that The quick rise in Enalapril dissolution with an increase in KYRON 314 might be attributable to the tablet expansion and fragmentation into primary particles. CCS show capillary activity and considerable hydration, with minimal potential for gel formation and quick disintegration of the table into bigger masses of aggregated particle, resulting in gins poor drug release.

Table8: Dissolution Testing of batchV-VIII

Time (min)	**%DrugRelease**			
	V	**VI**	**VII**	**VIII**
0	0	0	0	0
1	50.26	55.9	54.87	54.37
2	54.98	69.78	62.93	60.23
3	61.03	75.98	67.4	63.45
4	68.9	83.56	76.79	78.98
5	79.97	89.91	83.59	86.73
6	84.78	93.45	89.99	90.17
7	90.83	97.99	94.98	95.68
8	95.98	100.2		99.9
9	99.58			100.09

EVALUATION OF THE FLOATING AND PULSATILE RELEASE TABLET (FPRT):

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The time it took for the formulation to disintegrate ranged from 10 to 52 seconds. When KYRON T314 was employed as a disintegrant, it was found that the tablet disintegrated quickly owing to KYRONT314's easy and strong swelling ability when compared to CCS. The disintegration period of the tablet reduced as the concentration of CCS and KYRON T-314 increased. However, a disintegration research revealed that hardness plays a vital effect. To have a burst effect and hence have reduced hardness, the disintegration time for pulsatile release studies must be quick. As a consequence of the results, it was determined that batches II and VI were optimised, which was validated by a dissolving study.

Pulsatile Release Tablet (PRT)

In the fourth trial, the core tablets containing Enalapril(RRT) were compression coated with a variety of powders, including HPMC K4, HPMCE15LV, and sodium carboxymethylcellulose, which served as the outside erodible shell. Dissolution tests were performed on polymer combinations as well as individual polymers. When polymers came into contact with the dissolving media, batches created with mixed polymers formed too sticky a mass to release the medication, according to dissolution experiments. As a result, mixed polymers were shown to be unsuitable for pulsatile drug delivery systems. The crosscarmellosesodium coretablet was compressioncoated with HPMC K4, HPMC E15LV, sodium carboxymethylcellulose, and these batches were used as test batches for specific polymer studies. Figure 7.18,7.19,7.20 shows the in vitro release patterns of Enalapril from several coated systems in 0.1MHCl solution. Figure 7.18 demonstrates that HPMC K4M has a 4 hour lag period before following a sigmoidal release pattern with 100% drug release at the 10th hour. The lag period increased to 5 hours when the concentration of the HPMC K4 coating increased from 140 to 180 mg, and then the delayed release profile was followed with 100 percent drug release in the 17th to 18th hour. According to Fig. 7.19, carboxymethylcellulose sodium (NaCMC) has a 2 hour lag period, resulting in rapid and full drug release in the 10th hour. However, these tablets did not keep their form during the breakdown process, leading to the conclusion that they cannot be floated for an extended period of time. As a result, the Carboxymethylcellulose sodium (NaCMC) tablet (PRT) was not further investigated. Figure 7.20 demonstrates that HPMC E15LV has a 3-hour lag period before following a sigmoidal release pattern with 100% drug release at the 9th hour. The lag period increased to 4.5 hours when the concentration of the HPMC E15LV coating increased from 240 to 290 mg, and then the delayed release profile was followed with 100 percent drug release at the 12th to 14th hour. As a result of the above debate, it has been determined that carboxymethylcellulose sodium (NaCMC) cannot be employed to produce a successful pulsatile drug delivery system because it lacks adequate lag time and the ability to keep its form.

Table9:Dissolution Testing of batch C1-C9

Time (hrs.)	**%Drug Released**								
	C1	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0

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2	5	3	0	27.91	0	0	20	0	0
3	10.95	5.67	0	52.39	30.87	24.97	27.98	5.98	0
4	25.4	7.45	0	64.98	51.9	41.74	51.54	15.9	5.98
5	38.81	24.87	8.01	78.49	68.76	65.89	65.89	29.87	30.98
6	49.86	39.66	25.03	90.72	80.95	79.8	77.97	45.76	50.39
7	66.54	50.32	43.56	95.69	91.69	90.98	83.78	53.21	67.29
8	78.24	67.53	65.75	98.19	96.98	96.5	90.98	68.98	80.96
9	96.9	88.27	80.55	99.85	99.81	99.78	99.55	77.98	86.19
10	99.61	94.93	89.6			99.95		85.82	93.98
11		98.88	95.38			99.96		90.89	98.42
12		99.97	98.3					95.97	99.88

In the fourth trial, the core tablets containing Enalapril(RRT) were compression coated with a variety of powders, including HPMC K4, HPMCE15LV, and sodium carboxymethylcellulose, which served as the outside erodible shell. Dissolution tests were performed on polymer combinations as well as individual polymers. When polymers came into contact with the dissolving media, batches created with mixed polymers formed too sticky a mass to release the medication, according to dissolution experiments. As a result, mixed polymers were shown to be unsuitable for pulsatile drug delivery systems. The crosscarmellosesodium coretablet was compressioncoated with HPMC K4, HPMC E15LV, sodium carboxymethylcellulose, and these batches were used as test batches for specific polymer studies. Figure 7.18,7.19,7.20 shows the in vitro release patterns of Enalapril from several coated systems in 0.1MHCl solution. The lag period increased to 5 hours when the concentration of the HPMC K4 coating increased from 140 to 180 mg, and then the delayed release profile was followed with 100 percent drug release in the 17th to 18th hour. According to Fig. 7.19, carboxymethylcellulose sodium (NaCMC) has a 2 hour lag period, resulting in rapid and full drug release in the 10th hour. However, these tablets did not keep their form during the breakdown process, leading to the conclusion that they cannot be floated for an extended period of time. As a result, the Carboxymethylcellulose sodium (NaCMC) tablet (PRT) was not further investigated. Figure 7.20 demonstrates that HPMC E15LV has a 3-hour lag period before following a sigmoidal release pattern with 100% drug release at the 9th hour. The lag period increased to 4.5 hours when the concentration of the HPMC E15LV coating increased from 240 to 290 mg, and then the delayed release profile was followed with 100 percent drug release at the 12th to 14th hour. As a result of the above debate, it has been determined that carboxymethylcellulose sodium (NaCMC) cannot be employed to produce a successful pulsatile drug delivery system because it lacks adequate lag time and the ability to keep its form.

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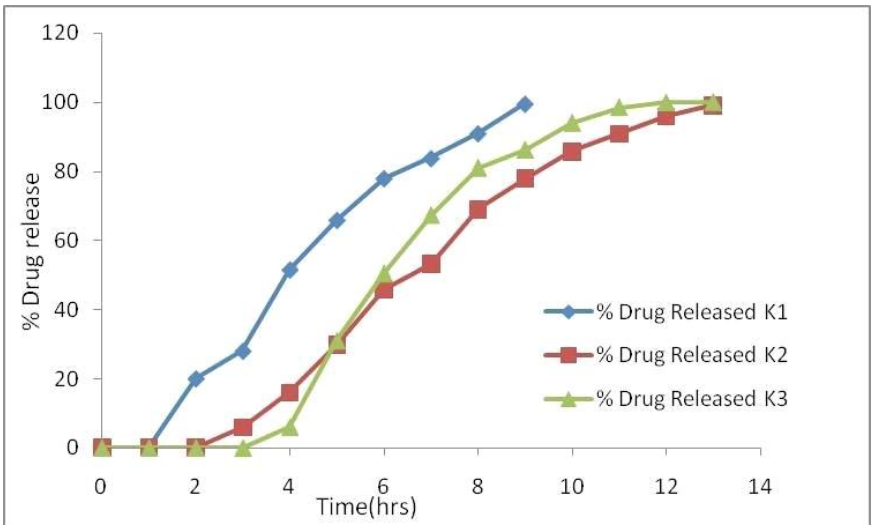

Fig 4 : In vitro release profiles of Enalapril from the pulsatile release tablet(PRT) coated with different amount of HPMC K4M+Core tablet containing KYRONT 314.

Table10:DissolutionTestingofbatchK1-K6

Time(hrs.)		**%DrugReleased**				
	K1	**K2**	**K3**	**K4**	**K 5**	**K6**
0	0	0	0	0	0	0
1	0	0	0	0	0	0
2	20	0	0	15.98	3.98	0
3	27.98	5.98	0	43.78	39.98	0
4	51.54	15.9	5.98	54.89	59.79	0
5	65.89	29.87	30.98	63.79	71.98	54.98
6	77.97	45.76	50.39	76.89	80.98	74.89
7	83.78	53.21	67.29	87.99	88.93	87.89
8	90.98	68.98	80.96	95.92	94.99	94.98
9	99.55	77.98	86.19	99.89	99.99	98.99
10		85.82	93.98		100.09	99.98
11		90.89	98.4		99.89	100.04

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			2			
12		95.97	99.88		100.05	99.97
13		99.2	99.96		100.03	100.06
14					99.99	100.09

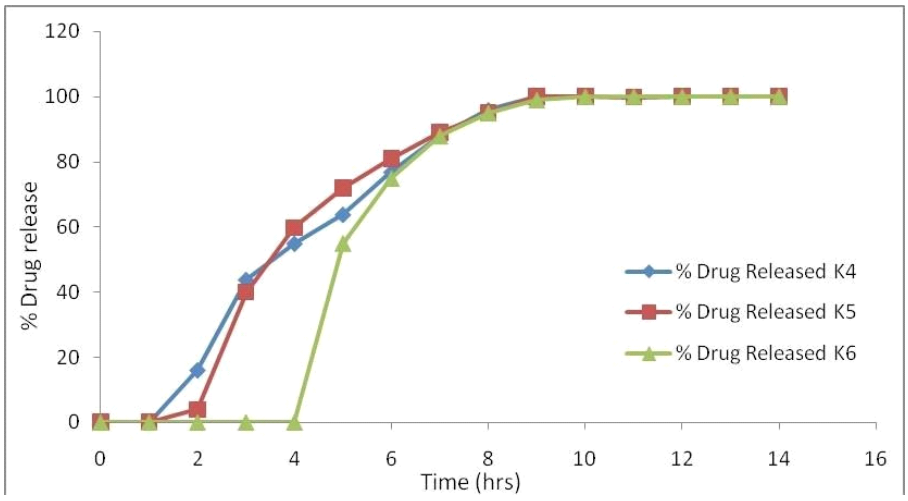

Fig 5 : In vitro release profiles of Enalapril from the pulsatile release tablet(PRT) coated with different amount of HPMC E15LV+Core tablet containing KYRONT 314

In Vitro Buoyancy Determination

Table 11: on set of time for floating of various formulations

Formulation	On set of time for floating
F1	Greaterthan1hr
F2	Formulationshowednofloating
F3	Remainingfloatingwasnomorethan3h
F4	float completely within 1 min and remainedfloatingover aperiod of12h
F5	Greaterthan15min

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The buoyant layer's additional fillers influence the tablet's floating behaviour. Lactose-containing tablets floated faster than tablets made with basic calcium phosphate, an inorganic filler. The varied densities explained this; the lactose-containing tablet had the lowest density (1.0 g/cm3 at a hardness of 4.3 Kg/cm2), while the basic calcium phosphate tablet had a significantly greater density (1.9 g/cm3 at a hardness of 5.2 Kg/cm2). Lactose also has a greater water solubility than glucose, resulting in a quicker water absorption of the medium into the tablet. The breakdown of the tablet was caused by microcrystalline cellulose, an insoluble filler with a high water absorption and disintegration capability. Floating was not achieved because CO2 did not concentrate in the buoyant layer of the tablet and instead escaped through the fragmented tablet. Lactosewa was chosen as the filler of choice and used for subsequent research based on these findings. F4formulationwasusedforfurtherinvestigation.

SWELLING INDEX DETERMINATION

When compared to HPMC E15LV and NaCMC, tablets containing HPMC K4M showed a higher swelling index, which might be attributable to HPMCK4hydration M's properties. NaCMC exhibited swelling properties, however after a period of time, the tablet was unable to keep its form and integrity (Eq 6.1) Up to 10 hours, HPMC K4M and HPMC E15LV demonstrated a steady increase in swelling index. (Fig7.23)

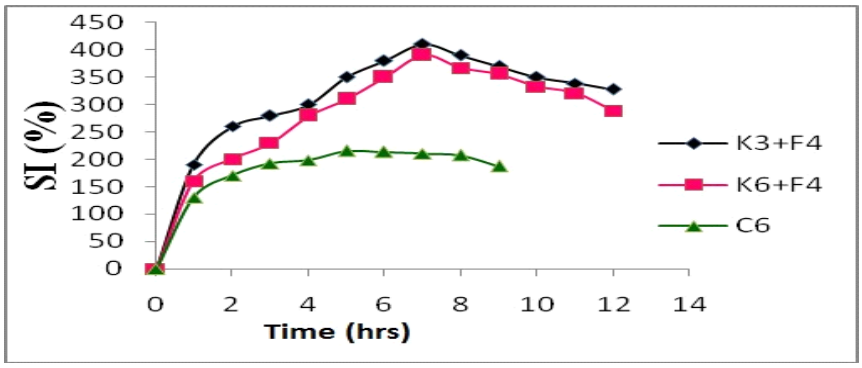

Fig 6:Swelling index of tabletsofK3+F4,K6+F4andC6

FLOATING AND PULSATILE RELEASE TABLET(FPRT)

The FPRT was manufactured as described above and consisted of the buoyantlayer F4 (Table 6.8) combined with a PRT containing 20 mg Enalapril core tabletcompression-coated with290 mg ofHPMCE15LV(FormulationK6).

Table11:DissolutiontestingofbatchK6+F4

Time(hrs.)	%DrugReleased
0	0
1	0
2	0
3	0
4	11.09
5	54.98

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6	74.89
7	87.89
8	94.98
9	98.99
10	99.98
11	100.04
12	99.97
13	100.06
14	100.09

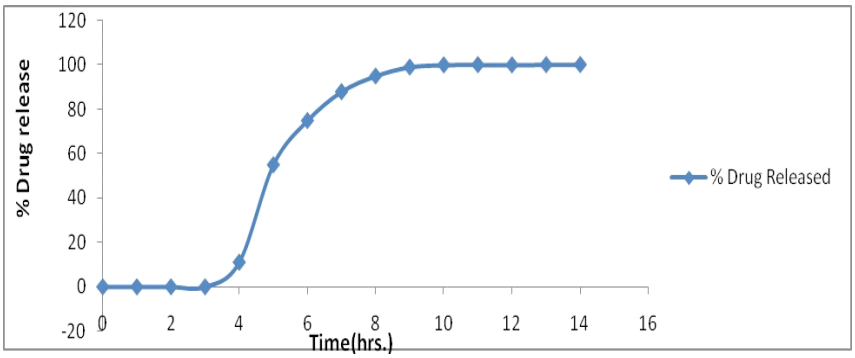

Fig.7: Enalapril in vitro release characteristics from the floating pulsatile release tablet (FPRT) Of batchK6+F4

Only optimal batch (K6+F4) FPRT tablets were tested for friability, hardness, and drug content. The hardness test revealed that the formulation had high mechanical strength. Hardnesswasrangedfrom3.8to4.0Kg/cm2. The range of friability was 0.5 to 0.56. Friability was less than 1%, indicating that the tablet was mechanically resistant. The amount of drug discovered was high (>99.23). It was uniformly tablet compositions and ranged from 99.32 to 99.45. At 236 nm, an ultraviolet (UV) spectrophotometric technique was presented, which follows Beer'slaw in the concentration range of 5 to 50 g/ml and has a high correlation coefficient (0.9997).

Table12:Evaluation Of Floating and Pulsatile Release Tablet

Sr no.	**Formulations**	**Hardness(Kg/ cm^2)Friabilit y(%)**	**Drug content(%)**	
1	K6+F4	3.8	0.43±0.11	99.45

CONCLUSION

Due to KYRON T-314's easy and strong swelling ability compared to CCS, the core containing KYRON T-314 disintegrates the tablet in a short time. In vitro, the PRT including buoyant materials such as HPMCK100M, NaHCO3, and citric acid produced an acceptable buoyant

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force, with a floating onset time of less than 1 minute. PRT's pulsatile release process takes use of a unique interaction between the hydrophilic polymeric covering and the aqueous gastrointestinal fluids. The in vitro release profiles of Enalapril from PRT prepared with HPMC E15LV as the retarding polymer are characterised by a predetermined lag time (4.10.2 h for K6+F4), the length of which varies depending on the type and amount of the polymeric layer applied to the cores as well as the type of super disintegranting core tablet. The designed system implements a unique approach for drug pulse release. As a consequence of the findings, it was determined that the PRT we developed could accomplish a quick release after a lag period of 40.2 hours with relatively low variability. The korsmeyer and peppas model was found to be followed by the drug release profile of the optimised batch K6+F4. As a result, it may be argued that the medication is released by diffusion and erosion.

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