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FORMULATION AND EVALUATION OF CONTROLLED RELEASE TABLETS OF PIOGLITAZONE

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ABSTRACT

Pioglitazone Controlled release tablets were prepared by using polymers like Hydroxy propyl methyl cellulose, Psyllium, Guar-gum, Xanthum gum and Carbopol. From this study it can be concluded that Pioglitazone C.R tablets prepared by Hydroxy propyl methyl cellulose K15M (i.e. H3) showed good release rate than the tablets prepared by using other polymers. Pre compression and Carr's index of the pure drug indicated that the drug had good flow property, even the formulations were found to be within the range. Post compression studies, for tablets like thickness, diameter, hardness, friability, drug content uniformity was done. The dissolution studies were carried out for 24 hours. As per the result of dissolution study of formulation H3, P3, G3 and X3 showed reasonable release 99.87%, 97.85%, 92.48% and 93.51% respectively at the end of 24hrs. Formula H3 showed good drug release profile 99.87% at the 24 hrs, showed excellent matrix integrity during the period of study, when compare to other formulations. The formulation H3 was considered optimum because it showed negligible drug release in acidic medium and drug release in the phosphate buffer (pH 7.4) was found to be almost complete. The stability studies of the selected formulation showed that the product was stable through-out the study period .

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INTRODUCTION:

For many decades treatment of an acute disease or a chronic illness has been mostly accomplished by delivery of drugs to the patients using various pharmaceutical dosage forms, including tablets, capsules, pills, suppositories, creams, ointments, liquids, aerosols and injectable as drug carriers. Even today these conventional drug delivery systems are the primary pharmaceutical products commonly seen in the prescription and over the counter drug market place[1]. This type of drug delivery system is known to provide a prompt release of drug. Therefore to achieve as well as to maintain the drug concentration within the therapeutically effective range needed for treatment, it is often necessary to take this type of drug delivery system several times a day. This results in a significant fluctuation in drug levels. Recently, several technical advancements have been made. They have resulted in the development of new techniques for drug delivery[2]. These techniques are capable of controlling the rate of drug delivery, sustaining the duration of therapeutic activity and / or targeting the delivery of drug to a tissue[3]. Although these advancements have led to the development of several novel drug delivery systems that could revolutionize the method of medication and provide a number of therapeutic benefits, they also create some confusion in the terminology between "Controlled release" and "Sustained release." Unfortunately these terms have been often used interchangeably in the scientific literature and technical presentations over the years[4,5].

It has been constantly used to describe a pharmaceutical dosage form formulation to retard the release of a therapeutic agent such that it appearance in the systemic circulation is delayed and /or Prolonged and its plasma profile is sustained in duration[6].

Pioglitazone is a thiazolidinedione antidiabetic agent that depends on the presence of insulin for its mechanism of action. It decreases insulin resistance in the periphery and in the liver resulting in increased insulin-dependent glucose disposal and decreased hepatic glucose output.

The present research project relates to a CR oral formulation of anti-diabetic drugs like Pioglitazone, the present research comprising Pioglitazone formulated by using polymers like guar gums, Xanthum gums, Psyllium and hydroxypropyl methylcellulose are used for controlling the drug release[7]. And the polymers are mixed in a predetermined ratio.

MATERIALS AND METHODS:

Materials:

Pioglitazone hydrochloride drug was obtained as a gift sample from Lee Pharma,Hyderabad,India. Polymers HPMC K15M from Strides acrolab, Bangalore. Psyllium from Vindhya pharma, Hyderabad. Guar-gum and Xanthum-gum from Himedia laboratory, Mumbai. Magnesium stearate from Ranchem,Hyderabad. All the chemicals were of analytical grade.

Preparation of Pioglitazone C.R Tablets

To prepare an optimum formulation of controlled release of Pioglitazone tablets for a 24 hrs.release and evaluate the in vitro performance, carbopol 71G, Guar-gum, Xanthum-gum, Psyllium, HPMC K15M as a hydrophilic matrix forming agents and Microcrystalline-cellulose as filler-binder for increasing the compressibility. Matrix tablets were prepared by direct compression in each formulation. The composition of formulation was given in **Table 1 and 2.** All ingredients were passed through sieve no.60. Pioglitazone was mixed with the required quantities of different polymers; Cellulose microcrystalline by geometric mixing. The powder blend was then lubricated with magnesium stearate, talc. Appropriate amount of the mixture was weighed and fed manually in to the die of a single punch tableting machine, the tablets were round and flat with an average diameter 12 mm.

Table 1 Optimized formulation for the Pioglitazone C.R tablets.

Sl.No	Ingredients	H1	H2	H3	P1	P2	P3
01	Pioglitazone	40	40	40	40	40	40
02	HPMC K15M	40	80	120	-	-	-
03	Psyllium	-	-	-	40	80	120
04	Guar-gum	-	-	-	-	-	-
05	Xanthum-gum	-	-	-	-	-	-
06	Carbopol 71G	40	40	40	40	40	40
07	Avicel Ph 102	170	130	90	170	130	90
08	Talc	7.5	7.5	7.5	7.5	7.5	7.5
09	Magnesium stearate	2.5	2.5	2.5	2.5	2.5	2.5

Table-2 Optimized formulation for the Pioglitazone C.R tablets.

Sl.No	Ingredients	G1	G2	G3	X1	X2	X3
01	Pioglitazone	40	40	40	40	40	40
02	HPMC K15M	-	-	-	-	-	-
03	Psyllium	-	-	-	-	-	-
04	Guar-gum	40	80	120	-	-	-
05	Xanthum-gum	-	-	-	40	80	120
06	Carbopol 71G	40	40	40	40	40	40
07	Avicel Ph 102	170	130	90	170	130	90
08	Talc	7.5	7.5	7.5	7.5	7.5	7.5
09	Magnesium stearate	2.5	2.5	2.5	2.5	2.5	2.5

Pre Compressional Parameters of Pioglitazone Blend:

Angle of Repose

While there is some variation in the qualitative description of powder flow using the angle of repose, much of the pharmaceutical literature appears to be consistent with the classification by Carr'sin the table below. There are examples in the literature of formulations with an angle of repose in the range of 40-50^o that manufactured satisfactorily. When the angle of repose exceeds 50^o, the flow is rarely acceptable for manufacturing purposes.

The angle of repose (θ) was calculated using the following formula.

$$\tan\theta = h/r \quad \text{or} \quad \theta = \tan^{-1}(h/r)$$

Bulk Density and Tapped Density

Bulk density is the ratio between a given mass of powder or granules and its bulk volume. Tapped density is the ratio between a given mass of powder or granules and the constant or fixed volume of the powder or granules after tapping. An accurately weighed quantity of powder (W) (which was previously passed through sieve no. 40) was carefully transferred into 250 ml measuring cylinder and initial volume (V_o) was measured. The cylinder is then allowed to tap on to a wooden surface from the height of 2.5 cm at 2-second intervals. The tapping was continued until no further change in volume (until a constant volume) was obtained (V_f). The bulk density and tapped density are calculated by using the following formula.

$$\text{Bulk Density} = W/V_o$$

$$\text{Tapped Density} = W/V_f$$

Compressibility Index

In recent years, the compressibility index and the closely related Hausner's ratio have become the simple, fast, and popular methods of predicting powder flow characteristics. The compressibility index has been proposed as an indirect measure of bulk density, size and shape, surface area, moisture content, and cohesiveness of materials, because all of these can influence the observed compressibility index. The compressibility index determined by measuring both the bulk volume and tapped volume of a powder.

Basic methods for the determination of compressibility Index

While there are some variations in the method of determining the compressibility index the basic procedure is to measure the unsettled apparent volume, (V_0), and the final tapped volume, (V_f), of the powder after tapping the material until no further volume changes occur. The compressibility index and the Hausner's ratio are calculated as follows:

$$\text{Compressibility Index} = \left(\frac{V_0 - V_f}{V_0}\right) x100$$

Drug-Excipient compatibility studie

In this FTIR (model – Perkin Elmer) instrument was used. FTIR spectra for the drug of optimized tablets were obtained. One part of Potassium Bromide was mixed with 100 parts of the optimized tablet powder and used for the FTIR spectrum. Pure drug was also mixed with 100 parts of Potassium Bromide and spectrum was obtained. Both the spectra were compared for the possible deviations.

Post Compressional Parameters of Pioglitazone C.R matrix tablets

Hardness / Crushing Strength

Hardness (diametric crushing strength) is a force required to break a tablet across the diameter. The hardness of a tablet is an indication of its strength. Oral tablets normally have a hardness of 4 to 6 kg/cm2. The tablet was placed horizontally in contact with the lower plunger of the Monsanto hardness tester and zero reading was adjusted. The tablet was then compressed by forcing the upper plunger until the tablets breaks. This force was noted.

Friability test

Friability is the loss of weight of tablet in the container/package, due to removal of fine particles from the surface. This in-process quality control test is performed to ensure the ability of tablets to withstand the shocks during processing, handling, transportation, and shipment. The percent friability was determined using the following formula.

$$\text{Friability} = \left(\frac{W_1 - W_2}{W_1}\right) x100$$

Where,

W_1 = weight of ten tablets before test

W_2 = weight of ten tablets after test

Uniformity of weight or Weight variation test

Twenty tablets of each formulation were selected at random and weighed individually. The weight of individual tablets was noted. Average weight was calculated from the total weight of all tablets. The individual weights were compared with the average weight. Not more than two of the tablets must differ from the average weight by not more than the percentages stated in table below.

Estimation of drug content

Five tablets were taken and crushed in motor and powdered.10mg of blend was weighed and transferred in 10mlvoumetric flask .The blend was dissolved in Distilled water. The solution was filtered, suitable diluted and the drug content was analyzed by UV is spectrophotometrically at λmax 278 nm. Each sample was analyzed in triplicate. Generally, the drug content in any formulation should fall within the limit of 92 – 102%.

Dissolution rate studies

In vitrodrug release

In vitro drug release of the samples was carried out using USP – type II dissolution apparatus (paddle type). The dissolution medium, 900 ml 0.1N HCl up to 2hrs and after 2hrs medium was replaced with P^H 7.4 buffer was placed into the dissolution flask maintaining the temperature of 37 $\pm$ 0.5°C and rpm of 100. One Pioglitazone tablet was placed in each paddle of dissolution apparatus. The apparatus was allowed to run for 12 hours. Samples measuring 5 ml were withdrawn at the time intervals 0.5, 1, 1.5, 2hour for the first 2hrs and at every 1hr intervals up to 12 hours using 5 ml pipette. The fresh dissolution medium (37°C) was replaced every time with the same quantity (5ml) of dissolution medium. Collected samples were suitably diluted with medium (if required) and analyzed spectrophotometrically at λmax 274nm using medium as blank. The percentage drug release was calculated. All the dissolutions were done triplicate.

Kinetics and Mechanism of drug release:

First order constant: First order rate constant obtained by plotting log %Dissolved versus Time, the plot will be straight line and slope of the line (m) will be –K / 2.303.

The slope of the line and the corresponding value of k can be calculated which is indicative of the release rate profile.

$$\textbf{In Q-InQo = Kt}$$

Where Q is the amount of drug release at time t. Qo is quantity of drug present initially in the dosage form, and K is the first order release constant.

Higuchi constant: To investigate the mechanism of drug release the in vitro data were plotted as cumulative drug release versus square root of time as described by Higuchi, when the linearity was observed in the graph that indicates the diffusion controlled release.

$$\mathbf{Q = K_H t^{1/2}}$$

Where Q is amount of drug release at time t, K_H is Higuchi square root of time release rate constant.

Korsemeyer – Peppas constant: To under stand the mechanism of drug release and to compare the differences among release profile of these matrix formulations, the percent drug release versus time profiles were fitted into the equation proposed by Peppas.

$$\mathbf{Mt / M\text{œ} = Kt^n}$$

Where Mt is drug release at time t, Mœ is the total amount of drug in the dosage form, Mt / Mœ is the fraction of drug release up to time t, K is the kinetic constant and n is the release exponent indicative of the release mechanism. Where n = 0.45 indicates Fickian diffusion, when between 0.45 - 0.89 indicates anomalous Non Fickian transport and 0.89 indicates Case- II transport, n=1 for zero-order release.

RESULTS AND DISCUSSION

FT-IR Studies:

The Infrared spectra of pioglitazone hydrochloride solid admixtures of drug and excipients were recorded between 500 to 3500cm^{-1} on FTIR. From the FTIR studies at 1693.6 and 1742.79 are the characteristics peaks of Pioglitazone Hydrochloride. No significant change occurred in the characteristics peaks of pioglitazone hydrochloride in all the solid admixtures. The spectrum shown in (Figures 1 & 2)

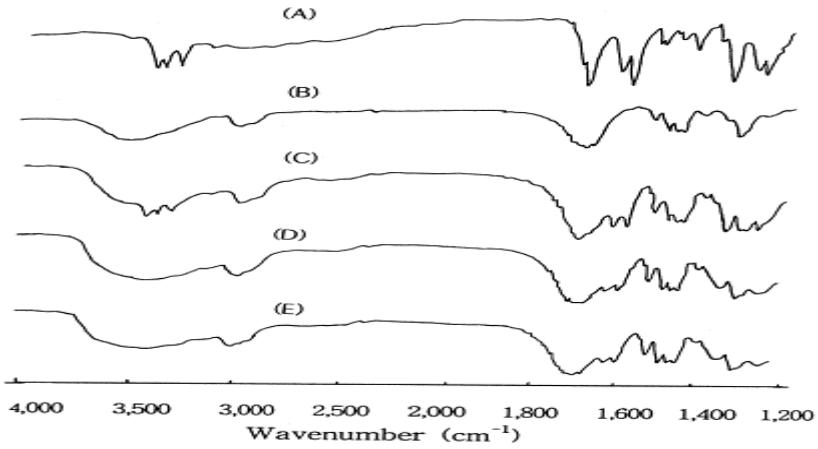

Fig.1 FTIR Graph of Pioglitazone with different polymers

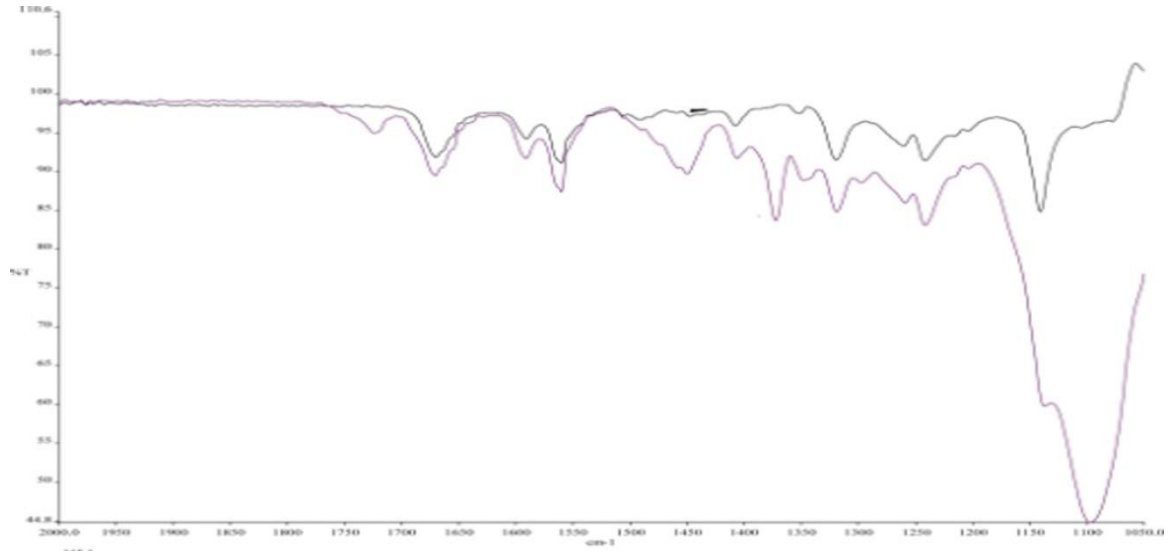

Fig. 2 FTIR Graph of Pioglitazoneand Formulation H3.

Pre-Compressional Parameters

The pre-compression parameters like bulk density, tapped density, Carr's index and hausner's ratio have been performed. These were found to be good for all the formulations but the formulation H3, P3, G3, X3 are found to be focused specially. Below given is the table that describes all the values of all the formulated batches.

Table-3 Pre- compression parameters of different formulations.

Code	Angle of repose	Bulk density	Tapped density	Compressibili-ty index	Hausner's ratio
H1	22.33±1.10	0.234±0.04	0.245±0.06	9.24±0.12	1.04±0.01
H2	23.17±1.34	0.212±0.10	0.230±0.06	10.31±0.45	1.08±0.02
H3	21.34±1.26	0.314±0.02	0.322±0.13	10.84±0.74	1.02±0.01
P1	24.14±0.56	0.243±0.56	0.252±0.10	11.12±0.14	1.03±0.01
P2	25.38±1.56	0.224±1.10	0.231±0.74	14.25±0.75	1.03±0.01
P3	27.45±0.78	0.217±0.78	0.225±0.39	12.38±1.10	1.03±0.02
G1	27.34±1.12	0.272±0.75	0.294±1.12	14.42±1.21	1.08±0.01
G2	22.14±1.29	0.237±0.25	0.242±1.06	13.36±0.64	1.02±0.02
G3	23.57±1.41	0.225±1.24	0.228±0.57	11.24±0.71	1.01±0.01
X1	20.40±1.17	0.284±1.06	0.289±0.41	13.39±1.12	1.01±0.02
X2	17.76±1.48	0.269±1.12	0.275±0.79	14.42±0.66	1.02±0.03
X3	21.39±1.22	0.252±0.45	0.256±1.12	12.56±0.14	1.01±0.01

Post-Compression Parameters

The punches used to compress the tablets were 11×6mm, oval shaped. The shape and size of the prepared tablets were found to be within the limit. The average weight was found to be within the prescribed limit. The hardness of the tablets was found to be in the range of 5.84 to 6.12 and Thicknesses of the tablets were found to be in the range of 3.64 to 5.89. The results were tabulated in the table 5.6.1 below. Drug content for each of the formulations were estimated. The drug content for all the batches were found to be in the range of 97.40 to 99.85%. The results are given in table 4.

Table-4 Post- compression parameters of the tablets.

Formulations	Average wt. (mg)	Hardness	Friability %	Thickness	Drug Content
H1	297.8	5.92±0.32	0.32	3.64±0.04	99.42
H2	298.2	5.89±0.28	0.29	3.81±0.04	99.72
H3	298.6	6.12±0.34	0.18	3.74±0.02	99.85
P1	296.10	5.84±0.40	0.14	3.84±0.02	99.17
P2	297.40	5.94±0.31	0.23	3.87±0.03	97.35
P3	298.75	5.87±0.46	0.31	3.92±0.06	97.80
G1	298.30	5.92±0.64	0.13	5.72±0.03	97.12
G2	297.60	5.88±0.39	0.31	5.69±0.02	98.25
G3	299.10	5.97±0.41	0.43	5.78±0.04	98.60
X1	298.91	5.89±1.10	0.22	5.81±0.02	97.40
X2	299.12	6.01±0.78	0.37	5.89±0.04	98.75
X3	301.30	5.92±0.84	0.34	5.77±0.01	98.62

In-Vitro Dissolution Studies

All the 12 formulation of prepared tablets of Pioglitazone were subjected to *in vitro* release studies, these studies were carried out using dissolution medium, (pH 1.2 and Phosphate buffer pH 7.4).by using USP-2 (paddle type) dissolution apparatus. The results were evaluated for 24 hours. As per the results of dissolution study formulations H-1, H-2, H-3, P1, P2, P3, G1, G2, G3, X1, X2 and X3 showed 84.21%, 93.53%, 99.87%, 64.21%, 75.27%, 97.85%, 77.48%, 83.27%, 92.48%, 80.57%, 89.91% and 93.51% release respectively over a period of 24 hours.

Among all the formulation, H3, P3, G3 and X3, showed 99.87%, 97.85%, 92.48 and 93.51%, release respectively at the end of 24 hours. The formulation H3 its release at the end of 24th hr is 99.87% also all other parameters like hardness, thickness, friability, and drug content and weight variation for this formulations were within the range. So, a formulation H3 was selected as the optimized formulation.

The data of all the formulated tablets is shown in the tables below and graphs are drawn respectively.

Table 5 Cumulative percent drug release of H1 to H3 formulations.

Sl.No	Time (hrs).	H1	H2	H3
01	0	0	0	0
02	01	6.54	7.05	9.21
03	02	11.27	12.57	14.35
04	03	16.47	17.24	19.64
05	04	20.43	22.56	24.27
06	05	24.57	27.54	29.53
07	06	28.74	32.43	33.15
08	07	32.47	37.26	38.54
09	08	36.62	42.2	43.57
10	09	40.05	47.58	48.11
11	10	44.27	52.64	53.23
12	11	48.69	57.54	58.73
13	12	60.27	65.29	63.51
14	16	69.58	78.13	76.52
15	20	78.56	87.28	89.27
16	24	84.21	93.53	99.87

Table 6 Cumulative percent drug release of P1 to P3 formulations.

Sl.No	Time (hrs).	P1	P2	P3
01	0	0	0	0
02	01	11.24	6.21	7.45
03	02	14.41	10.52	12.54
04	03	17.59	14.71	17.24
05	04	21.34	18.52	22.32
06	05	24.53	22.01	27.15
07	06	27.36	26.32	32.06
08	07	30.54	30.54	37.41
09	08	33.82	34.12	42.34
10	09	36.32	38.26	47.59
11	10	39.74	42.58	52.16
12	11	42.38	46.37	57.37
13	12	45.21	52.14	65.28
14	16	50.24	60.22	76.42
15	20	58.47	68.45	89.24
16	24	64.21	75.27	97.85

Table 7 Cumulative percent drug release of G1 to G3 formulations.

Sl.No	Time (hrs).	G1	G2	G3
01	0	0	0	0
02	01	6.47	7.42	8.14
03	02	10.55	11.52	13.53
04	03	14.16	15.63	18.12
05	04	18.21	19.24	23.41
06	05	22.34	23.51	28.53
07	06	26.54	27.57	33.67
08	07	30.37	31.13	38.54
09	08	34.25	35.22	43.26
10	09	38.62	39.52	47.95
11	10	42.14	43.2	52.17
12	11	46.32	47.56	58.24
13	12	52.37	55.24	70.54
14	16	66.54	64.27	79.53
15	20	74.24	73.59	87.27
16	24	77.48	83.27	92.48

Table 8 Cumulative percent drug release of X1 to X3 formulations.

Sl.No	Time (hrs).	G1	G2	G3
01	0	0	0	0
02	01	7.02	8.59	9.12
03	02	11.2	12.46	13.43
04	03	15.26	16.57	17.27
05	04	19.52	20.23	21.57
06	05	23.34	24.42	25.63
07	06	27.15	28.76	29.58
08	07	31.55	32.43	33.42
09	08	35.62	36.51	37.14
10	09	39.17	40.2	41.29
11	10	43.29	44.19	45.3
12	11	47.59	48.57	49.51
13	12	54.84	56.47	58.74
14	16	68.04	68.49	70.54
15	20	74.24	80.71	81.56
16	24	80.57	89.91	93.51

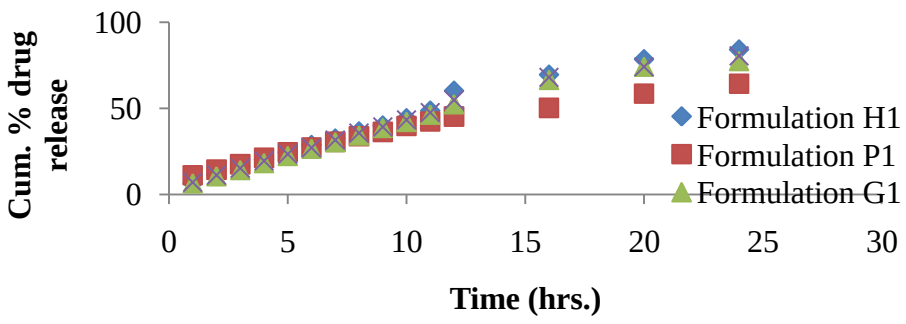

Fig 3 Comparrison of Dissolution Profiles of Formulation H1,P1,G1and X1

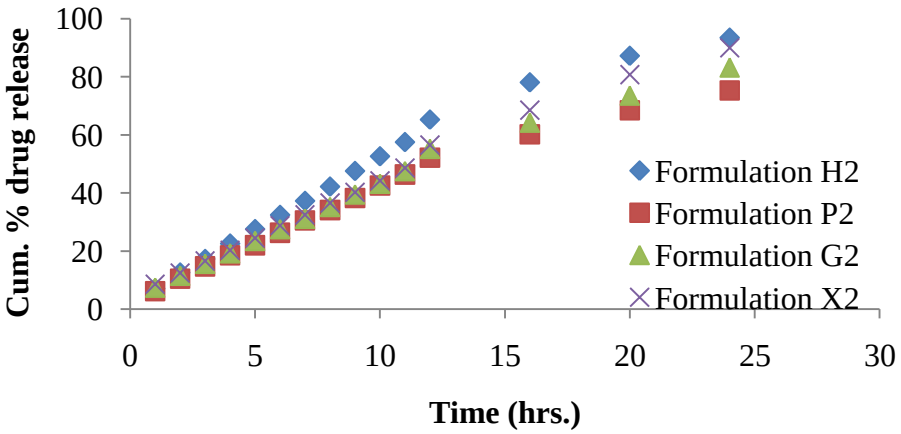

Fig. 4. Comparison of dissolution profiles of Formulation H2, P2, G2 and X2

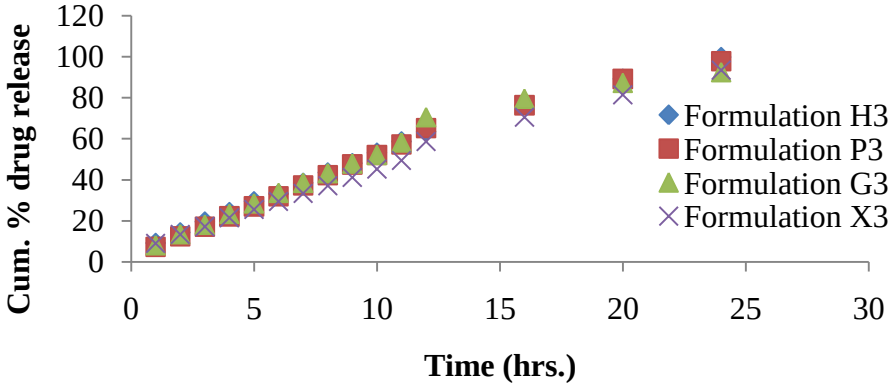

Fig. 5. Comparison of dissolution profiles of Formulation H3, P3, G3 and X3

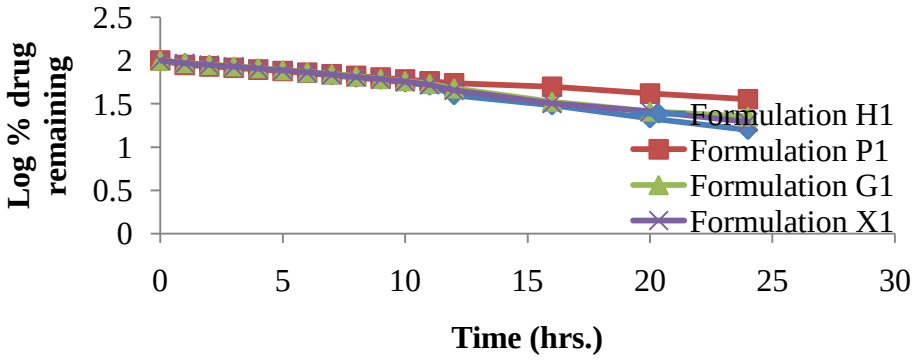

Fig. 6 Comparison of First order plot of Formulation H1, P1, G1 and X1.

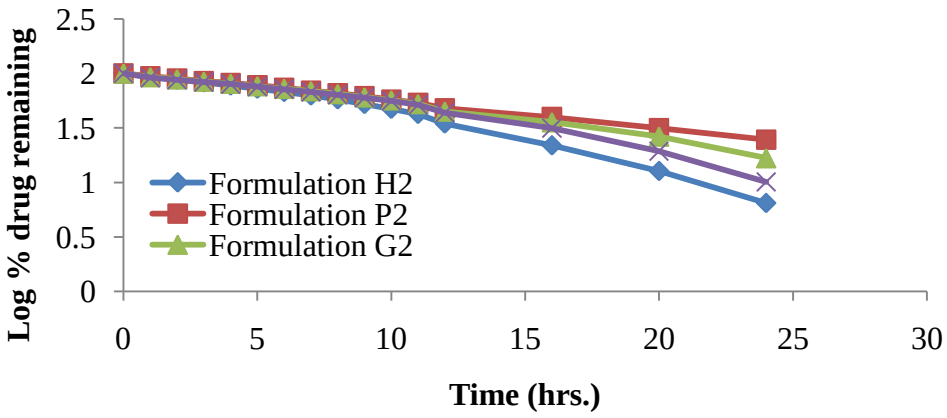

Fig. 7 Comparison of First order plot of Formulation H2, P2, G2 and X2.

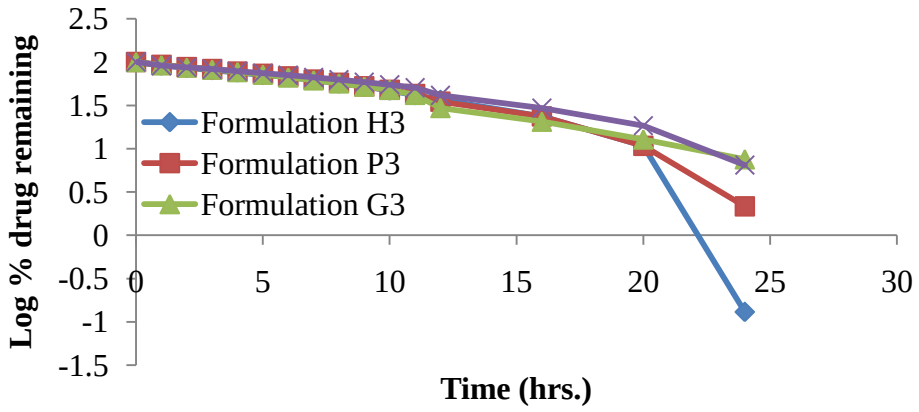

Fig. 8 Comparison of First order plot of Formulation H3, P3, G3 and X3.

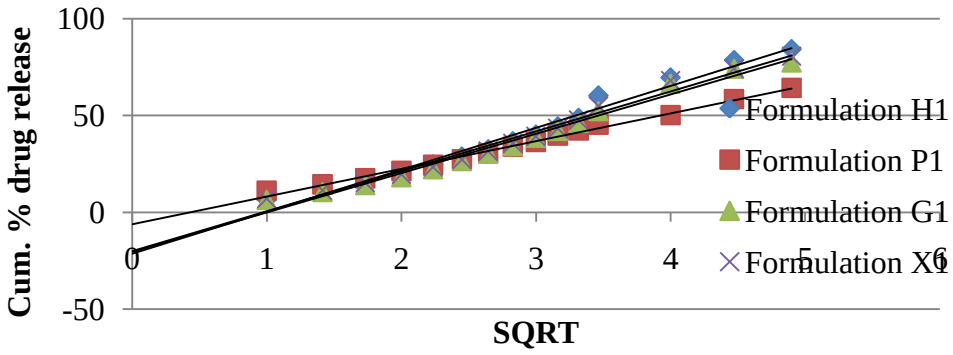

Fig. 9 Comparison ofHiguchi plot of Formulation H1, P1, G1 and X1.

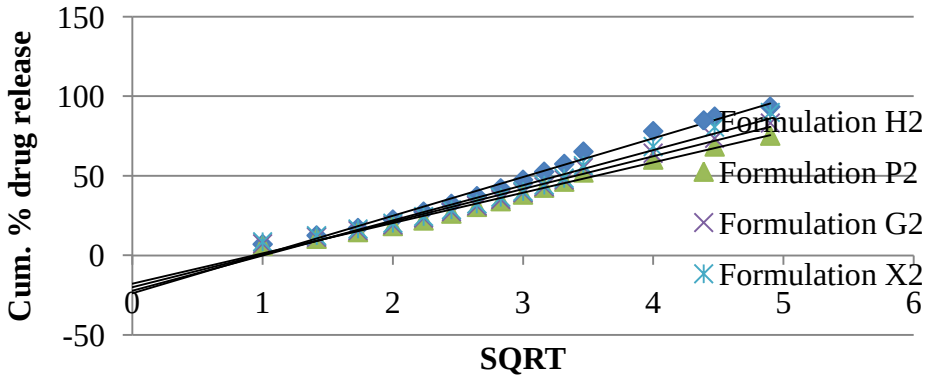

Fig. 10 Comparison ofHiguchi plot of Formulation H2, P2, G2 and X2.

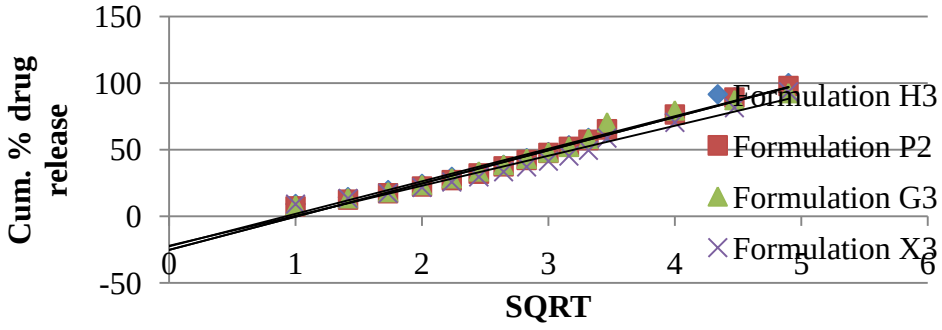

Fig. 11 Comparison ofHiguchi plot of Formulation H3, P3, G3 and X3.

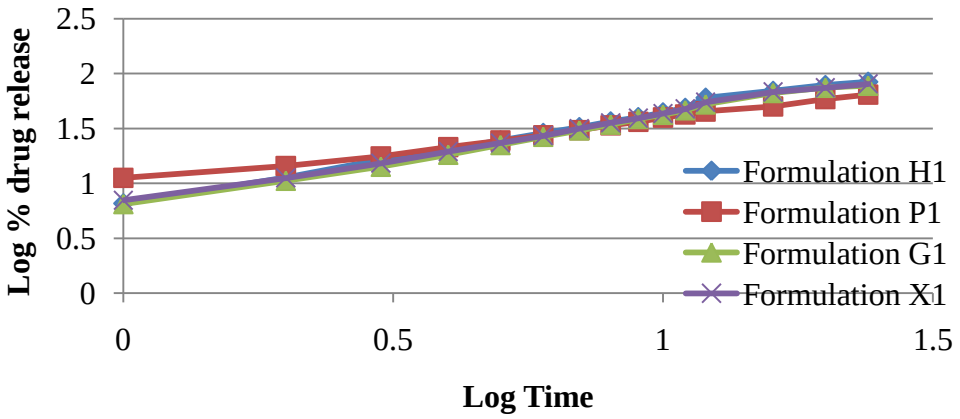

Fig. 12 Comparison ofDouble log plot of Formulation H1, P1, G1 and X1.

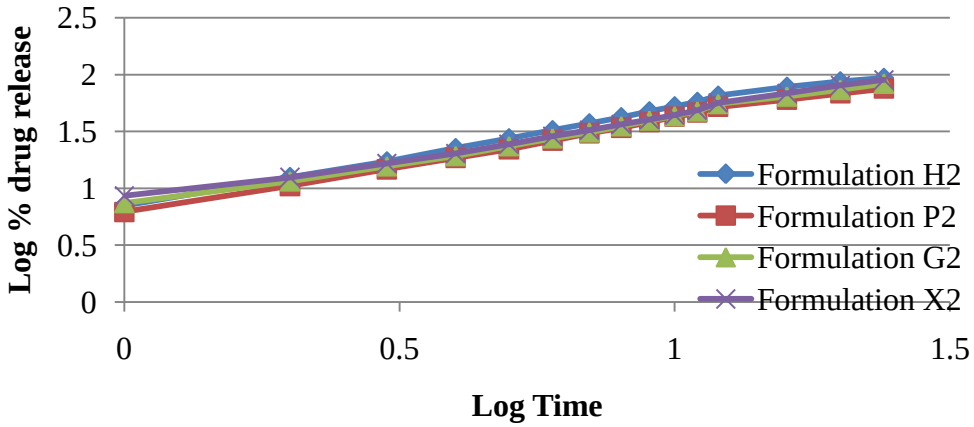

Fig. 13 Comparison ofDouble log plot of Formulation H2, P2, G2 and X2.

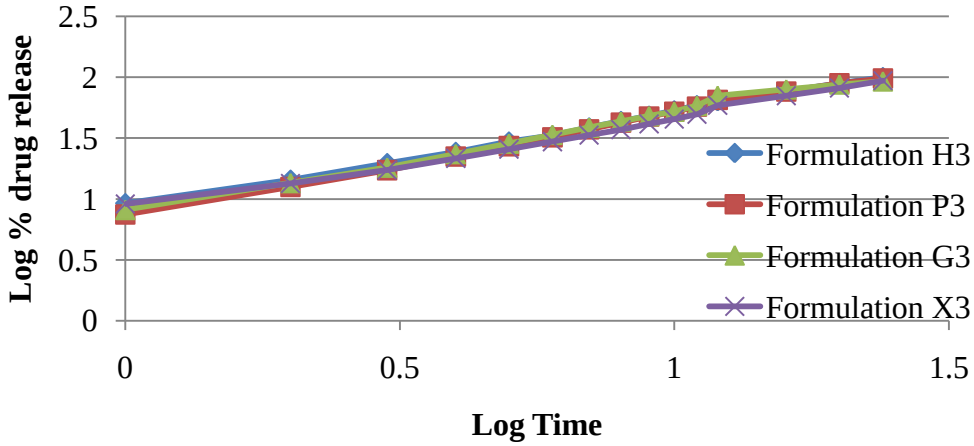

Fig. 14 Comparison ofDouble log plot of Formulation H3, P3, G3 and X3.

Kinetics of Drug Release

Different models like Zero order, First order, Higuchi's, and Korsmeyer-peppas plots were drawn. The regression coefficient (R2) value for Zero order, First order, Higuchi's, and Korsmeyer-peppas plots (figure 5.8.1 to 5.8.60) were drawn. For formulation H3 were found to be 0.9845, 0.7047, 0.9868. The optimized formulations H3 follow Zero order and Korsmeyer-peppas. The regression coefficient (R2) of Higuchi plot of optimized formula H3 is 0.9868 that shows the drug releases through the matrix was diffusion and slope (n) value of peppas plot is 0.986 this confirms that non-Fickian diffusion (anomalous transport) was the main mechanism. The regression coefficient (R2) value of zero order is 0.9845 in. Thus, the drug release follows zero order release kinetics.

The formulations H3, P3, G3 and X3 showed nearly equal results. The reaction kinetics of the formulated tablets is tabulated in the table given below. Table. 9.

Table 9 Reaction kinetics of various formulations

Sl.No	Code	R^2 Zero order	R^2 First order	R^2 Higuchi	n value Korsemeyer and peppas
01	H1	0.9698	0.9820	0.9780	0.8379
02	H2	0.9659	0.9678	0.9854	0.8544
03	H3	0.9845	0.7047	0.9868	0.7825
04	P1	0.9726	0.9912	0.9932	0.5859
05	P2	0.9908	0.9967	0.9880	0.8215
06	P3	0.9914	0.8896	0.9855	0.8511
07	G1	0.9707	0.9896	0.9795	0.8368
08	G2	0.9820	0.9827	0.9825	0.7994
09	G3	0.9523	0.9749	0.9778	0.8170
10	X1	0.9675	0.9884	0.9807	0.8157
11	X2	0.9684	0.9533	0.9748	0.7820
12	X3	0.9779	0.9207	0.9729	0.7667

STABILITY STUDIES

Table 10 Stability studies of optimized formulation.

Sl.No	Parameter	25°C/60%RH			30 °C/65%RH			40 °C/70%RH		
		0	**30**	**60**	**0**	**30**	**60**	**0**	**30**	**60**
01	Physical appearance	No change	No change	No change	No change	No change	No change	No change	No change	No change
02	Hardness	2.92	5.94	5.96	6.07	6.08	6.10	6.08	6.10	6.12
03	Friability	0.16	0.11	0.090	0.18	0.10	0.078	0.20	0.12	0.07
04	Drug content	99.76	99.72	99.65	99.85	99.82	99.80	99.80	99.80	99.78
05	% Drug release	99.76	99.80	99.70	99.48	99.50	99.40	99.60	99.50	98.82

The stability studies were performed on selected formulation where the drug release was studied at 250C ± 20C / 60% ± 5% RH, 300C ± 20C / 65% ± 5% RH and 400C ± 20C / 75% ± 5% RH. The samples were analyzed for drug content, physical appearance, hardness, friability and dissolution studies in 0.1N HCl and in phosphate buffer pH 7.4. The physical appearance of the samples kept for stability studies were checked and found that there was no difference in the appearance. The drug content analysis also showed that the products were stable (Table 10). Further the formulations did not show any significant difference in dissolution rate after a study period of 3 months.

CONCLUSION:

In the present study, Pioglitazone Controlled release tablets were prepared using polymers like Hydroxy propyl methyl cellulose, Psyllium, Guar-gum, Xanthum gum and Carbopol. From this study it can be concluded that Pioglitazone C.R tablets prepared by Hydroxy propyl methyl cellulose K15M (i.e. H3) showed good release rate than the tablets prepared by using other polymers. The formulation H3 was considered optimum because it showed negligible drug release in acidic medium and drug release in the phosphate buffer (pH 7.4) was found to be almost complete. The stability studies of the selected formulation showed that the product was stable through-out the study period (3months). Different formulations are formulated by using various polymers and the rate of drug release was in the following order from those selected polymers.

HPMC K15M> Psyllium> Xanthum Gum> Guar-gum.

The present investigation proved Psyllium as an emerging natural polymer in the preparation of C.R tablets.

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