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Research

Design and evaluation of sustained release tablet of hydrophilic matrix system drug used aceclofenac

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Abstract

The objective of the present study was to develop "once daily" sustained release tablets of Aceclofenac (200mg) by wet granulation using hydrophilic polymer like Hydroxy propyl methyl cellulose K -100. The drug excipient mixtures were subjected to preformulation studies. The tablets were subjected to physicochemical studies, in- vitro drug release, kinetic studies and stability studies. FTIR studies shown there was no interaction between drug and polymer. The physicochemical properties of tablets were found within the limits. Aceclofenac is a non steroidal anti-inflammatory agent used in symptomatic treatment of rheumatoid arthritis, osteoarthritis and spondylitis. The drug release from optimized formulations was extended for a period of 24 hrs. The kinetic treatment of selected formulation showed that the release of drug follows zero order models. The optimized formulations were subjected to stability studies for one month at 45° temperature with RH 75±5% and showed there were no significant changes in drug content, physicochemical parameters and release pattern. Results of the present study indicated the suitability of hydrophilic polymers in the preparation of matrix based sustained release formulation of Aceclofenac.

Keywords: Aceclofenac , Matrix tablet, Sustained release

INTRODUCTION

For many decades treatment of an acute disease or a Chronic illness has been mostly accomplished by delivery drug to patient using various pharmaceutical dosage forms, including tablets, capsules, pills, suppositories, creams, ointment, liquids, aerosols and injectables as drug carriers. This type of drug delivery system is known to provide a prompt release of drug or immediate release product. Such immediate release product results in relative rapid drug absorption and onset of accompanying pharmacodynamic effects. . However after absorption of drug from the dosage form is complete plasma drug concentration decline according to the drug pharmacokinetics profile. (Yie.W. Chein,1992)

Eventually plasma drug concentration fall below the minimum effective plasma concentration (MEC), resulting in the loss of therapeutic activity. Before this point is reached another dose is usually given if sustained therapeutic effects are desired.

Dosage forms, in recent years various modified release has been introduced.

The term controlled release oral dosage form is not new to most people working in various fields of pharmaceutical research. In fact approximately 30 year's ago, the US-FDA published regulatory requirement for controlled release products.

The novel system of drug delivery offers a means of improving the therapeutic effectiveness of incorporated drug by providing sustained, controlled delivery and or targeting the drug to desired site. The goal of any drug delivery system is to provide a therapeutic amount of drug to the proper site in the body to achieve promptly and then maintain the desired drug concentration.

Hydrophilic swellable matrices (hydrogels)

Hydrogels are defined as 'network of hydrophilic polymers which can absorb a significant amount of water (>20% of their dry weight) with out dissolving or losing their structural integrity'. Polymer of this type are usually cross-linked, albeit the swelling may be due to other causes, such as Vander wall forces, crystallites, hydrogen bonds, mere physical entanglement or ionic bonds.

An outline for possibility of using HPMC in SR preparations of the swellable matrix type has been described in Dow's Methocel Bulletin (1982), formulating SR pharmaceutical products with Methocel.

The enhanced release rate observed at the beginning for the short time of release process is known as " burst effect "and is many a time undesirable since it may, have negative therapeutic consequences. After this burst, hydration and consequent swelling and /or erosion of related polymer occur. These phenomenon control the release process but with time, the diffusion path length increase and saturation effect is attained, resulting in a progressively slow release rate during the end of dissolution span.

Drug release mechanism from matrices

From time to time, various authors have proposed different types of drug release mechanisms from matrices. It has been proposed that drug release from the matrices usually implies water penetration in the matrix, hydration, swelling, diffusion of the dissolved drug (polymer hydro fusion), and / or the erosion of the gelatinous layer. However, it is worth mention that the release mechanism of a drug would depend on the dosage form selected, pH, nature of the drug and, of course, the polymer used. (Ansil's 2005)

The result of in-vitro release profile obtained for all thr formulation were ploted in modes of data treatment as follows;

1. Zero order kinetic model- cumulative percentage drug release versus time.
2. First kinetic model- log cumulative percent drug remaining versus time.
3. Higuchi's model- cumulative percentage drug release versus square root of time.
4. Korsmeyer equation\ peppas model - log cumulatine percent drug released versus log time (korsmeyer R.W.et.al1983)

Drug candidate for sustained release drug delivery system

To be a successful SR product, the drug must be release from the dosage form at a predetermined rate, dissolved in the gastrointestinal fluids, maintain sufficient GI residence time, and be absorbed at a rate that will replace the amount drug being metabolized and excreted (Robinson.J.R1987, Ansil's 2005, Thomas Wai-Yip.et.al 1978, Ashok V.et.al.2000.). In general, the drugs best suited for incorporation into an external product have the following properties.

MATERIALS AND METHODS

Materials

Drug: ACECLOFENAC was obtained from ARVIND REMEDIES Pvt. Ltd, Thiruvallore. Tamilnadu.

Chemicals: Chemicals and reagents used for the preparation of buffers, analytical solutions and other experimental purposes are listed in table.

Table 1: List of cheminals used in formulation development study

S.No.	Chemicals	Grade	Manufacturer / Supplier
1.	Acetonitrile	HPLC	RFCL Limited.
2.	Glacial acetic acid	HPLC	Merck Pvt.Ltd.
3.	Hydrochloric Acid	HPLC	Universal laboratories.
4.	Methanol	HPLC	Merck, Germany
5.	Potassium di-hydrogen phosphate (KH_2PO_4)	HPLC	S.D. Fine Chemicals.

6.	Sodium Hydroxide	HPLC	Merch specialties Pvt.Ltd

Excipients: The excipients used in formulation development

Table 2: List of excipient used in formulation development and study

S. No.	Excipients	Brand Name	Grade	Supplier / Manufacturer
1.	Hydroxy propyl methyl cellulose	Methocel	K 100M Premium	Colorcon, India
2.	Hydroxy propyl methyl cellulose	Methocel	K 15M Premium	Colorcon, India
3.	Magnesium Stearate	-	-	-
4.	Talc	-	-	Golcha Group
5.	Mannitol	-	-	Jothi aromas
6.	Povidone	-	-	DK enterprises
7.	Lactose	-	-	Unify chemicals
8.	Aerosil	-	-	-
9.	Isopropyl alcohol	-	-	Unify chemicals

Instruments: Instruments and equipments used.

Table 3: List of equipments used

S.No	Equipments / instruments	Model Number	Manufacturer
1.	Tablet station punching Machine 10	CJD3-3	Clit Jemkay Eng Pvt. Ltd
2.	Hot air oven	-	-
3.	Sieve no 10	-	Jaico metals
4.	Sieve no 16	-	Jaico metals
5.	electronic Weighing Balance	AB 54-5	Mettler Toledo
6.	electronic Weighing Balance	BL 60s	Satorius
7.	Tablet Hardness Tester		Inlab
8.	Friability Tester	USP (EF-2)	Electrolab
9.	Digital vernier caliper		Mitutoyo
10.	Dissolution Tester Temperature controller Fraction Collector	(TDT – 08L) USP ETC- 11L FC - 12	Electro lab Electro lab Electro lab
11.	UV-VIS. Spectrophotometer	UV-1601	Shimadzu
12.	Stability control oven (440ºC/75RH)		Thermo lab,
13.	pH Meter	510 pH	Micropro gradmats
14.	Bulk density Apparatus	ETD – 1020	Electro lab
15.	Ultra sonic bath	SFE590	Ultra wave
16.	FT-IR Spectrophotometer	Jasco	FT-IR 410
17.	HPLC (Auto sampler, Micro pump, Column oven, UV/VIS detector)	-	Water 2695seprtion module.Water- 2696 photo diode array detector,YMC-Pack C18RS(150×4.6mm)
18	Strip packing machine	-	Rapid pack
19.	IR moisture balance.	M-3A	Advance. Researchinst.
20.	Melting point tester	-	Campbell electronics.

Methodology for development of sustained release tablet

Pre formulation studies

Preformulation may be described as a phase of the research and development process where the formulation scientist characterizes the physical, chemical and mechanical properties of new drug substances, in order to develop stable, safe & effective dosage forms. (leon lachman.et.al.1987)

Bulk density

Bulk density is defined as the mass of powder divided by the bulk volume. Bulk density largely depends on particle shape, as the particles become more spherical in shape, bulk density is increase. In addition as granules size increase, bulk density decrease. Bulk density is determined by measuring the volume of a known mass of

powder sample that has been passed through a screen into a graduated cylinder or through a volumetric measuring apparatus into a cup.

Procedure

A known quantity of powder was poured into the measuring cylinder carefully level the powder with out compacting, if necessary and read the unsettled apparent volume, Vo, to the nearest graduated unit. Calculate the bulk density, in gm per ml, by the formula

Bulk density = Bulk Mass/ Bulk Volume

Tapped density

Tapped density is achieved by mechanically tapping a measuring cylinder containing a powder sample. After observing the initial volume, the cylinder is mechanically tapped and volume readings are taken until little further volume changes are observed.

Cylinder dropping distance: 14± 2 mm at a normal rate of 300 drops / minute.

Unless otherwise specified, tab the cylinder 500 times initially and measure the tapped volume, Va, to the nearest graduated unit. Repeat the tapping an additional 750 times and measure the tapped volume, Vb, to the nearest graduated unit. If the difference between the two volumes is less than 2%, Vb is the final tapped volume, Vf. Repeat in increments of 1250 taps, as needed, unit the difference between succeeding measurements is less than 2%. Calculate the tapped density, in gm per ml, by the formula:

$$\text{Tapped Density} = \frac{m}{Vf}$$

Generally replicate determinations are desirable for the determination of this property.

Measurement of Powder Compressibility

The compressibility Index and Hausner Ratio are measures of the propensity of a powder to be compressed. As such, they are measures of the relative importance of inter particulate interactions. In a free flowing power, such interactions are generally less and tapped densities will be closer in value. For poorer flowing materials, there are frequently greater inter particle interactions, and a greater difference between bulk and tapped densities will be observed.

It is one of the parameters to judge the purity of crude drugs. In case of pure chemicals or phytochemicals, melting points are very sharp and constant. Since the crude drugs contain the mixed chemicals, they are described with certain range of melting point.

Procedure*:* A small quantity of powder was placed into a fusion tube. That tube is placed in the melting point determining apparatus containing castor oil. The temperature of the castor oil was gradual increased automatically and read the temperature at which powder started to melt and the temperature when all the powder gets melted.

Particle size (Sieving methods)

The particle sizes of the prepared granules were estimated by sieving method. Sieving method directly gives weight distribution. Normally 15% of fine (passed through mesh 100) should be present in granulated material to get a proper flow of material and achieve good compaction in tabletting[(Herbert A1.et.al.999)].

Method

Sieves were arranged in a nest with the coarse at the top. A sample (10 gm) of the granules was placed on the top sieve. The sieve set was fixed and shaken for a certain period of time (20 minutes). The granule retained on each sieve was weighed. Frequently, the granules were assigned the mesh number of the screen through which it passed or on which it was retained.

Technique	Particle size
Microscopic	1-100
Sieve	>500
Sedimentation	>1
Elutriation	1-50

Drug excipient compatibility studies:. Fourier transform IR spectroscopy

Drug and excipient were analyzed by IR spectral studies by using KBr pellet technique. In this method, the drug and KBr were mixed at the ratio of 1:300. Then these mixtures were pressed in to a pellet. The FTIR spectra were recorded using KBr pellet method in the region of 400-2000 cm^{-1}. Spectra were recorded for pure drug, pure excipients and drug with excipients (tablet) [(Willard1988, Gurdeep.R.Chatwal 2002)].

RESULTS AND DISCUSSION

Pre formulation Studies

Organoleptic properties

These tests were performed as per procedure (6.2.1) given in material and method part. The results are illustrated in following table

Table 4: Observation of Organoleptic Properties

Test	Specification	Observations
Colour	_	White or almost white, crystalline powder.
Taste	_	Bitter
Odour	_	No characteristic odour

Physical characteristics A .Loss on drying

This test was done as per procedurestated in material and method section. The result illustrated in following table.

Table 5: Observation for Loss on drying

Test	Specification / limits	Observations
Loss on drying	Not more than 0.5 %	0.38%

Angle of repose

It was determined as per procedure given in material and method part. The results are illustrated in following tables:

Table 6: Determination of angle of repose

Materials	Angle of repose
Aceclofenac raw material	31.92°
Granules ready for compression	29.76°

The results of the table indicate that the Aceclofenac raw material showing passable flowability with the angle of repose values ranging from 32.25º to 33.45º. The granules ready for compression showing fair to good flowability with the angle of repose values ranging from 28.43º to 29.02º according to angle of repose graph readings and are better than that of powder drug.

Bulk density and tapped density

It was determined as per procedure given in material and method part. The results are illustrated in tables

Table 7: Determinations of Bulk Density and Tapped Density

Material	Bulk density (gm/ml)	Tapped density (gm/ml)	Compressibility Index	Hausner ratio
Aceclofenac	0.652	0.833	21.73	1.270
Granules ready for compression	0.612	0.75	18.36	1.225

The bulk density, tapped density, compressibility index and Hausner ratio were observed as. It reveals that all the formulation blend having good flow characteristics and flow rate than raw material.

Melting point

It was determined as per procedure given in material and method part. The results are illustrated in table;

Table 8: Observation of Melting point

Test	Specification	Observation
Melting point	149°C -150 °C	150°C

Solubility

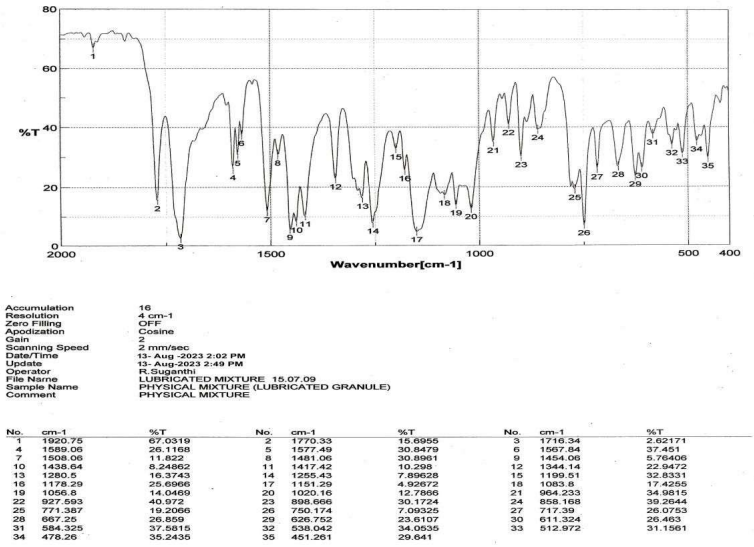
It was determined as per procedure (6.2.4) given in material and method part. The following table illustrated the result.

Table 9: Solubility determination

Quantity of Aceclofenac	Quantity of solvent	Inference
1.0 gm	100 ml water	Practically insoluble
1.0gm	10 ml methanol	Souble
1.0gm	10 ml acetone,	Freely soluble

FTIR Studies

The FTIR spectra of the pure drug, excipient and physical mixture of drug and excipient were recorded in between 400 to 2000 wave number (cm^{-1}), no peaks are observed with the main drug peaks .the following spectrum and table shows IR spectrum for drug and polymer and the wave number of characteristic bands are the same.



No.	cm-1	%T	No.	cm-1	%T	No.	cm-1	%T
1	1920.75	67.0319	2	1770.33	15.6955	3	1716.34	2.62171
4	1589.06	26.1168	5	1577.49	30.8479	6	1567.84	37.451
7	1508.06	11.822	8	1481.06	30.8961	9	1454.06	5.76406
10	1438.64	8.24862	11	1417.42	10.298	12	1344.14	22.9472
13	1280.5	16.3743	14	1255.43	7.89628	15	1199.51	32.8331
16	1178.29	25.6966	17	1151.29	4.82672	18	1083.8	17.4255
19	1056.8	14.0469	20	1020.16	12.7866	21	964.233	34.9815
22	927.593	40.972	23	898.666	30.1724	24	858.168	39.2644
25	771.387	19.2066	26	750.174	7.09325	27	717.39	26.0753
28	667.25	26.859	29	626.752	23.6107	30	611.324	26.463
31	584.325	37.5815	32	538.042	34.0535	33	512.972	31.1561
34	478.26	35.2435	35	451.261	29.641			

Fig 1: IR Spectrum of Physical mixture, (Aceclofenac+lactose+mannitol+HPMC K100 +PVP K 30+Talc+MS)

Table 10: Comparison study of frequency ranges of Drug and polymers

Groups	Frequency cm^{-1}		
	Acecofenac	Aceclofenac+ HPMC K 100	Aceclofenac+ PVP K 30
C=O(acid)	1770.33	-	1770.33
=C=O (ketone)	1716	1716.34	1716.34
-(N-H)	1508	-	1540.85
-C-H (alkane)	1452	1452.14	1454.06
-C-C- (stretch)	1417	-	1419.35
-C-N-	1344	-	1344.14
-C-O-	1255	-	1255.43
C-O-C(ether)	1054	1149.37	1056.80
-C-H- (alkane)	964.23	-	964.233
-C-Cl	750.174	750.174	-

All the peaks present in the pure drug was observed in the mixture. It indicates that there is no significant changes of peak in the pure drug. So it include that, No interaction between drug and polymers and it seems to be drug and polymer is compatible with each other.

Analytical methods

Determination of λmax of Aceclofenac Uv Spectrophotometric Method

A UV spectrophotometric method given in IP is used for dissolution samples of Aceclofenac SR tablet. Absorbance scans of drug in 0.1NHCL / Phosphate buffer pH6.8 showed maximum at 274 nm, which is selected as the analytical wavelength.

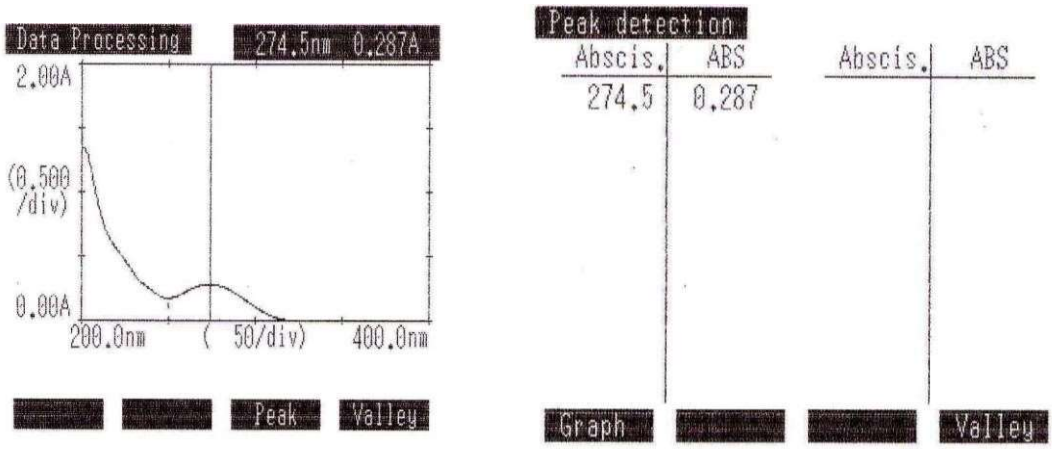


Fig 2: UV Absorbance spectrum of Aceclofenac

Drug	λmax as per IP(nm)	Obtained λmax(nm)	Deviation (nm)
ACECLOFENAC	275	274.5	275 2

Assay

(A). By UV method

Potency of standerd = 99.21% Sample weight = 55.20mg Standered weight = 54.9mg Sample LOD = 99.62%

Assay of Aeclofenac raw material by UV spectrophotometer

Table 11: Assay of Aeclofenac raw material by UV spectrophotometer

Materials	Absorbance	Percentage found
Test sample	0.283	98.16%
Standard	0.286	

Specification: Aceclofenac contains not less than 90.0% and not more than 101.% $C_{16}H_{13}C_{l2}NO_4$, calculated with reference to the dried substance.

Comments: Results show the raw materials are within the IP limits.

By HPLC method

Potency of standerd = 99.21%

Raw material sample weight = 25.8mg Standered weight = 25.00mg Percentage found = 99.93%

Table 12: Assay of Aeclofenac raw material by HPLC method

Materials	Area 1	Area 2	Area 3	Area 4	Average area	Percentage found
Standard sample	1656293	1659203	1659199	1661090	1658942.2	99.93%

Raw material	1721999	1727010	-	-	1724504.5

Evaluation of uncoated sustained release aceclofenac matrix tablet

Table 13: Evaluation of uncoated Sustained release matrix tablets

Formulation	Weight variation in mg	ıickness in mm	iameter in mm	Hardness in Kg/cm^2	ability (%)
F_1	320	3.95	9.58	6.2	0.62
F_2	325	3.98	9.58	6.4	0.53
F_3	319	3.60	9.57	6.8	0.71
F_4	386	6.00	9.58	6.0	0.54
F_5	384	4.70	9.58	5.0	0.78
F_6	340	4.15	9.57	5.5	0.53
F_7	320	3.97	9.58	4.6	0.53
F_8	320	3.95	9.58	5.4	0.51

- The weight variations for all the formulation F1 to F8 were within the pharmacopoeial specification.
- Thickness of F4 (punch Size 12/32 DC), the thickness limit, 3.1-6.2 mm, and Thickness of F5 (punch Size 12/32 FB), the thickness limit, 3.1-3.6 mm, remaining done with punch size 12/32 BC, with thickness limit - 3.3-3.6mm.
- Hardness of all formulation F1to F8 was in range of 5.4- 6.8 kg/cm2.
- Diameter of all formulation F1 to F8 was in the range of 9.57- 9.58 mm.
- Friability of all formulation was in the range of 0.51 to 0.78%.

Assay

Estimation of Aceclofenac SR tablet
By U.V. method

Aceclofenac was estimated as per procedure given in material and method section. The following table no: 21 illustrated the results.

Limit

Not less than 90.0% and not more than 110.0% of the stated amount of the Aceclofenac
% Purity of = 99.21%
Sample weight = 80 mg
Standard weight = 55.7 mg

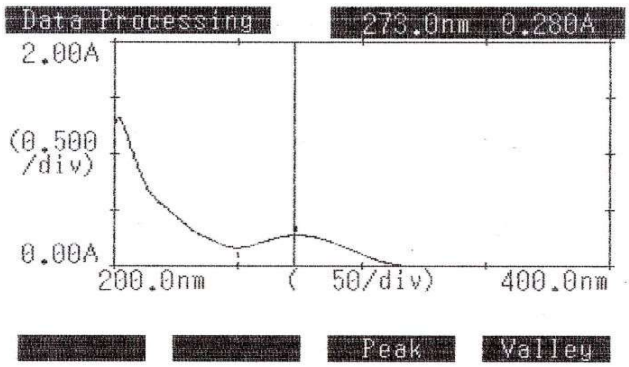


Fig 3: **UV Absorbance spectrum of Aceclofenac sustained release tablet**

Table 14: Estimation of Aceclofenac SR tablet by U.V. method

Materials	Absorbance at 237 nm	Percentage found
Test Sample	0.261	100.15%
Standard	0.287	

The result indicates that values are complies as per IP limit

HPLC method for Analysis

By using the chromatographic conditions mentioned in materials and method section the assay for drug content of final selected formulation is performed and calculated by following formula.

Table 15: HPLC method for Analysis

Materials	Area 1	Area 2	Area 3	Area 4	Average area	Percentage found
Standard sample	1656293	1659203	1659199	1661090	1658942.2	99.126%
Test sample	1660047	1655041	-	-	1657544	

The result indicates that values are complies as per IP limit.

Stability studies (as per ich guidelines)

The fabricated sustained release formulation (finely selected F-8) was subjected to stability studies at 40ºC± 2ºC/75% RH ±5 % for 30 days. The product was evaluated for appearance and hardness every 10 days. Drug polymer compatibility, drug content and drug release studies were conducted as per the planned scheduled as above.

Dissolution data of percentage cumulative drug release

Table 16: Comparisons of dissolution data of stability sample at Accelerated Temperature

Time (in hours)	Initial (0 days)	30 days
2	2.63	2.12
4	33.41	34.25
6	40.54	39.64
8	46.00	44.13
10	54.10	55.54
12	66.06	65.49
16	75.28	73.20
20	88.95	86.89
24	95.72	95.02

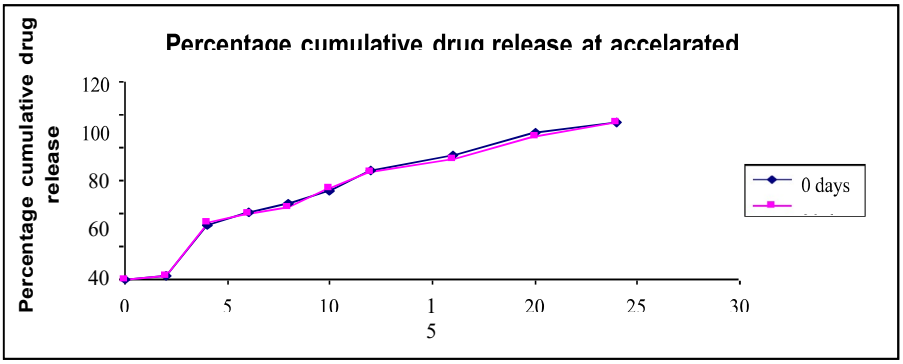


Fig 4: Comparison of dissolution data of stability samples at Accelerated condition

In vitro release study of marketed tablet.

Percent cumulative drug release for marketed Product		
Time in hour	**Formulation 8**	**marketed Product drug release**
2	2.63	2.23
4	33.41	23.45
6	40.54	31.58
8	46.00	49.41
10	54.10	57.95
12	66.06	69.83
16	75.28	74.22
20	88.95	83.82
24	95.72	91.35

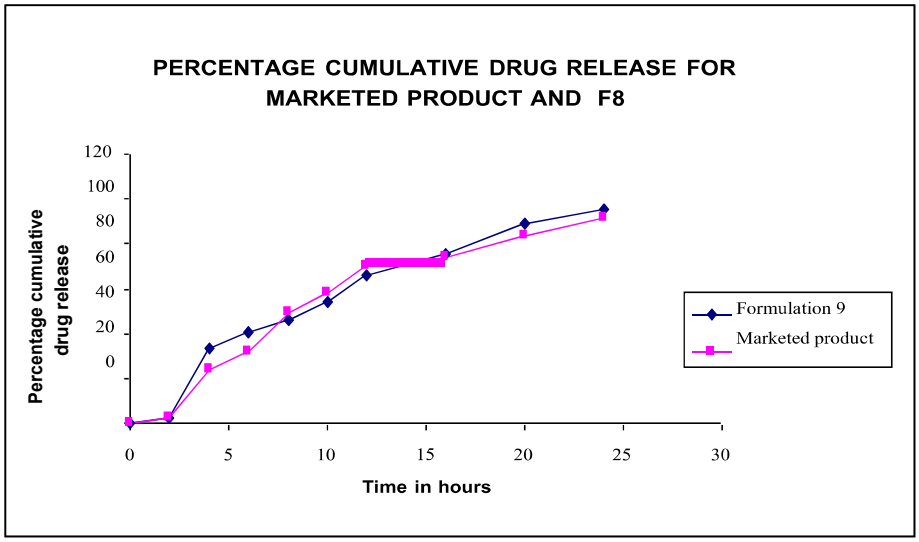


Fig 5: Comparison of dissolution data of Marketed product with F8

Kinetic studies of aceclofenac sustained release matrix tablet (f8)

Table 17: Consolidation chart of kinetic study:

Time In Hours	√Time	Cumulative percent drug release	Log percent of cumulative drug release	Amount of drug release in mg	Percent of drug remained	Log percent of drug remained
2	1.41	2.63	0.419	5.26	194.74	2.28
4	2.00	33.41	1.523	66.82	133.18	2.124
6	2.44	40.34	1.605	80.68	119.32	2.07
8	2.82	46.00	1.662	92.00	108.00	2.033
10	3.16	54.10	1.733	108.20	91.80	1.96
12	3.42	66.06	1.819	132.12	67.88	1.83
16	4.00	75.28	1.876	150.56	49.44	1.69
20	4.47	88.95	1.944	177.90	22.10	1.34
24	4.89	95.72	1.981	191.14	8.56	0.932

Fig 6: Strip packed form of Aceclofenac sustained release tablets Each tablet Aceclofenac IP 200mg

Excipient: q.s Batch. no: SBB0979 Mfg. Date: Sep 2023

SUMMARY

Literature survey reveals that the pioneer research have done on the several polymers. The successful preparation of swellable matrices therefore depends on the availability of proper selection of polymers. The present investigation was undertaken with the objective to prepare Aceclofenac SR matrix tablets, to be use once in a day using hydrophilic polymer HPMC K100.

The polymers used for the present study were added in different ratio. The tablets were formulated by using povidone as a binder, lactose and mannitol as diluents. magnesium stearate and talc acts as a lubricant. Raw material of Aceclofenac evaluated for angle of repose, bulk density and tapped density. The result shows that the raw material exhibits passable flow properties. Loss on drying and melting points shows that the drug is pure which was further confirmed by percentage purity determination of drug by UV techniques, obtained as 98.16%respectively.

The tablets were prepared by wet granulation method and evaluated for physical parameters. The result shows that the granules have good flow property. Granules were also evaluated for particle size. The mean particle size was 0.382 mm, which was found satisfactory for the tablet preparation. The results of uniformity of weight variation, hardness, thickness, diameter, friability. All the samples of tablets prepared fulfilled the pharmacopoeial requirements of uniformity of weight.

The In-vitro drug dissolution were performed for 24 hours, 0.1N HCL for 2 hours and phosphate buffer pH6.8 for remaining hours. Assay was carried out for the formulation F8 using UV and HPLC techniques which were observed to be 100.51% and 98.68%, respectively. The evaluation of release characteristics like effect of dissolution medium, effect of different shape of tablet and effect of hardness of tablet shows changes in -vitro release characteristics of drug. The FTIR spectral analysis showed that there is no appearance or disappearance of any characteristic peaks of pure Aceclofenac and in the physical mixture of drug of polymer.

Stability studies of the selected formulation tablets were carried out by keeping the tablet at accelerated temperature 40^{o}C ± 2^{o}C / 75% ± 5%RH for 30 days. All the parameter was within the limits after 30 days. The comparative study with the marketed sample was evaluated under dissolution study's with F8 shows a release of 95.12% within 24 hours were as the marketed sample shows a release of 91.35%, F8 shows a better release profile than the marketed product. The tablets were packed in the mode of strip packing. From the study it was conclude that the polymer solubility as well as the nature of the polymer plays an important role in developing the sustained release dosage form.

CONCLUSION

The study was undertaken with the aim to Formulation and evaluation of Aceclofenac sustained release tablet using HPMC grade of polymer as retarding agent. Preformulation studies were done initially and result directed for further course of formulation. Based on the pre formulation studies different batches of Aceclofenac are prepared using selected excipients and the granules were evaluated for tests of Loss on drying, angle of repose, bulk density, tapped density, compressibility index, Hauser ratio, sieve analysis before being punched as tablets which were found within the limits. Tablets were tested for weight variation, hardness, thickness, friability and in vitro drug release as per pharmacopoeial procedure, which are within the limits. Kinetic studies were observed as zero order and release mechanism of drug through polymeric membrane was found through diffusion and rate of diffusion is controlled by swelling of polymer. Infrared spectra of the tablet revels, that there is no significant

interaction between drug and polymer. The dissolution studies formulations of F2, F5, F8 were good release and F6 formulation was excellent. From the above results and discussion, it is concluded that the formulation of sustained release tablet of Aceclofenac containing HPMC K100, mannitol and lactose which are taken as ideal or optimized formulation of sustained release tablet for 24 hours release as it fulfills all the requirement of sustained release tablet and study encourages further clinical trials and long term stability study on this formulation.

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