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Research

Formulation and development of cefidinir sustained release tablets using various retarding polymers

Syed Asadulla Bakhtiary[1], Srikant Pallothu Chowdary[2], Syam Prasad Borra[3], Mohammed Ibrahim[4]

[1]Professor & HOD, Department of Pharmacology, Prathap Narender Reddy College of Pharmacy, Peddashapur, Shamshad. Telangana-509325, India
[2]Professor, Department of Pharmaceutics, Prathap Narender Reddy College of Pharmacy, Peddashapur, Shamshad, Telangana-50932, India
[3] Assistant General Manager, Hetero Labs Limited, Gandhinagar, Hyderabad, Telangana- 500037, India
[4]Professor & Principal, Department of Pharmaceutical Chemistry&Analysis, Prathap Narender Reddy College of Pharmacy, Peddashapur, Shamshad. Telangana-50932, India

*Author for Correspondence: Syed Asadulla Bakhtiary
Email: dr.asadpnrcp@gmail.com

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Abstract

The tablets of Cefidinir with sustained-release formulations primarily based on tamarind gum, carnuba wax substance, and fenugreek have been developed. Hardness, weight variation, fragility, and remedy content material have all been measured for every capsule. Concentrates used in the preliminary formulation, such as the resting point, data. The therapy grew to be given in vitro for 12 hours in a phosphate cradle with a pH of 6.8. The artificial pill has enough cutoff standards for each single actual individual. The Carnuba Wax (F6) tablet has a greater supported drug discharge (99.72%) than the framework pill. polymer- enhanced lattice pills proven that polymer enlargement impeded the shipping of medicinal drugs.

Keywords: Fenugreek, Cefidinir, Tamarind Gum, Carnuba Wax, sustained release tablets

INTRODUCTION

For a long time, the most complete and broadly utilised approach of managed distribution of prescription by means of numerous medicinal has been implied to be the oral remedy movement. Reasons for the oral route's recognition might also encompass its convenience large doses of the drug can also be taken at once. No be counted the approach of transport (fast, supported, or regulated discharge) and the format of measuring systems, the natural aspects must be developed. (both sturdy scattering or fluid). To effectively assemble an oral medication dosage form, it is critical to acquire a requisite definition configuration.

The growing rate and challenge of advertising new additives, as nicely as the increasing reputation of

the therapeutic advantages of managed drug transport, have sparked an expanded quantity of activity in the introduction in latest years. Since supported discharge science is nevertheless tremendously novel, many discoveries have resulted from research. Many medicines are designed to keep a therapeutically nice and secure blood. Degree over an prolonged size of time[1-3]. The framework adequate measures is a main issue in attaining this goal. Names for drug shipping structures that are designed to produce a delayed therapeutic impact by way of persistently turning in cure over a lengthy duration of time after preliminary administration encompass "managed release," "extended action," "organized conveyance," and "stockroom estimations" form. The few hours of impact time after taking an oral supported furnished dosage shape relies upon on the data season at domestic in the GIT.

MATERIALS AND METHODS

The materials used in this current research work are procured from reliable sources of Cefdinir, SURA LABS, FDC Limited, TamarindGum, Carnubawax, Fenugreek and MicroC1ystallineCellulose are procured from Nihartraders pvt Ltd. All other reagents used I this research work are procured from most reliable vendors.

METHODOLOGY

Analytical method development

Determination of Calibration Curve

10mg of pure drug was dissolved in 10ml methanol (p1imaiy stock solution - 1000Lg/ml). From this primary stock solution 1ml was pipette out Into 10ml volume tricflaskai1dmadeitupto 10ml with the media (Secondarystocksolution-lO0µg/ml)[4-9]. From secondary stock solution required concentrations were prepared (shown in Table8.1 and8.2) ai1d those concentrations absorbance were found out at required wave length.

Preformulation parameters

The quality of tablet, once fo1mulated is generally dictated by the quality of physic chemical prope1ties of blends. There are many formulations and process variables involved in mixing and all these can affect the characte1istics of blends produced. The various characteristics of blends tested as per Pha1macopoeia.

Formulation development of Tablets

All the formulations were prepared by direct compression. The compositions of different fo1mulations are given in Table 1 The tablets were prepared as per the procedure given below and aim is to prolong the release of Cefidinir[10-16]. Total weight of the tablet was considered as 200mg.

Table1: Formulation composition for tablets

Ingredients	Fl	F2	F3	F4	FS	F6	F7	FS	F9
Cefdinir	100	100	100	100	100	100	100	100	100
TamarindGum	10	20	30	-	-	-	-	-	-
Camubawax	-	-	-	10	20	30	-	-	-
Fenugreek	-	-	-	-	-	-	10	20	30
MicroCrystalline Cellulose	30	20	10	30	20	10	30	20	10
Talc	5	5	5	5	5	5	5	5	5
Magnesium stearate	55	55	55	55	55	55	55	55	55
Totalweight	200	200	200	200	200	200	200	200	200

Allthequantitieswereinmg

Evaluation ofpost compression parameters for prepared Tablets

The designed Formulation tablets were studied for their physicochemical prope1ties like weight va1iation, hardness, thickness, friability and mug content.

Weight variation test

To study the weight variation, twenty tablets were taken and their weight was determined individually and collectively on a digital weighing balance. The average weight of one tablet was determined from the collective weight. The weight variation testwouldbe a satisfact01y method of determining the mug content uniformity. Not more than two of the individual weights deviate from the average weight by more than the percentage shown in the following table andnone deviateby more than twice the percentage. The mean and

deviation were dete1mined[17]. The percent deviation was calculated using the following formula.

% Deviation = (Individual weight – Average weight /Average weight) x 100

RESULTS & DISCUSSION

The present study was aimed to developing sustained release tablets of Cefidinirusing various polymers. All the formulations were evaluated for physic chemical properties and *in- vitro* dmg release studies.

Analytical Method

Graphs of Cefidinir were taken in 0.1NHCl and inp H6.8 phosphate buffer at 286 respectively. As mentioned in the figure 1&2.

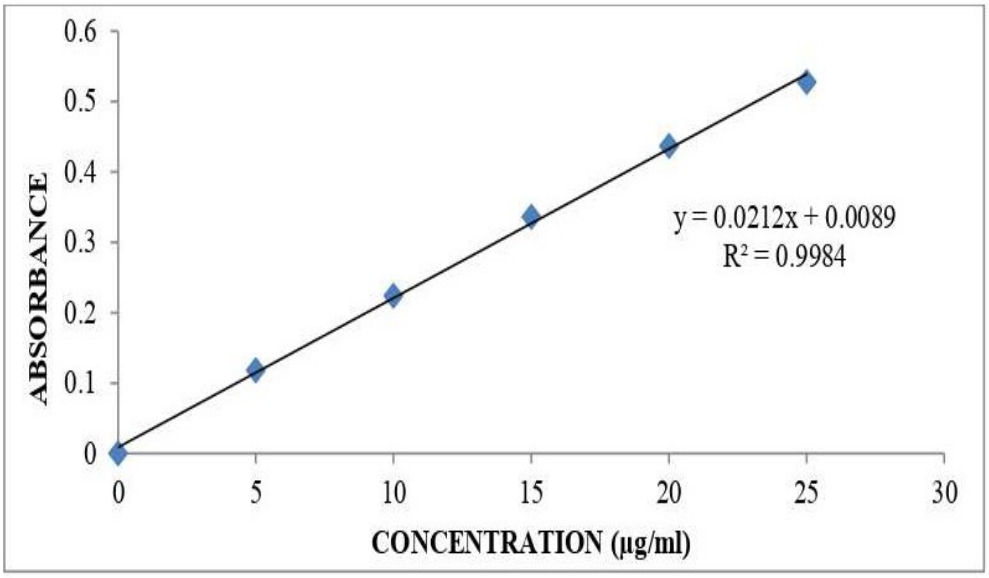

Fig 1: Standard curve ofCefidinfrin0.1NHCl

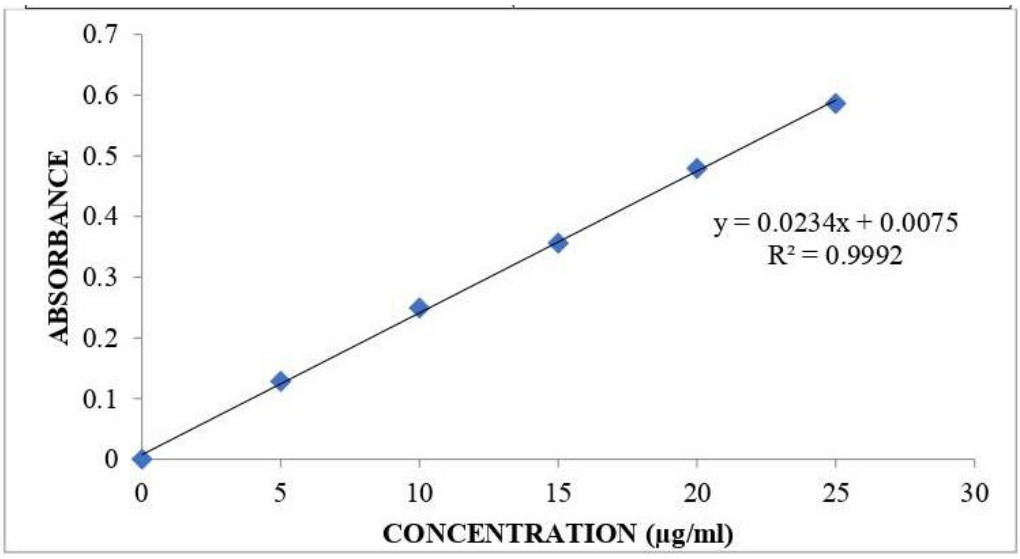

Fig 2: Standard curve of Cefidinfrin pH 6.8 Phosphate buffer

Tablet powder blend was subjected to various pre -formulation parameters. The angle of repose values indicates that the powder blend has good flow prope1ties. The bulkdensity of all the Formulations was found to be in the range of 0.46±0.002 to 0.61±0.004 (gm/cm3) showing that the powder has good flow properties[18-23]. The tapped density of all the formulations was found to be in the range of 0. 52±0.002 to 0.72±0.005 showing the powder has good flow properties. The compressibility index of all the Formulations was found to be below 9.52-15.28 which show that the powder has good flow prope1ties.

Quality Control Parameters For tablets

Tablet quality control tests such as weight variation, hardness, and friability, thickness, anddrugreleasestudies in differentmedia were performed on the compression coated tablet.

Weight variation test

Tablets of each batch were subjected to weight variation test, difference in weight and percent deviation was calculated for each tablet and was shown in the Table. The average weight of the tablet is approximately in range of195.36 to 200.05 mg, so the pe1missible limitis ±7.5% (>200 mg). The results of the testshowed that, the tablet weights were within the pharmacopoeialimit.

Hardness test

Hardness of the three tablets of each batch was checked by using Pfizer hardnesstester. Theresults showed that the hardness ofthe tablets is in range of 4.2 to 4.9 kg/cm^2, which was within IP limits.

Thickness

Thickness of three tablets of each batch was checked by using Micrometer and data shown in Table-8.4. The result showed that thickness of the tablet is raging from 2.18 to2.34 mm.

Friability

Tablets of each batch were evaluated for percentage friability (24-27). The average friability of all the simulations was less than 1**%** as per official requirement of IP indicating a good mechanical resistance of tablets.

***Invitro* Drug Release Studies**

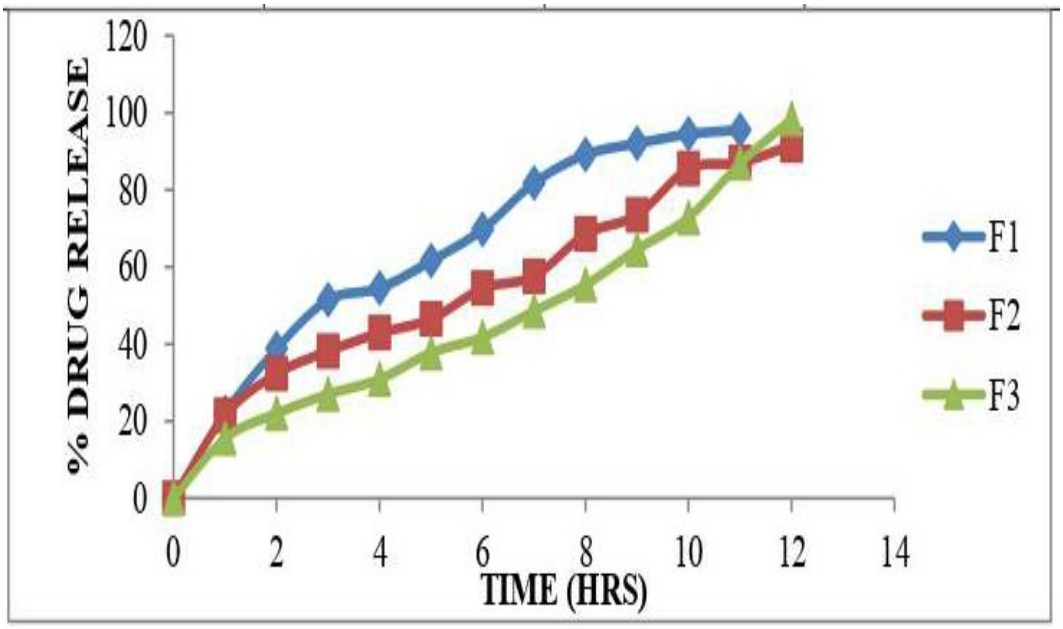

Fig 3: Dissolution profile of Cefidinir (Fl,F2,F3formulations)

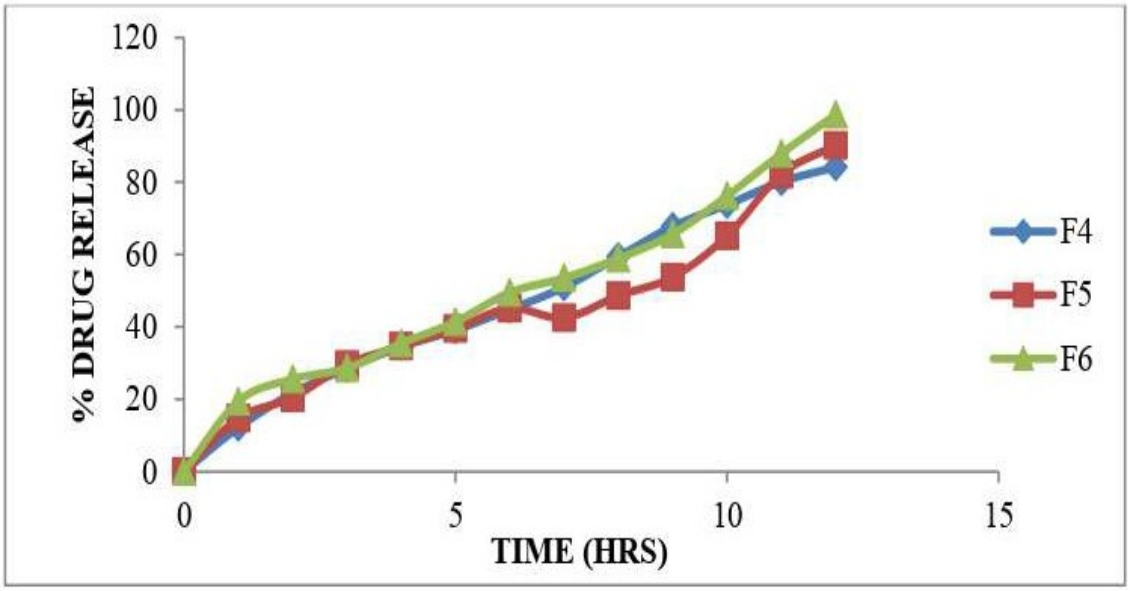

Fig 4: Dissolution profile of Cefidinir (F4,F5,F6 formulations)

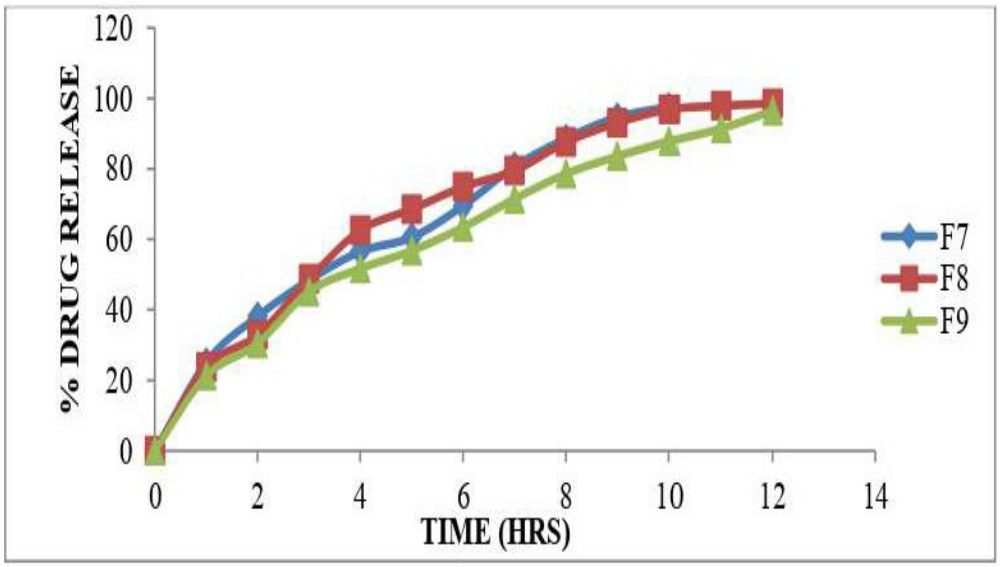

Fig 5: Dissolution profile of Cefidinir (F7, F8, F9formulations)

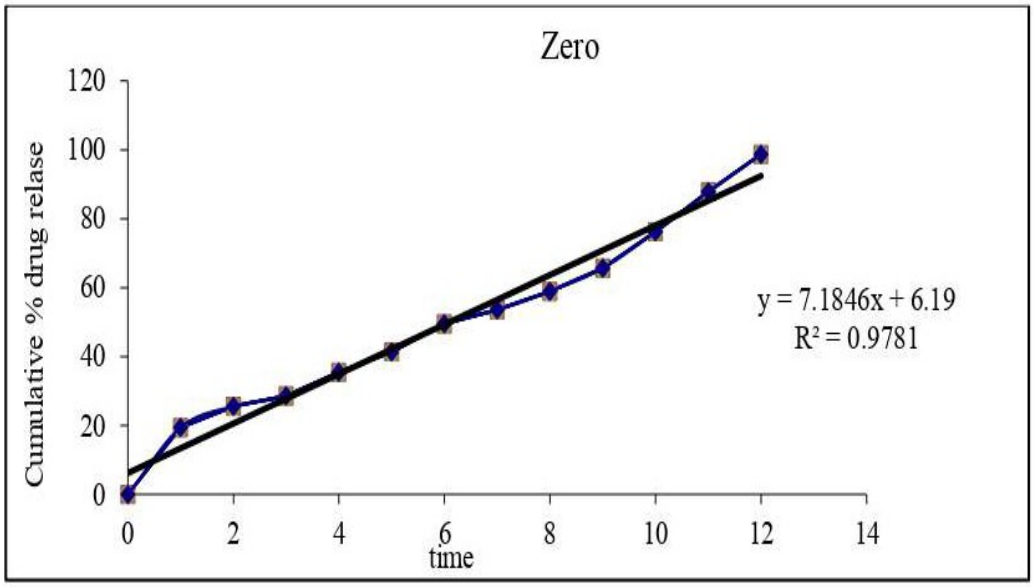

Fig 6: Zero order release kinetics graph

From the above graphs it was evident that the formulation F6 was followed Zero order release kinetics mechanism as represented in the figure 6&7.

Drug -Excipient compatibility studies Fourier Transform-Infrared Spectroscopy

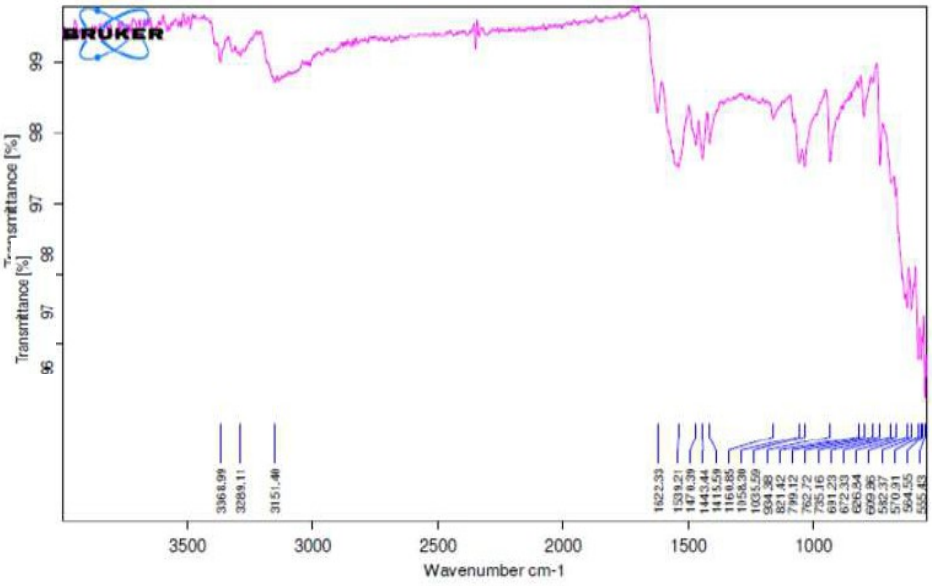

Fig 7: FTIR Spectrum of Cefidinir pure drug.

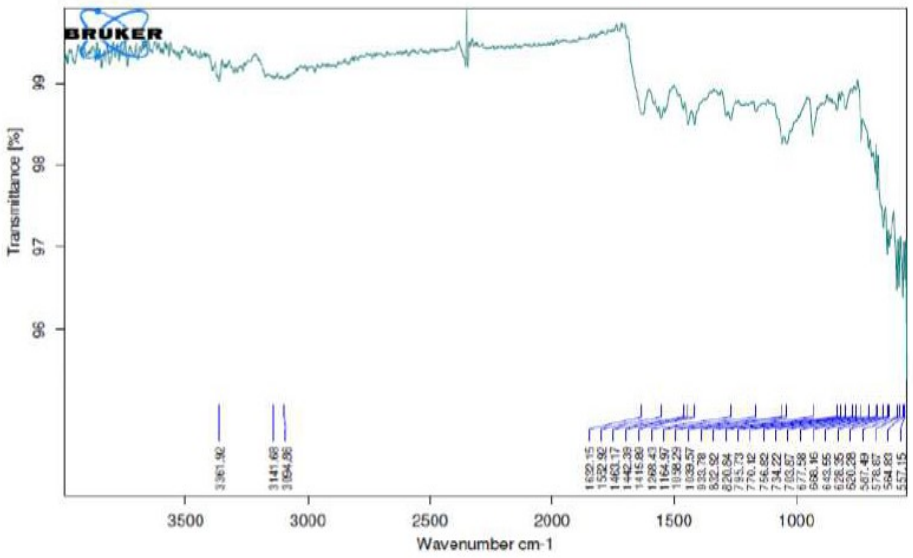

Fig 8: FT-IR Spectrum of Optimized Formulation

From the FTIR data it was evident that the drug and excipients doses no thave any interactions as shown in the figure 8.Hence, they were compatible.

CONCLUSION

Cefidinir sustained release matrix tablets were successfully prepared by using various polymers to retard the release and achieve the retard dissolution profile. Drug & polymer were found to become patible as indicated by FTIR studies. From the observation sit was concluded that polymers used in different concentrations differ in their ability to sustain the drug release. Further it was concluded that polymers Camuba Wax showed better sustained releaseprope1ty than other polymers in the Formulation of sustained release matrix tablets. Release rate of drug fromthematrixwassignificantlyinfluencedbyproportionofswellingofCarnubaWax.It may be excluded from the present study that slow& controlled release of cefidinir over a period of 12 hours was obtained from formulation F6 using Camuba Wax. The drug release kinetics revealed Zero order release kinetics pattern. Formulation and evaluation of sustained release matrix tablets of Cefidinir was found to be beneficial.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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