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EVALUATION OF ALBIZIA GUM IN THE FORMULATION OF CONTROLLED RELEASE MATRIX TABLETS USING LOSARTAN POTASSIUM

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ABSTRACT

Matrix tablets were developed using albizia gum for investigating it's suitability for the controlled release using losartan potassium as a model drug. Tablets were prepared by direct compression method. Lactose and dibasic calcium phosphate (DCP) were used as channeling agents. *In vitro* studies were performed in 0.1 N HCl for the first two hours and pH 6.8 phosphate buffer for the next ten hours. Concentration of gum and nature of diluents influence the retardation of drug release. The drug release was retarded when compared with dissolution patterns of synthetic polymers like poly ethylene oxide (PEO 303) and poly vinyl alcohol (22-30 cps). The release rate, extent and mechanisms were found to be governed by the concentration of the gum and channelling agents. Increased rate and extent of the drug release were found by using higher content of channelling agent in the matrix due to increased porosity. It was found that type and concentration of channelling agent significantly affect the percentage drug release, release rate constant (K) and diffusion exponent (n). The FTIR and DSC studies confirmed that there was no interaction between the drug and albizia gum.

KEYWORDS: Losartan potassium, albizia gum, controlled release matrix tablets, poly ethylene oxide, poly vinyl alcohol, lactose and dibasic calcium phosphate.

INTRODUCTION

Most of the natural biodegradable polymers include gums, mucilages, resins etc. obtained from plant origin. Natural gums, mucilages and resins have been successfully employed in the pharmaceutical dosage forms as natural biodegradable polymeric materials in the design of modified release drug delivery systems. Both the natural polymers and synthetic polymers have been investigated extensively as biodegradable excipients but the natural excipients are preferred over the synthetic as they are inert, safe, nontoxic, biocompatible, biodegradable, low cost, eco friendly and abundantly available in nature.[1-4]

Among all the types of dosage forms matrix tablets are widely used for oral controlled drug release systems as they are easy to prepare. Many natural gums have been investigated as matrix forming materials for the design and development of oral tablets to achieve sustained and controlled drug delivery. Hydrophilic polymers are the most suitable for retarding drug release.[5-7] These polymers when they come in contact with water get hydrated and forms gel. The drug release from this gel will be usually diffusion controlled and hence the release will be sustained over a prolonged period of time.[8] In the present study albizia gum was evaluated as rate controlling matrix material for controlled release.

Albizia gum is obtained from the incised trunk of the tree *Albizia zygia* (Family: Leguminosae) and is shaped like round elongated tears of variable color ranging from yellow to dark brown.[9] Wide spread in tropical Africa. In the Ghanaian traditional medicine, the leaves of *Albizia zygia* are used in the management of mental troubles.[10] The pounded bark is applied topically to treat yaws, sores, wounds, and toothache. Leaf decoctions are administered to treat fever and diarrhea. Ground roots of the plant are added to food to treat cough and as an expectorant. The root bark juice is also used on wounds to promote healing.[11] In Nigeria, some communities use the plant for the treatment of waist pain and in Cameroon[12], decoction of the leaves and stem is used in the treatment of boils, diarrhea, male sexual impotence, edema, and fracture.[13, 14] Albizia gum is also used as tablet binding agent and suspending agent.[15, 16] Southern part of Sudan is used to take the bark of *Albizia zygia* (in the form of powder or decoctions) as native antimalarial drug. The methanolic extract of the stem bark of *Albizia zygia* exhibited antiprotozoal activity against *Plasmodium falciparum* K1 strain.[17] As this gum is having good swelling property and hydrophilic in nature, this gum can be used as polymer for the design of controlled release dosage forms.

Losartan potassium is an orally active non-peptide angiotensin -II receptor antagonist used in treatment of hypertension due to mainly blockade of AT1 receptors.[18] The main limitation of low therapeutic effectiveness is due to narrow therapeutic index, poor bioavailability (25-35%), and short biological half life (1.5-2.5 hrs). Conventional tablets should be administered 3-4 times to maintain plasma drug concentration. To increase therapeutic efficacy, reduce frequency of administration and for better patient compliance in the present research work twice daily controlled release matrix tablets of losartan potassium were prepared by using albizia gum in different proportions of drug- polymers and the tablets were evaluated for drug release kinetics and mechanism.

MATERIALS AND METHODS

Materials

Losartan potassium was received as a gift sample from M/s. Micro labs Ltd., Pondicherry. Albizia gum was purchased from Yarrow Chem Products, Mumbai. Lactose, dibasic calcium phosphate (DCP) and magnesium stearate were purchased from Loba Chemie Pvt. Ltd.

Methodology

Preparation of standard curve of losartan potassium[19]

Accurately weighed 50 mg of losartan potassium and dissolved in 100 mL of either 0.1 N HCl / pH 6.8 phosphate buffer to obtain a solution containing 500 µg/mL of drug in the respective medium.

The stock solution was suitably diluted to obtain the losartan potassium concentration of 1, 2, 3, 4, 5, 6 & 7 µg/mL 0.1 N HCl and 1, 2, 3, 4 & 5 µg/mL with pH 6.8 phosphate buffers and the absorbance was measured at 248 nm against the respective reagent blank i.e. 0.1 N HCl or pH 6.8 phosphate buffer by using double beam UV visible spectrophotometer (Elico model SL 210). All estimations were done in triplicate and average values were reported with standard deviation. A standard curve was drawn between absorbance and the concentration and the values of correlation coefficient (r), slope (m) and intercept (c) were calculated.

Pre compression parameters

Powders normally flow under the influence of gravity; dense substances are generally less cohesive than lighter ones. Hence, differences in densities of various ingredients may lead to improper mixing and filling during manufacturing of formulation. This results in weight variation and variations in content uniformity of finished products. Hence, determination of

density, compressibility index, Hausener's ratio and angle of repose of any ingredient will helpful in successful formulation development.

Preparation of matrix tablets

The selected gum was used for the preparation of the controlled release matrix tablets of the model drug, losartan potassium using drug- polymer ratios of 1:0.25, 1:0.5 and 1:0.75. (Table 1) 300 tablets were prepared in each batch by direct compression method because of the good flow properties of the powder blend as per the initial studies carried out. Required quantities of powder was weighed and mixed in a geometric dilution pattern. The final powder blends ready for compression were further evaluated to conform the flow properties by using compressibility index, Hausener's ratio and angle of repose. The powder blends were compressed in to tablets by using an Elite 10 station minipress with 8 mm diameter flat round punches with a compression force sufficient to obtain hardness in the range of 4-6 kg/cm^2.

For comparison of this selected gum for their suitability for the compression of the controlled release matrix tablets, known established polymers (Table 2) were compared from synthetic source. Matrix tablets with synthetic polymers were also prepared by direct compression technique using the above described procedure.

Table 1: Composition of matrix tablets of losartan potassium using natural gum

Formulation code	Losartan potassium (mg)	Albizia gum (mg)	Dibasic calcium phosphate (mg)	Lactose (mg)	Magnesium stearate (mg)	Total wt of tablet (mg)
ALD1	77	19.25	51.25	__	2.5	150
ALD2	77	38.5	32	__	2.5	150
ALD3	77	57.75	12.75	__	2.5	150
ALL1	77	19.25	__	51.25	2.5	150
ALL2	77	38.5	__	32	2.5	150
ALL3	77	57.75	__	12.75	2.5	150

Table 2: Composition of matrix tablets of losartan potassium using synthetic polymers

Formulation code	Losartan potassium (mg)	PEO (303) (mg)	PVA (22-30 cps) (mg)	Microcrystalline cellulose (mg)	Talc (mg)	Magnesium stearate (mg)	Arosil (mg)	Total wt of tablet (mg)
F1	77	19.25	__	205.75	27	14	7	350
F2	77	38.5	__	186.5	27	14	7	350
F3	77	57.75	__	167.25	27	14	7	350
F4	77	__	19.25	205.75	27	14	7	350
F5	77	__	38.5	186.5	27	14	7	350
F6	77	__	57.75	167.25	27	14	7	350

Evaluation of prepared matrix tablets

The prepared matrix tablets were subjected to different quality control tests such as uniformity of weight, hardness, thickness, friability, drug content and *in vitro* dissolution studies.

Uniformity of weight[20]

This test was conducted according to the procedure given in Indian Pharmacopoeia. Randomly twenty tablets were selected and average weight was noted. Individual weight of tablets was noted and the percentage deviation of its weight from the average weight was determined. Prepared tablets passes the test if not more than two of the individual weights deviated from the average weight by more than the 7.5% and none deviate more than twice 7.5% for tablets weighing in the range of >80<250 mg and 5% for tablets weighing >250 mg.

Hardness[21]

Randomly five tablets were selected and the hardness of each tablet was determined by using Monsanto hardness tester. The tablet to be tested was placed in between the fixed and movable jaw after adjusting the reading to zero. By moving the screw knob the force on the tablet was gradually increased until the tablet breaks. The pressure required in kg to break the tablet was noted from the scale on the tester.

Thickness

Test was conducted by selecting five tablets randomly; thickness of the each tablet was evaluated by Vernier callipers. Mean and standard deviation were calculated.

Friability[22]

Tablets equivalent to the weight of 6.5 g were selected randomly from a batch and initial weight (w_0) was noted. They were placed in a Roche Friabilator. The chamber was allowed to rotate 100 revolutions. During each revolution these tablets fall from a distance of six inches to undergo shock. After completion of 100 revolutions, tablets were collected from the chamber, dedusted and weighed them (w). The loss in weight indicates the friability. The percent loss in weight should not be greater than 1.0% is acceptable. The percent loss in weight or friability (f) was calculated by **Eq. 1** given below.

$$f(\%) = \left(1 - \frac{w}{w_o}\right) \times 100 \quad \text{-Eq. 1.}$$

Estimation of drug content[23]

Ten tablets were randomly selected from each batch, powdered in a mortar individually and the powder equivalent to dose of the one tablet (77 mg of losartan potassium) was taken in to a 100 mL volumetric flask containing 70 mL of pH 6.8 phosphate buffer. The flask was shaken occasionally for 30 minutes and the volume was made up to 100 mL mark with pH 6.8 phosphate buffer. About 10 mL of the solution was taken and filtered. The filtrate was suitably diluted and the absorbance was measured at 248 nm against a reagent blank using double beam UV visible spectrophotometer (Elico model SL 210).

***In vitro* dissolution studies**[24]

Dissolution studies were conducted in triplicate for all the prepared tablets in an eight station dissolution apparatus (Veego) equipped with paddles by using the following dissolution conditions, medium for the first 2 hrs is 0.1N HCl and medium for the next 10 hrs is pH 6.8 phosphate buffer, revolutions per minute (RPM) maintained is 75, temperature is 37ºC. 5 ml of sample was withdrawn for every one hour interwel and the same amount of medium was replaced to maintain the sink conditions.

Samples were suitably diluted and drug content was determined by measuring the absorbance at 248 nm as described earlier using double beam UV visible spectrophotometer (Elico model SL 210).

Drug release kinetics and mechanism of drug release from the matrix tablets

The analysis of drug release kinetics and mechanism of drug release from pharmaceutical dosage forms is an important process. The dissolution data was fitted to popular release models such as zero order and first order to determine the rate of drug release and Higuchi's diffusion and erosion equation, to assess the drug release mechanism from the matrix tablets prepared. If the mechanism of drug release is by diffusion it was further characterized by Korsmeyer- Peppa's equation to conform the diffusion type i.e. Fickian or non-Fickian or anomalous diffusion.

RESULTS AND DISCUSSION

Standard curve of losartan potassium

The method obeyed Beer's law in concentration range of 1-7 µg/mL for 0.1 N HCl and 1-5 µg/mL for pH 6.8 phosphate buffers. The 'r' value was found to be more than 0.999 for both the media, which indicated a positive correlation between the concentration of losartan potassium and the corresponding absorbance values. The standard deviation values given in the table were found to be low, which indicated that the method used was reproducible. Thus, the method was found to be suitable in present investigation for estimation of losartan potassium in both the media. The concentration of both the media and corresponding absorbance's (Table 3) are given below. The standard curves are shown below (Fig. 1&2) for 0.1N HCl and pH 6.8 phosphate buffer respectively.

Table 3: Standard curve data for losartan potassium in 0.1 N HCl and pH 6.8 phosphate buffer.

Concentration (µg/ml)	Absorbance at 248 nm (mean±s.d., n=3)	
	0.1 N HCl	pH 6.8 Phosphate buffer
1	0.121±0.0010	0.058±0.0042
2	0.214±0.0020	0.121±0.0056
3	0.330±0.0010	0.173±0.0078
4	0.419±0.0015	0.230±0.0045
5	0.526±0.0010	0.291±0.0021
6	0.636±0.0026	_
7	0.734±0.0200	_

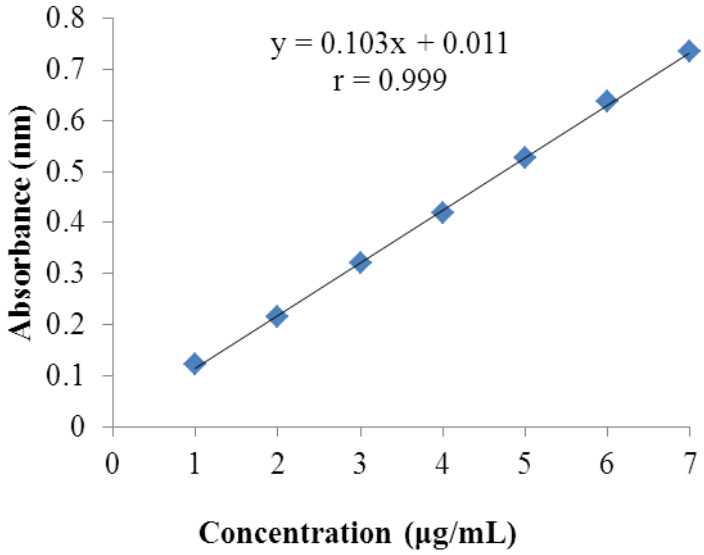


Fig. 1: Standard curve of losartan potassium in 0.1 N HCl**.**

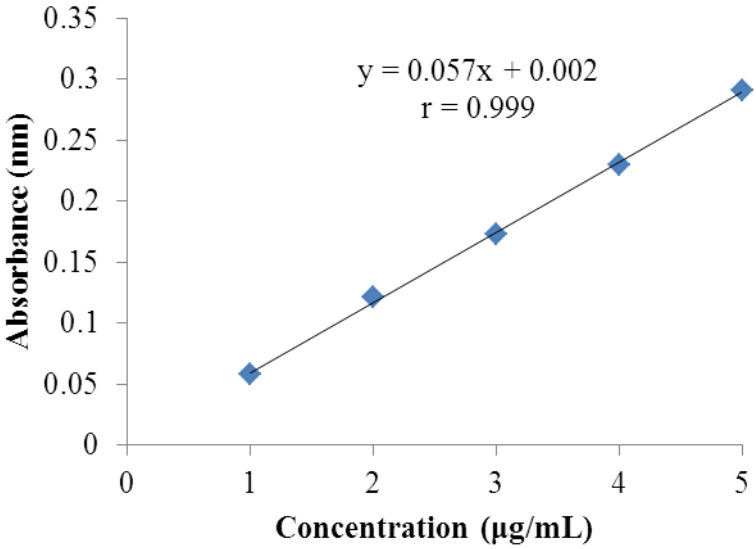


Fig. 2: Standard curve of losartan potassium in pH 6.8 phosphate buffer.

Flow properties of the powder blend

The powder blends were subjected for evaluation of flow properties (Tables 4 & 5) just before compression. Compressibility index ranging 5-20% indicates good flow property of the materials. Angle of repose between 25-30º indicates good flow properties of powders.

Table 4: Flow properties of losartan potassium powder blend prepared by using natural gum (mean±s.d., n=3).

Formulation code	Compressibility index (%)	Hausner's ratio	Angle of repose (º)
ALD1	8.54±0.76	1.01±0.05	27.31±0.38
ALD2	8.12±0.43	1.32±0.61	25.87±0.61
ALD3	9.29±0.68	1.06±0.35	27.18±0.49
ALL1	9.81±0.16	1.12±0.09	28.39±0.02
ALL2	9.43±0.09	1.03±0.67	28.31±0.72
ALL3	9.28±1.02	1.15±0.32	27.99±0.15

Table 5: Flow properties of losartan potassium powder blend prepared by using synthetic polymers (mean±s.d., n=3).

Formulation code	Compressibility index (%)	Hausner's ratio	Angle of repose (º)
F1	19.36 ± 0.17	1.23 ± 0.02	18.46 ± 0.17
F2	19.29±0.35	1.19±0.04	18.57±0.18
F3	19.54±0.13	1.45±0.05	18.87±0.23
F4	16.83 ± 0.32	1.26 ± 0.03	19.26 ± 1.21
F5	19.09 ± 0.30	1.24 ± 0.02	21.36 ± 2.01
F6	19.14±0.31	1.32±0.04	21.56±2.12

Evaluation of tabletting properties of the prepared tablets

The results of uniformity of weight, hardness, thickness, friability and drug content (Table 6 & 7) for all formulations were calculated. According to IP, the permissible level of deviation is ±11.25 mg for 150 mg tablet, and ±17.5 mg for 350 mg tablet. As the maximum deviation observed for all the tablets was found to be less than ±2 mg and hence, all the tablets passed the test. Hardness of the tablets was in the range of 5.00-6.00 kg/cm^2. The thickness of tablets was in the range of 2.8 to 4.1 mm. Weight loss in the friability test was less than 1% in all the cases. The drug content in all the matrix tablets was found in the acceptable range of 96.12 to 98.56 and complies with the drug content test (90-110%). Thus the formulated matrix tablets were of good quality, fulfilling the official requirements of the tablets.

Table 6: Tabletting characteristics of losartan potassium matrix tablets.

Formulation code	Uniformity of weight[a] (mg)	Hardness[b] (Kg/cm^2)	Thickness[b] (mm)	Friability[c] (%)	Drug content[d] (%)
ALD1	150.0±1.42	5.50±0.14	3.1-3.2	0.32±0.02	97.85±0.09
ALD2	149.0±0.68	6.00±0.30	2.9-3.0	0.48±0.36	96.53±0.07
ALD3	150.0±1.02	5.00±0.19	3.1-3.3	0.22±0.29	96.12±0.15
ALL1	148.0±1.18	6.00±0.33	3.0-3.1	0.47±0.61	97.02±0.06
ALL2	149.0±0.79	5.50±0.21	2.8-3.0	0.39±0.22	97.53±0.12
ALL3	151.0±0.63	6.00±0.15	3.1-3.2	0.49±0.27	96.98±0.11

a: Average weight with maximum observed deviation in mg, n=20; b: mean±s.d., n=5; c: weight equivalent to 6.5 g (44 tablets); d: mean±s.d., n=10

Table 7: Tabletting characteristics of losartan potassium matrix tablets prepared by synthetic polymers.

Formulation code	Uniformity of weight[a] (mg)	Hardness[b] (Kg/cm^2)	Thickness[b] (mm)	Friability[c] (%)	Drug content[d] (%)
F1	350.0±0.03	5.4±0.16	4.0±0.26	0.30±0.03	98.26±0.31
F2	349.0±0.05	5.3±0.39	3.9±0.19	0.29±0.02	98.45±0.23
F3	351.0±0.12	5.4±0.42	4.0±0.23	0.30±0.03	98.27±0.12
F4	348.0±0.27	5.4±0.71	4.1±0.17	0.27±0.06	98.07±0.23
F5	350.0±0.37	5.6±0.35	3.9±0.52	0.22±0.06	98.46±0.16
F6	351.0±0.31	5.5±0.49	3.9±0.46	0.21±0.05	98.56±0.24

a: Average weight with maximum observed deviation in mg, n=20; b: mean±s.d., n=5; c: weight equivalent to 6.5 g (19 tablets); d: mean±s.d., n=10

***In vitro* dissolution studies for losartan potassium matrix tablets**

In vitro dissolution studies for losartan potassium matrix tablets were carried out (Table 8) and release profiles of different matrix tablets and corresponding curves (Fig. 3) are shown below.

The dissolution studies were conducted only up to a period of 12 hrs irrespective of the complete drug release and only those formulations which are able to give 100 % of the drug release as contemplated were considered for further studies.

Losartan potassium released from the matrix tablets formulated was affected by diluents. In the present work water soluble and water insoluble diluents were used. In case of soluble diluent like lactose, when the tablet is getting exposed to dissolution medium the soluble diluents gets dissolved in the dissolution medium and pores are created through which the dissolution medium penetrates in to the core of the tablet there by enhancing the faster diffusion of the drug, where as in case of dibasic calcium phosphate, because it is an insoluble diluent the lag time for penetration of the liquid is more, hence, the drug release is retarded.

As the goal of the present investigation is to complete the drug release in a uniform way with zero order, soluble diluent played its role in making it uniform drug release compared to the insoluble diluent. Hence, lactose is more suitable for water soluble drug compared to dibasic calcium phosphate.

In case of losartan potassium matrix tablets prepared with synthetic polymers, dibasic calcium phosphate and lactose showed poor tabletting characteristics. Hence, they were replaced with microcrystalline cellulose however the drug release is completed within two hours (Table 9) with same ratios of polymers, where as in case of natural polymers the drug release was extended up to 12 hrs, hence, further comparisons were not made. Dissolution graphs (Fig. 4) are shown below.

Hence, the usage of natural polymer in the preparation of matrix tablets is the better choice to control the drug release over a period of 12 hrs. Commercial formulations with this dose are not available so we have not compared with commercial tablets.

Table 8: Cumulative percent drug released vs. time of albizia-losartan potassium matrix tablets prepared using DCP and lactose as diluents.

Time (hrs)	Cumulative % drug released (mean±s.d., n=3)					
	ALD1	ALD2	ALD3	ALL1	ALL2	ALL3
	DCP			Lactose		
1	10.11±0.41	8.62±0.17	7.56±0.23	11.61±0.57	12.47±0.51	14.62±0.22
2	16.39±0.61	15.67±0.31	13.21±0.11	22.45±0.62	16.50±0.47	20.79±0.77
3	24.36±0.87	26.32±0.71	16.63±0.23	34.6±0.67	25.26±0.33	25.33±0.74
4	26.34±0.32	33.12±0.49	21.40±0.28	47.68±0.93	32.10±0.11	27.27±0.18
5	29.33±0.18	38.47±0.41	26.66±0.35	56.04±.0.82	39.26±0.23	30.33±0.81
6	37.06±0.63	45.11±0.26	31.91±0.35	64.66±0.53	45.13±0.58	38.60±0.36
7	46.10±0.33	49.13±0.96	35.91±0.43	72.19±0.51	49.31±0.69	47.01±0.63
8	51.58±0.46	51.41±0.48	41.12±0.15	79.21±0.51	52.14±0.84	52.85±0.34
9	63.51±0.45	58.68±0.76	47.43±0.43	86.34±0.34	63.86±0.67	64.52±0.55
10	73.13±0.24	65.64±0.57	56.63±0.47	90.56±0.56	79.46±0.75	77.31±0.42
12	78.57±0.63	69.63±0.56	61.61±0.37	98.67±0.38	90.36±0.65	83.58±0.36

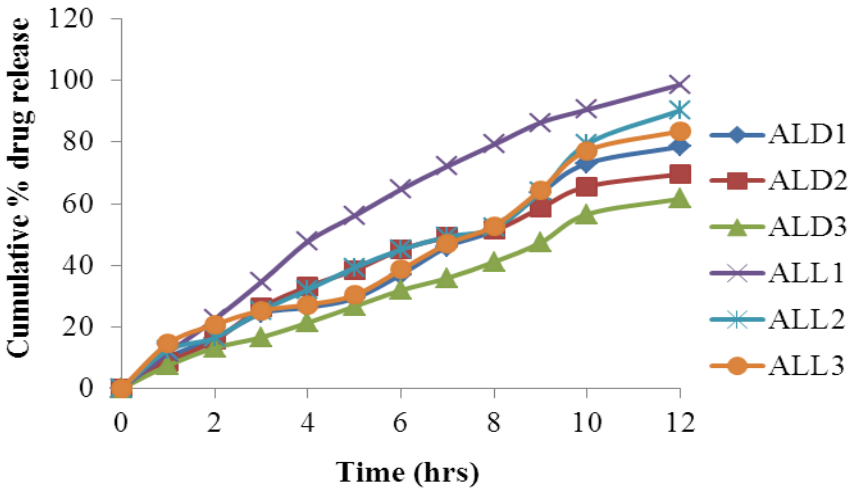


Fig. 3: Comparative dissolution profiles of albizia-losartan potassium matrix tablets.

Table 9: Cumulative percent drug released vs. time of losartan potassium matrix tablets prepared using synthetic polymers.

Formulation code	Time (hrs)			
	0.5	1	1.5	2
F1	36.26±0.03	49.28±o.23	67.20±o.59	98.21±0.07
F2	41.23±0.06	50.74±0.89	68.18±0.15	97.80±0.63
F3	32.41±0.38	47.25±0.14	64.76±0.79	98.27±0.39
F4	46.87±0.57	73.13±0.35	97.26±0.22	-----
F5	53.17±0.54	78.21±0.23	93.13±0.47	-----
F6	42.37±0.72	67.82±0.33	92.19±0.68	-----

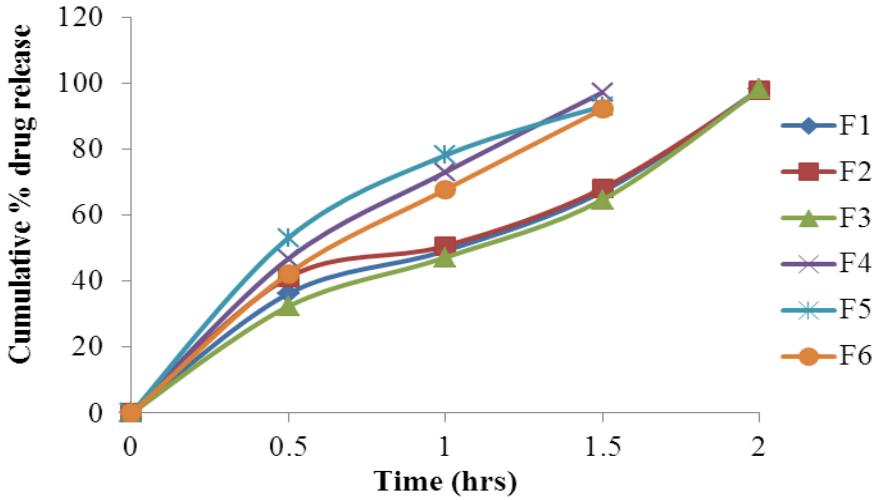


Fig. 4: Comparative dissolution profiles of losartan potassium matrix tablets F1-F6.

Drug release kinetics of matrix tablets

Analysis of release data as per zero order and first order kinetic models indicated that the rate of drug release from the tablets followed first order kinetics in case of DCP as diluent, (Table 10) whereas zero order kinetics in case of lactose as diluent.

Drug release mechanism of matrix tablets

When the release data was analyzed as per Higuchi's diffusion equation, the release was observed by diffusion mechanism. To confirm the further type of diffusion i.e. Fickian or non-Fickian data was analyzed with Korsmeyer- Peppa's equation. The release exponent "n" was in the range 0.531 – 0.880 with all the matrix tablets indicating non - Fickian (anomalous) diffusion with erosion.

Release mechanisms (Table 11) are summarized below. As the albizia gum proportion (%) in the matrix tablets was increased, release rate was decreased in both the series formulated using lactose or DCP as diluent.

Table 10: Correlation coefficients (r) values of drug release kinetics of matrix tablets of losartan potassium using DCP and lactose as diluents.

Formulation code	Zero order		First order	
	k_0 (mg/hr)	r	k_1 (hr^{-1})	r
ALD1	6.6	0.9289	0.124	0.9830
ALD2	5.2	0.9729	0.111	0.9925
ALD3	5.14	0.9716	0.078	0.9938
ALL1	8.224	0.9972	0.020	0.8452
ALL2	7.154	0.9843	0.163	0.8390
ALL3	6.718	0.9727	0.138	0.8907

Table 11: Correlation coefficients (r) values of drug release mechanisms of matrix tablets of losartan potassium using DCP and lactose as diluents.

Formulation code	Higuchi r	Erosion r	'n' value from Peppa's equation
ALD1	0.8974	0.9740	0.582
ALD2	0.9645	0.9886	0.577
ALD3	0.9176	0.9916	0.531
ALL1	0.9437	0.9453	0.880
ALL2	0.9057	0.9774	0.816
ALL3	0.8852	0.9390	0.718

Optimization

The drug release from the matrix tablets could be controlled by varying the proportion of drug-polymer in the matrix. The results of the study thus indicated albizia gum could be used as rate controlling matrix in design of controlled release tablets. Both water soluble and water insoluble diluents can be included in the matrix tablets without affecting its rate controlling efficiency.

From the above dissolution studies it was observed that among all formulations, ALL1 showed near 100% drug release over a period of 12 hrs and fallowed expected zero order kinetics and non-Fickian diffusion and the tablet integrity was also maintained throughout prescribed time. Hence, among different ratios employed in the present research work, the drug: polymer ratio of 1:0.25 showed optimized release, so it was concluded that the formulation with low concentration of gum and high concentration of diluent was more suitable for the formulation of controlled release matrix tablets for water soluble drug like losartan potassium.

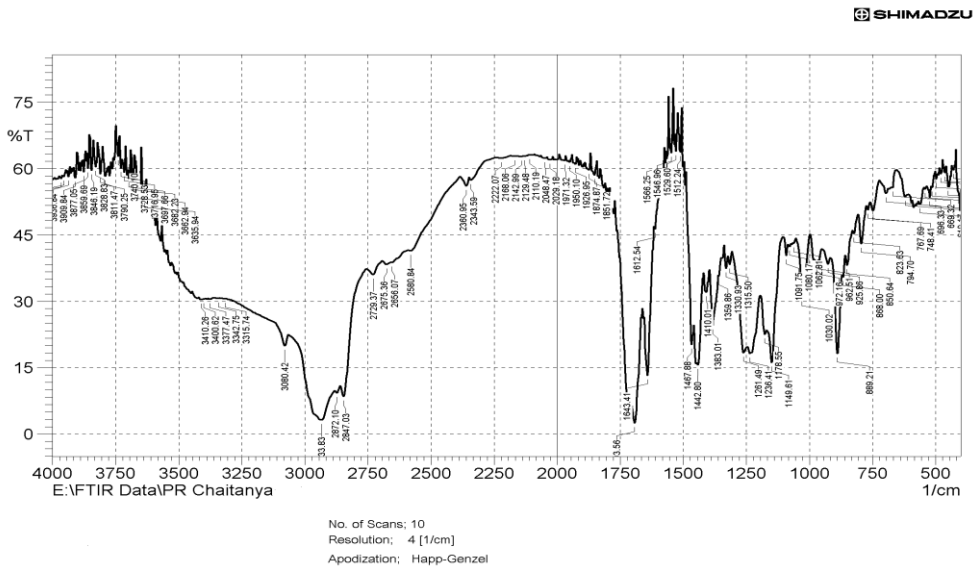
Drug-excipient compatibility studies

The present study was aimed to investigate the suitability of albizia gum for the preparation of controlled release matrix tablets. Generally drug-excipients compatibility studies were carried out for physical mixtures of drugs and excipients as per ICH guidelines. However there is possibility of drug-excipient incompatibility during compression due to heat and other processing variables rather than physical mixture. Hence, compatibility studies were carried out for matrix tablets instead of physical mixture. For other polymers also compatibility studies were not done because these polymers were earlier reported their suitability with losartan potassium.

The technique used was fourier transform infrared spectroscopy (FTIR) according to the procedure given in previous sections.

Fourier transform infrared spectroscopy (FTIR)

Pure albizia gum, losartan potassium, and optimized matrix tablet formulation ALL1 were subjected to FTIR spectroscopic analysis, to ascertain whether there is any interaction between the drug and the polymers used. The obtained characteristic peaks (Fig. 5) of losartan potassium were compared with the peaks obtained for their matrix tablet formulation ALL1. The characteristic bands of losartan potassium (Table 12) were identifiable and there was no major shift in them when combined with polymers used in the preparation of matrix tablet. This indicates that the drug was intact and had not reacted with the excipients used in the formulations and hence, they are compatible.



a)

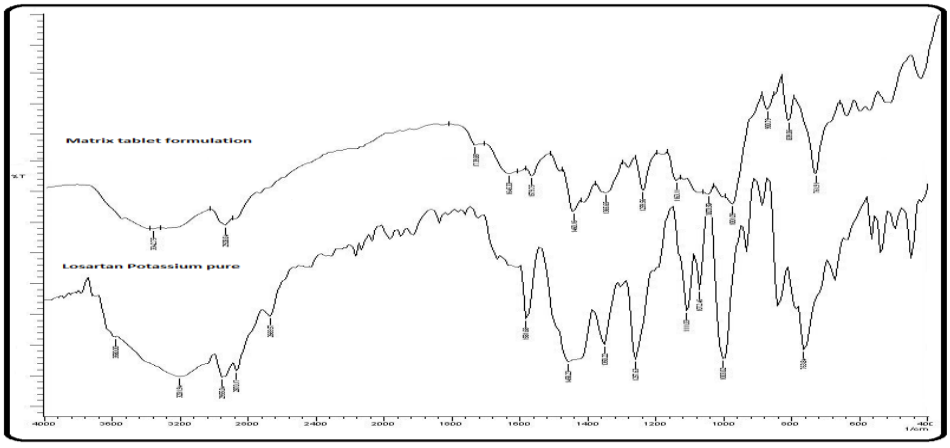
b) 

Fig. 5: FTIR spectra of (a) pure albizia gum (b) pure losartan potassium and optimized formula (ALL1).

Table 12: FTIR spectral data of losartan potassium and matrix tablet formulation (ALL1).

Functional groups	Wave number of pure drug (cm^{-1})	Wave number of formulation (cm^{-1})
C-Cl	763.84	761.91
Ar-H	2955.04	2928.04
C-N Stretching	1257.63	1259.36
N=N Stretching	1581.68	1579.75
C-O primary alcohol	1072.46	1070.53
C=C Stretching	1458.23	1460.16
OH Stretching	3201.94	3342.75

CONCLUSION

Matrix tablets of albizia gum were prepared in different concentrations. All the formulations were showed good tabletting properties. Among different concentrations of gum (1:0.25) were able to show the better controlled release of losartan potassium from matrix tablets over 12 hrs. The drug release was enhanced by using channeling agents like lactose and DCP. Among these two channeling agents lactose was showed better enhancement and controlled drug release. The drug release kinetics and mechanisms were evaluated. Compatibility studies were carried out for optimized formulations and the results proved that there was no interaction of drug and polymers.

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