WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Formulation and Evaluation of Oral Controlled Release Tablet of Losartan

[1]Mr. Navnath Subhash Kabadi*, [2]Mrs.Poonam P. Khade ,[3]Dr. Megha T. Salve

Shivajirao Pawar College of Pharmacy, Pachegaon, Tq. Newasa, Dist.A.nagar, Maharashtra,India.
Department of Pharmacy, Pachegaon, A.nagar-413725

ABSTRACT

Studies have been carried out to develop oral controlled release matrix tablet formulations of losartan potassium employing polymeric materials such ethylcellulose, sodium alginate, xanthan gum, guar gum, karaya gum, polyox WSR 301, and polyox WSR 303. Due to their claimed matrix forming properties, they are chosen as matrix forming polymers for controlled release. The drug content, hardness, friability, and weight consistency of the produced matrix tablets were assessed. To look for any interactions between the medicine and the excipients used in the formulation of matrix tablets, these investigations were conducted on the tablets prior to their being subjected to dissolution studies.

Keywords: Matrix Tablet, Controlled Release, Losrtan Postassium, Evalustion Parameters. .

INTRODUCTION

CONTROLLED RELEASE DOSAGE FORMS

The most popular and recommended method of delivering medicinal substances is by oral administration. Patient compliance, convenience of administration, precise dosing, economical production techniques, and an overall longer product shelf life are the reasons behind the oral route's appeal. The goal of developing a drug's controlled release formulation is to maximize its therapeutic benefits while reducing its adverse effects. In 1950, Smith, Kline, and French created Spansules, a pellet-filled capsule that was the first commercially manufactured oral controlled release formulation. These were created by applying a medication on nonpareil sugar beads, followed by further coatings with wax and glyceryl stearate.

Benefits include:

• Less variation in blood medication levels.

• A decrease in overall drug use in contrast to traditional treatment.

• Drug buildup is decreased with long-term treatment.

• The medical condition has stabilized due to more consistent drug levels.

• Some medications' bioavailability has improved due to spatial control.

• Extension of the product life cycle.

Restrictions

• A delay in the medication's start of effect.

• The potential for dose dumping in the event of a subpar formulation approach.

• A higher chance of first-pass metabolism.

• A stronger reliance on the dose form's GI residence duration.

• In certain situations, there may be a chance for a less precise dose modification.

MATERIAL AND EQUIPMENT

Material
Losartan potassium
Poly(ethylene oxides) {Polyox WSR 303 & Polyox WSR 301}
Euragits (Eudragit L 100 & Eudragit S 100).
Guar gum
Xanthan gum
Gum karaya
Ethyl Cellulose
Sodium alginate
Microcryslalline cellulose [Aviel PH 102]
Dicalcium phosphate
Starch 1500
Lactose

Sr .No.	**NAME OF INSTRUMENTS**	**NAME OF COMPANY**
1	Weigh balance	AVX 220,Shimadzu
2	Dissolution tester (USP)	TDT-08L, Elecrolab
3	UV Spectrophotometer	Uv-2450,Shimadzu
4	IR Spectrophotometer	S-8400,Shimadzu
5	Rotary Tablet Punching Machine	Hardik engineering
6	Hardness Tester	Pfizer

EXPERIMENTAL SECTION

Preparation of matrix tablets:

POLYOX WSR 301, WSR 303, Eudragit L 100, Eudragit S 100, ethyl cellulose, sodium alginate, xanthan gum, karaya gum, and guar gum were employed. Tables 4.6 to 4.25 provided the composition of several matrix tablet formulations. The medication and polymer used in the controlled release tablet formulations were made in various ratios. While the percentage of polymers varied for different matrix tablets, the drug's dosage remained constant.

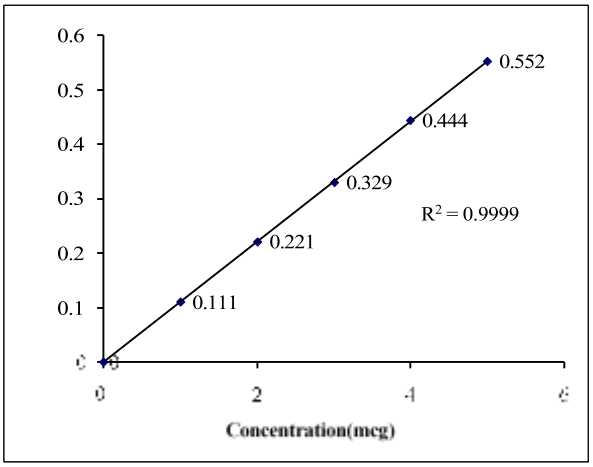
Method of Preparation :

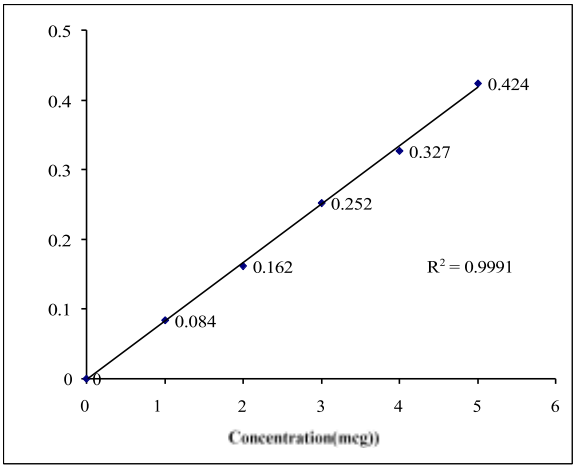
Tables 4.6 to 4.25 present the produced formulations and their constituent parts. Following screening through #40, the drug, polymer or polymers, and diluent were preblended using a lab-scale double cone blender. After applying the lubricant, the combination was again blended prior to compression. The tablet blends were instantly compressed using an Elite 10 station minipress fitted with 6mm flat round punches. To remove manufacturing variations, the same conditions were used to compress each batch of matrix tablets. Physical parameters such weight homogeneity, hardness, friability, and drug content uniformity were assessed further for each manufactured matrix tablet.

RESULT AND DISCUSSION

Table: **Calibration Curve Values of Losartan Potassium**

Concentration (µg)	Absorbance	
	0.1N HCl	**pH 6.8 Buffer**
0	0.000	0.000
1	0.111±0.002	0.084±0.003
2	0.221±0.003	0.162±0.002
3	0.329±0.001	0.252±0.003
4	0.444±0.002	0.327±0.001
5	0.552±0.001	0.424±0.003





Standard graph of Losartan potassium in0.1 N HCL and pH 6.8 buffer

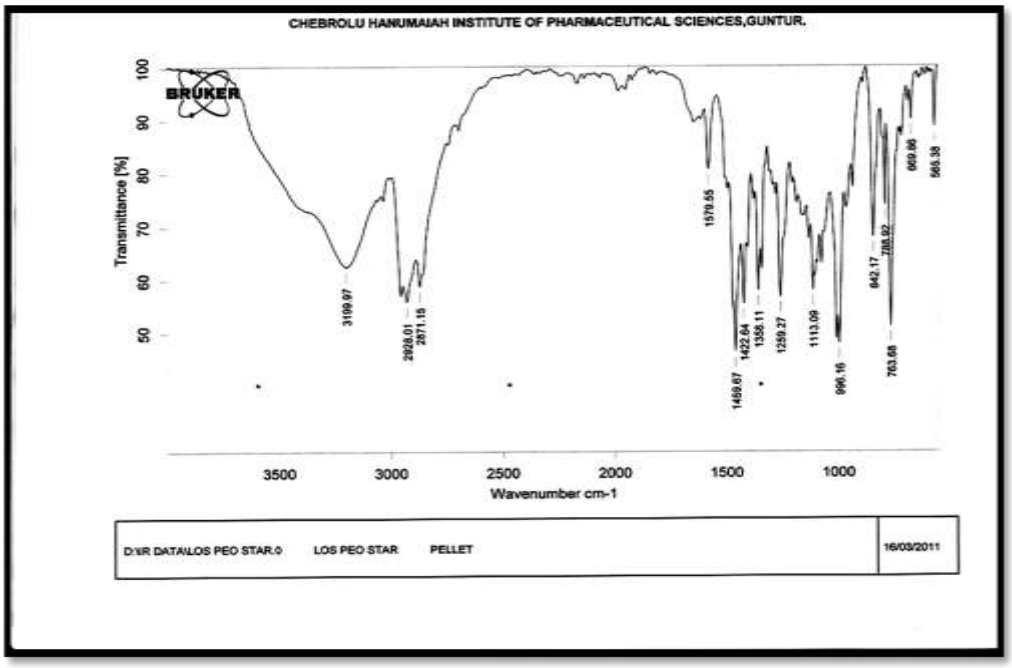
Formulation	Weight Uniformity (mg) ± S.D (n = 20)	Hardness (Kg/cm²) ± S.D (n = 6)	Friability (%) (n = 20)	Drug Content (%) ± S.D (n=6)
FVH1	300 ± 2.0	6.6 ± 0.1	0.19	98.9 ± 0.05
FVH2	301 ± 2.0	6.5± 0.2	0.16	99.3 ± 0.07
FVH3	350 ± 2.0	6.5 ± 0.3	0.16	99.4 ± 0.02
FVH4	300 ± 2.0	6.5 ± 0.2	0.15	98.8 ± 0.14
FVH5	301 ± 2.0	6.5 ± 0.2	0.18	100.0 ± 0.02
FVH6	350 ± 2.0	6.6 ± 0.2	0.16	100.0 ± 0.01

Formulations of Verapamil Hydrochloride & Losartan Potassium

Ingredients [mg/tablet]	**FORMULATIONS**					
	FLP1	**FLP2**	**FLP3**	**FLP4**	**FLP5**	**FLP6**
Losartan potassium	100	100	100	100	100	100
Polyox-WSR 303	50	75	100	50	75	100
Dicalcium phosphate	148.5	123.5	98.5	---	---	---
Starch 1500	---	---	---	148.5	123.5	98.5
Magnesium stearate	1.5	1.5	1.5	1.5	1.5	1.5
Total wt of tablet (mg)	300	300	300	300	300	300

Table: Swelling Characteristics of Various Matrix Tablet

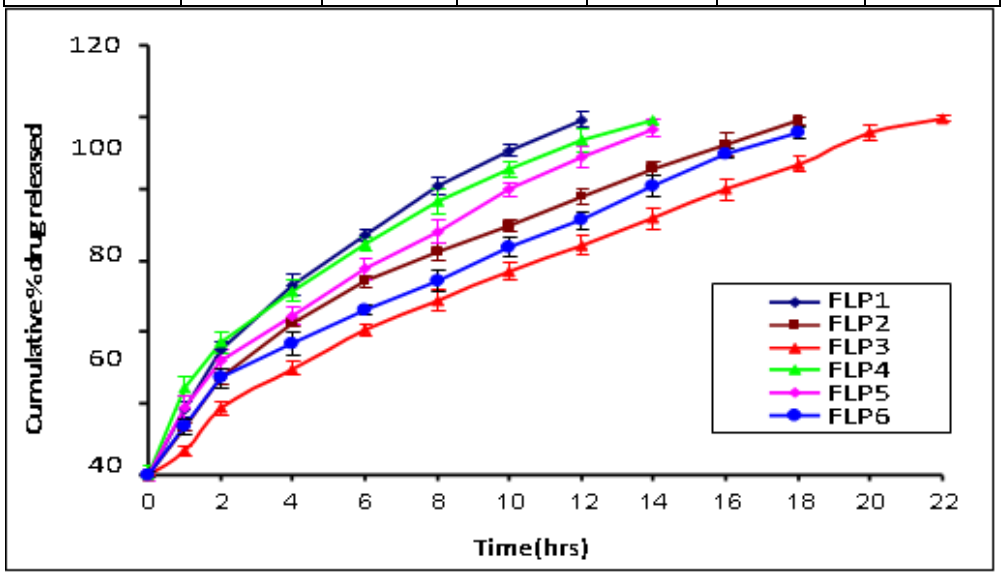
Formulation	**Swelling Index(%) at various time intervals (Hrs)**		
	2	**6**	**12**
FLP19	9.8	46.9	66.3
FLP20	18.4	51.2	79.3
FLP21	21.4	53.6	63.9
FLP22	18.1	48.2	76.4
FLP23	17.1	48.3	67.2
FLP24	14.7	48.4	80.5
FLP25	17.9	52.3	70.7
FLP26	11.7	51.6	81.2



FT-IR Spectra of Losartan Potassium

Release of Losartan Potassium from Controlled Release Matrix Tablet

Time(hrs)	**Cumulative % drug released**					
	FLP1	**FLP2**	**FLP3**	**FLP4**	**FLP5**	**FLP6**
1	18.27	13.41	6.88	18.24	14.98	13.74
2	35.16	27.22	18.66	31.25	28.54	27.13
4	52.95	42.39	29.66	51.41	41.77	36.6
6	66.85	54.04	37.66	64.52	52.16	45.93
8	80.75	62.22	45.66	76.30	62.58	52.24
10	90.34	69.66	55.28	85.53	76.25	62.14
12	99.25	77.58	64.22	99.35	86.22	73.34
14	--	85.44	73.88	--	98.99	80.14
16	--	92.36	83.31	--	100.00	89.70
18	--	98.89	90.22	--	--	99.02
20	--	--	99.34	--	--	--



Graph : **Release of Losartan Potassium from Controlled Release Matrix**

5. CONCLUSION

1. By using the direct compression procedure, it was discovered that losartan potassium, which is a freely water soluble medication, could be formulated as controlled release matrix tablets using POLYOX WSR 301 and POLYOX WSR 303.
2. The physical characteristics of the matrix tablet formulations, including drug content, hardness, friability, and weight uniformity, were consistent and within the IP limits.
3. In every instance, the weight uniformity of matrix tablet formulations was consistent and kept within the I.P.-specified bounds.
4. Hardness of all the matrix tablet formulations was found to be with in the range of 6.5 ± 0.5 Kg/cm². Friability loss was negligible, less than 0.20 % for all the matrix formulations.
5. FTIR spectrum analyses of a few different formulations of losartan potassium showed no significant interactions between the medication, diluents, or polymer.
6. The release of losartan potassium was prolonged for up to 12 hours by the matrix tablets that included POLYOX WSR 301. These matrix tablets released the medication according to an unusual transport mechanism.

6. REFERECNES

1. Sastry.S.V., Nyshadham.J.R. and Fix.J.A. Recent technological advances in oral Drug delivery – a review. Pharm Sci Technol Today, 3, 2000; pp. 138–145.
2. Rathbone.M.J., Hadgraft.J. and Roberts.M.S. Modified release drug delivery technology. Marcel Dekker, 2003; New York.
3. Lordi.N.G. Sustained release dosage forms. In: Lachman, L., Lieberman, The theory and practice of industrial pharmacy, 3rd edn. Varghese Publishing House, Bombay, 1987; pp.430– 456.
4. Chiao.C.S.L.and Robinson.J.R. Sustained release drug delivery systems. Remington: the science and practice of pharmacy, vol. II. Mack Publishing Company, Easton, PA, pp. 1995; 1660–1675.
5. Kydonieus.A.F. Fundamental concepts of controlled release. In: Controlled release technologies: Methods, theory, and applications. vol. I. CRC, Florida, 1990; pp. 1–19.
6. Lordi N.G. "Sustained release dosage form" chapter 14 in "Theory and practice of Industrial Pharmacy" , 3rd edition, Varghese Publishing House, 1991;p. 430-431.
7. Welling.P.G., Dobrinska.M.R. Chapter 6 in "Controlled drug delivery: Fundamentals and applications", 2nd edition, Marcel Dekker Inc., Volume 29, 1978: pp.254-289.
8. Madhukat, Mansukalal.D, Milind, Dattatraya Joshi and Bharat Pravinchandra. M. Pharmaceutical composition for controlled drug delivery system, patent No: US 7,157,100 B2, ; 2007.
9. James Swarbrick, James C. Boylan. Encyclopedia of Pharmaceutical Technology.2007; pp. 369-394.
10. Venkataraman Daar.S N, Chester.A, Kliener.L. An overview of Controlled release systems, Handbook of Pharmaceutical Controlled release technology, Marcel dekker Inc: 2000; p p.1-30