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HPTLC ESTIMATION OF TELMISARTAN AND RAMIPRIL IN PHARMACEUTICAL DOSAGE FORM AND ITS METHOD VALIDATION

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ABSTRACT

A simple, Accurate, precise method was developed for the simultaneous determination and validation of the telmisartan and ramipril in Tablet dosage form. Chromatogram was run through thermo BDS (250mm 4.6mm, 5µ). mobile phase containing Buffer and Acetonitrile in the ratio of 60:40A was pumped through column at a flow rate of 1ml/min. Buffer used in this method was 0.02N KH_2PO_4 buffer at P^H 3.0 temperature was maintained at 30ºC. Optimized wavelength for telmistran and ramipril was 245nm. Retention time of telmistran and ramipril were found to be 5.35min and 10.3min. % RSD of the telmistran and ramipril were found to be 1.11 and 0.518 respectively. %Recover was Obtained as 99.12 and 99.22 for telmistran and ramipril respectively. LOD, LOQ values are obtained from regression equation telmistran and rampril 9.47and1.16 and 31.57and 3.88 respectively. The HPTLC method % RSD 0.37 and 0.53 % Recover was obtained 99.85 and 99.73 respectively. The LOD LOQ was found to be 6.23 and 103 respectively.

KEYWORDS

Temistran, Ramipril, RP-HPLC, HPTLC, Acetonitrile and Potassium Dehydrogenate Phosphate.

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INTRODUCTION

Telmisartan (Figure No.1) Telmisartan is oral anti-hypertensive agent it is an Angiotensin-II antagonist (ARB). The effect of Angiotensin-II include vasoconstriction, that leads to increase in sympathetic activity and stimule the secretion of aldosterone, that leads to increase in sodium and water retention and left ventricle hypotrop Telmisartan blocks the binding of Angiotensin-II to the Angiotensin-I (AT_1) receptors in many tissues,

such as vascular smooth muscle and the adrenal glands Blockade of Angiotensin-I receptor inhibits the negative feedback of Angiotensin-II on rennin secretion, but the resulting increased plasma rennin activity and Angiotensin-II circulation levels do not overcome the effect of Telmisartan on blood pressure[1-10].

The HPLC methods for estimation of telmistran human plasma and pharmaceutical dosage forms. LC-MS-MS method was reported for the determination of telmistranin human plasma. Literature survey reveals several Analytical and Bioanalytical methods for the analysis of telmistran. The methods reported with telmistran aloneorin combination with other drug. Ramipril (Figure No.2) Ramipril is a non-sulfhydryl Angiotensin converting enzyme (ACEI). The mechanism action of Ramipril is Blockade of conversion of Angiogenesis-I to Angiotensin-II and helps in reducing blood pressure in hypertensive patients. Ramiprilat is the diacid metabolite of Ramipril. Ramiprilat produced from Ramipril by hepatic cleavage of ester group in liver. Ramipril indicated for the treatment of hypertension. It may use alone or in combination with other antihypertensive agents. The usual dosage of Telmisartan tablets is 1.25, 2.5, 5 and 10 mg once a day. Upper respiratory tract infections, Dizziness, Vomiting, Diarrhea and Pharyngitis. Discontinuation of therapy due to adverse events is required.

Telmisartan and Ramipril is the combination of Angiotensin receptor blocker (ARB) and Angiotensin converting enzyme inhibitor (ACEI). This combination completely blocks the Rennin Angiotens in Aldosterone system (RAAS) in hypertensive. This combination particularly useful to treat high blood pressure, that can damage the blood vessels of the Brain, Heart and Kidneys resulting in a stroke, Heart failure and kidney failure. By lowering blood pressure, Telmisartan and Ramipril can reduce the risk of having damage to Kidneys, Heart and other organs[11-15].

MATERIALS AND METHOD

Telmistran and ramipril standard was obtained from reputed companies, formulation tablets were purchased from local pharmacy. HPLC grade Methanol, Water and Acetonitrile were purchased from Merck specialties Pvt.limited, Mumbai. 0.45µmn ylonmem brane filter papers were obtained from Pall Life Sciences, Mumbai. A combined dosage tablet MIGNARMF was purchased from local market.

Instruments

Chromatographic separation was perform edona PEAK chromatographic system equipped with LC-P7000 iso critic pump, R heodyne injector with 20µl fixed volume loop, shim adzu HPLC-LC 2010 CHT with class VP version 6.12 with chemstion software HPTLCCAMANG linomate sample applicator scanner mode CAMNG TLC mode.

Chromatographic conditions

Separation of the drugs was achieved on a reverse phase C_{18} column, Hypersil ODS C_{18} The mobile phase consists of a mixture and 10 Mm potassium di hydrogen phosphate Acetonitrile (60:40] PH adjusted 3.0+0.01 the mobile phase flow rate 1ml\min injection volume 20 ml wave length 245nm run time 15 mints.

Mobile phase Preparation

The mobile phase was prepared by mixing Acetonitrile and buffer in the ratio of 40:60, v/v and later sonicated for10 minutes for the removal of air bubbles.

Buffer preparation

The buffer solution was prepared by weighing 1360. 1mg of potassium dehydrogenates phosphate and transferring to 1000ml of distilled water PH is adjusted 3.0 with ortho phosphoric acid and filtered through 0.45 membrane filters.

Preparation of stock and working standard stock solution

An accurately weighed quantity of 40 mg of Telmisartan and 5 mg of Ramipril is transferred into a 100 ml volumetric flask. Dissolved with 25 ml of methanol and diluted to required volume with mobile phase, having the concentration of 0.4 mg/ml of Telmisartan and 0.05 mg/ml of Ramipril.

Preparation of Sample Solution

Twenty tablets were weighed and ground to a fine powder. An amount of power equivalent to 40 mg of

Telmisartan and 5 mg of Ramipril were weighed accurately and transferred into a 100 ml volumetric flask containing 25 ml of methanol and sonicated for 30 min. And diluted to 100 ml with mobile phase, then the solution was filtered through 0.45 µm membrane filter and 5 ml of filtrate taken into 100ml volumetric flask and made up to the volume with mobile phase[16-19].

RESULTS AND DISCUSSION

Estimation method

The standard stock solution is diluted to the working concentration equivalent to that of sample. 20 µl of the standard and sample are injected separately and chromatograms are generated, with peak area obtained for standard and sample the content of Telmisartan and Ramipril in each tablet is calculated using the following.

System Suitability

System Suitability test sarean integral part of method development and suitability parameters like resolution and as symmetry or trailing factor are studied and tabulated.

Method validation

Validation of the analytical method is the process that establishes by laboratory studies in which the performance characteristics of the method meet the requirements for the intended analytical application. RP-HPLC method developed was validated according to International Conference on Harmonization (ICH) guidelines[20] for validation of analytical procedures. The method was validated for the parameters like system suitability, specificity, linearity, accuracy, precision, ruggedness, and robustness, limit of detection (LOD) and limit of quantification (LOQ)[21,22].

Table No.1: System Suitability Parameters

S.No	Parameters	Telm	Rami
1	**Resolution**	2.85	
2	**Tailing factor**	1.6	1.2

Table No.2: System Precision of HPTLC method

S.No	Area of TELM	Area of RAMI
1	19195.6	7480.4
2	19189.7	7485.6
3	19220.4	7392.8
4	19230.5	7479.6
5	19180.4	7486.4
Mean	19203.32	7464.96
% R.S.D	0.11	0.54

Table No.3: Linearity Data for Telmisartan by HPTLC

S.No	Concentration (µg/ml)	Peak area
1	120	11518.6
2	160	15320.3
3	200	19205.7
4	240	23099.9
5	280	26282.9

Table No.4: Linearity Data for Ramipril by HPTLC

S.No	Concentration (µg/ml)	Peak area
1	15	4407.1
2	20	6012.3
3	25	7498.1
4	30	8994.4
5	35	1031.2

Table No.5: Recovery Studies of HPTLC Method

S.No	Sample	Amt. of std. added (mg)	Amt. of drug recovered (mg)	% Recovery	Mean% Recovery
1	TELM	4 4 4	3.989 3.982 4.012	99.72 99.55 100.3	99.85
2	RAMI	0.5 0.5 0.5	0.496 0.501 0.499	99.2 100.2 99.8	99.73

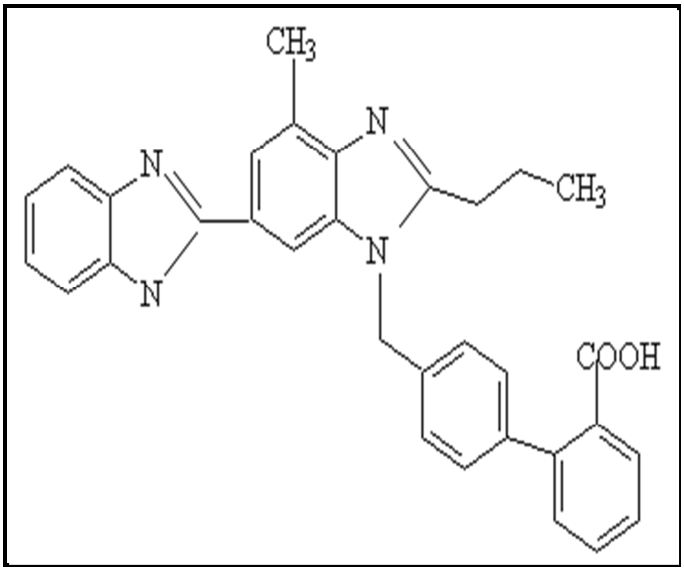

Figure No.1: Structure of Telmistran

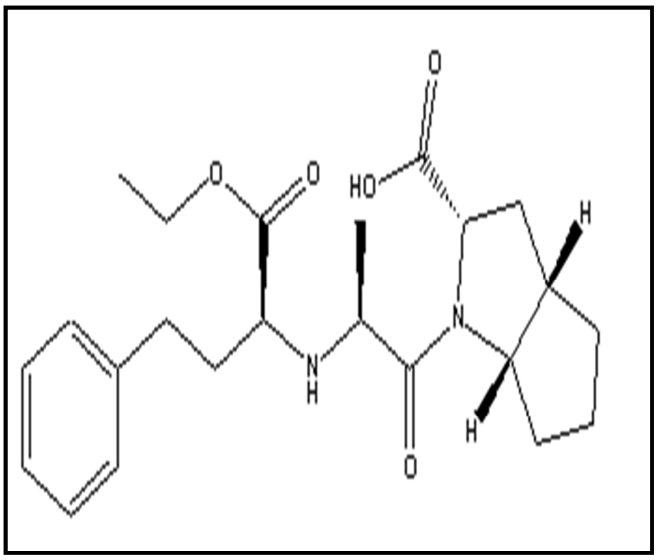

Figure No.2: Structure of Ramipril

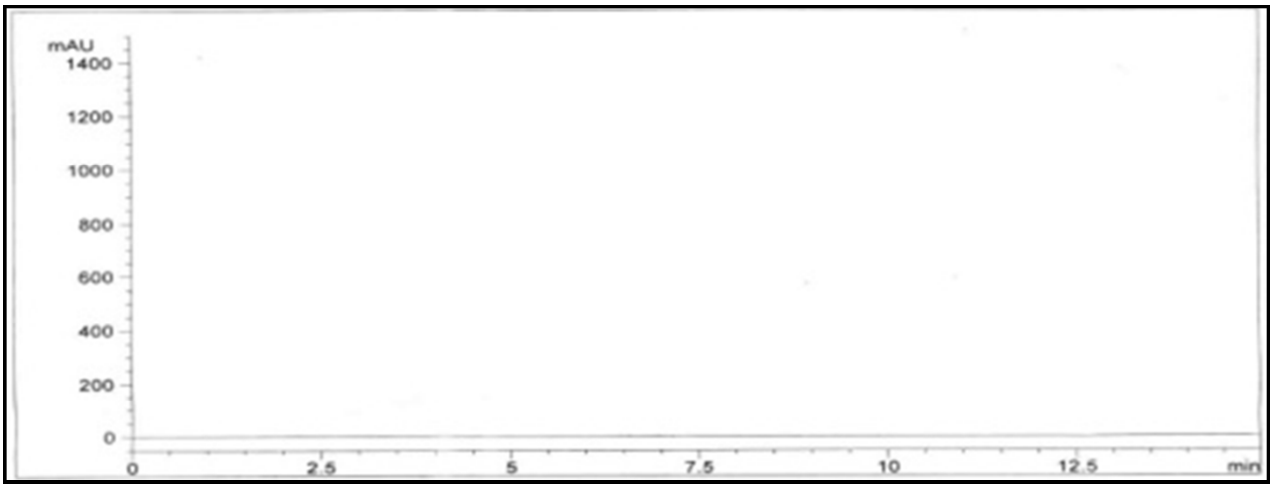

Figure No.3: Chromatogram of Mobile Phase by Developed HPLC Method

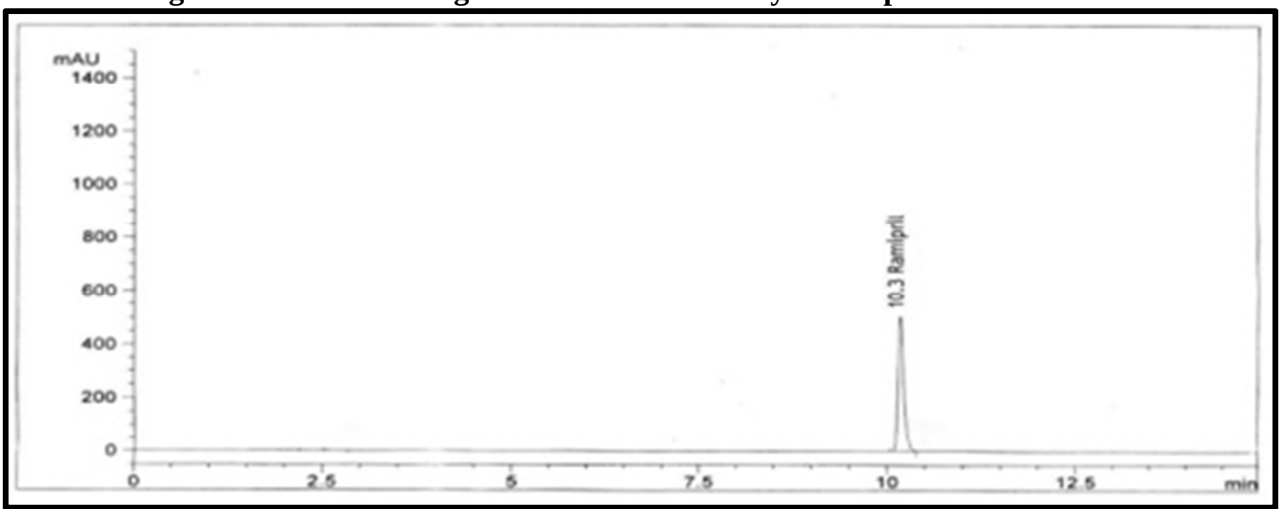

Figure No.4: Chromatogram of Standard Telmisartan

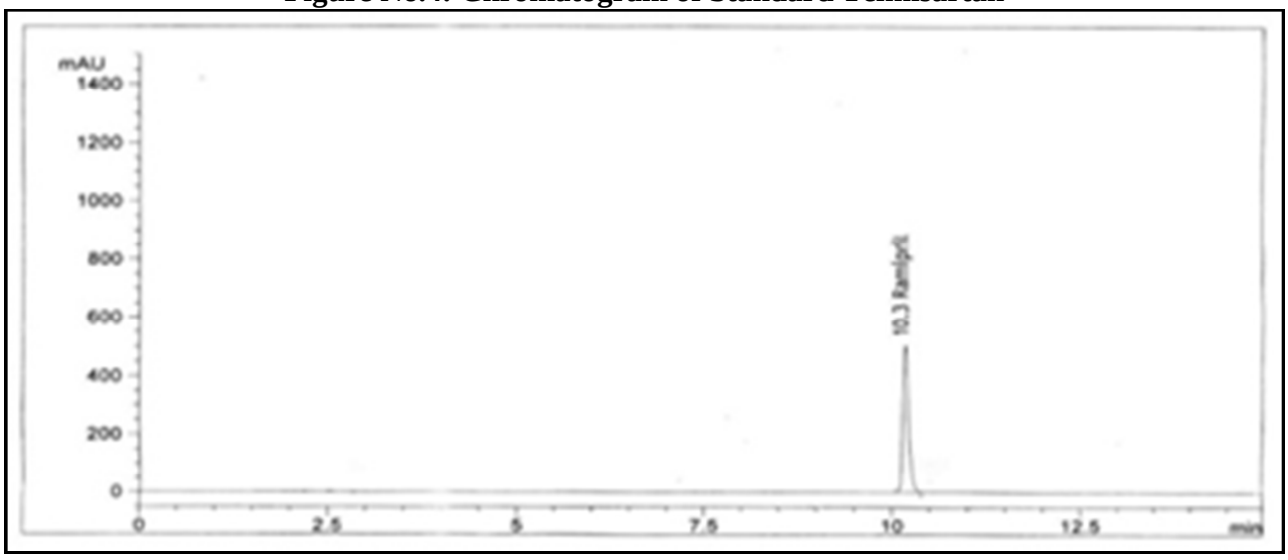

Figure No.5: Chromatogram of Standard Ramipril

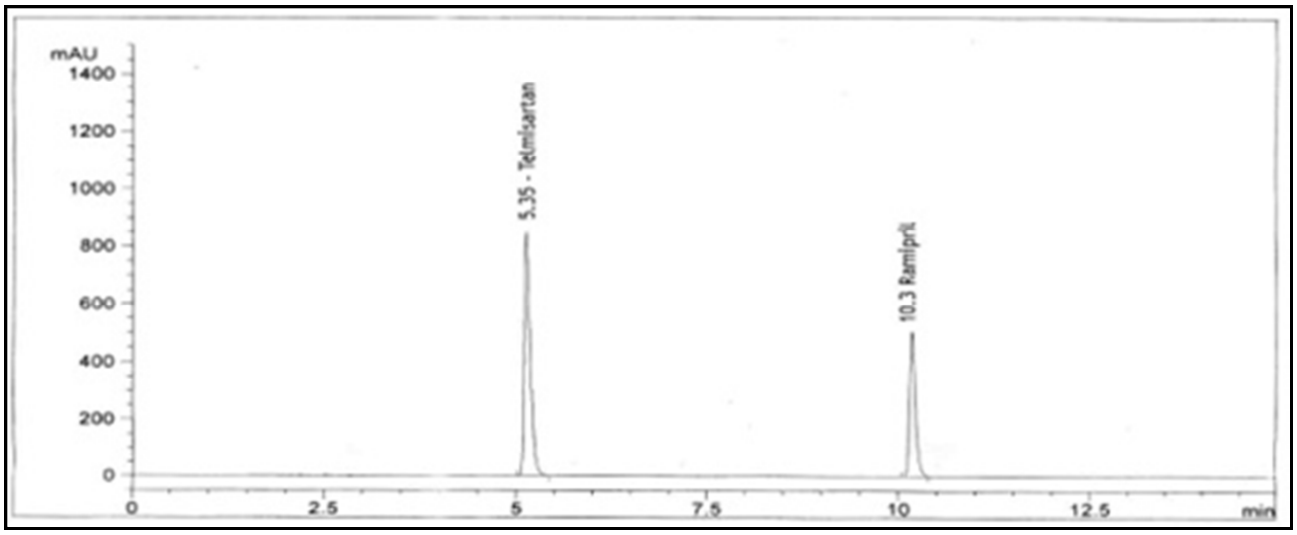

Figure No.6: Chromatogram of Standard Telmisartan and Ramipril

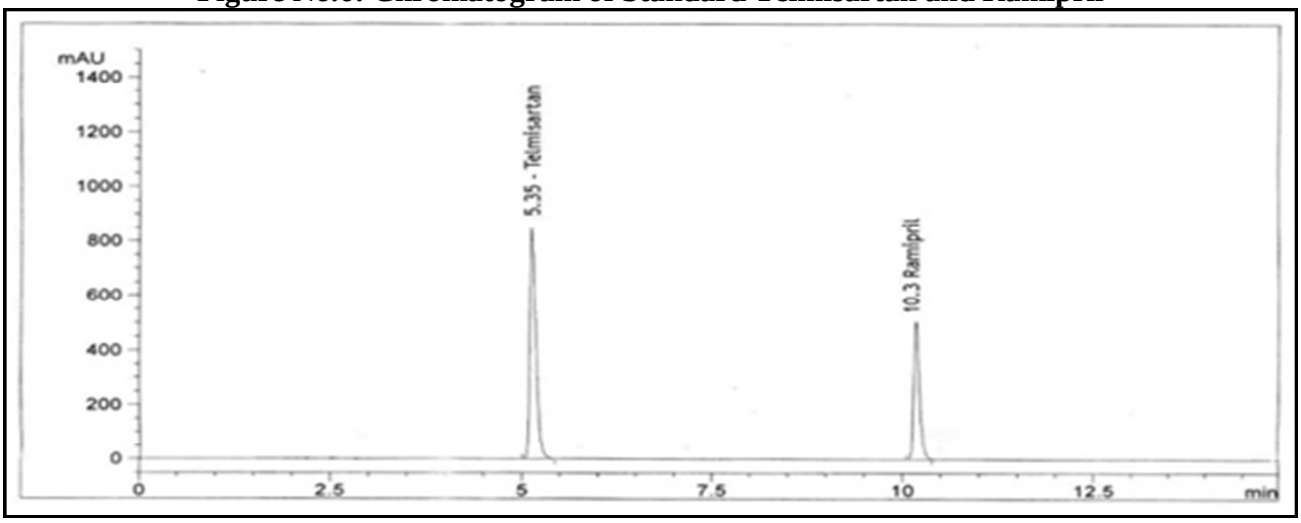

Figure No.7: Chromatogram of Telmisartan and Ramipril Formulation

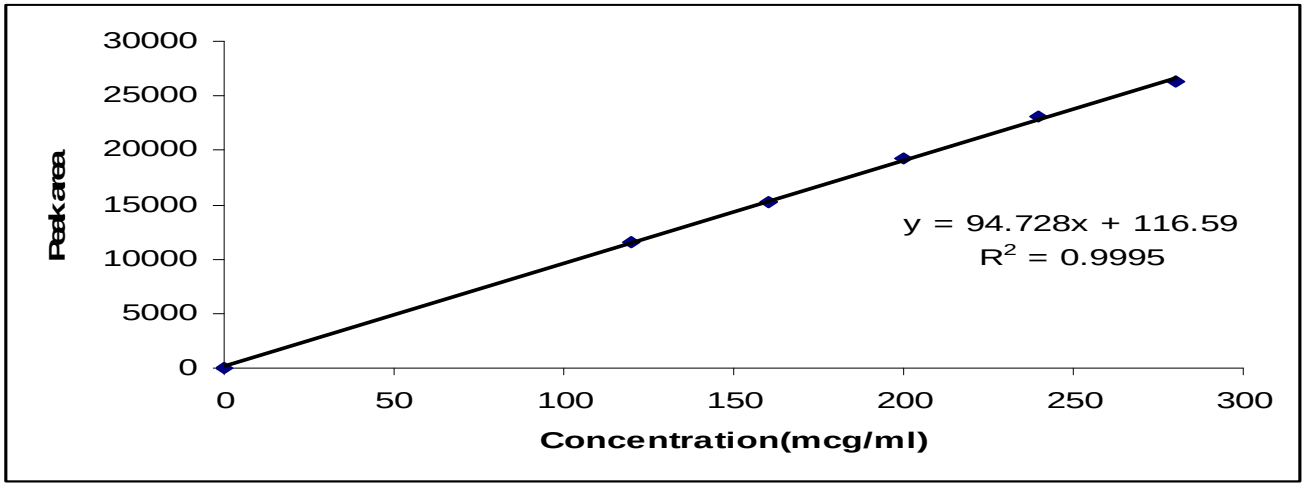

Figure No.8: Linearity Curve for the Drug Telmisartan by HPTLC

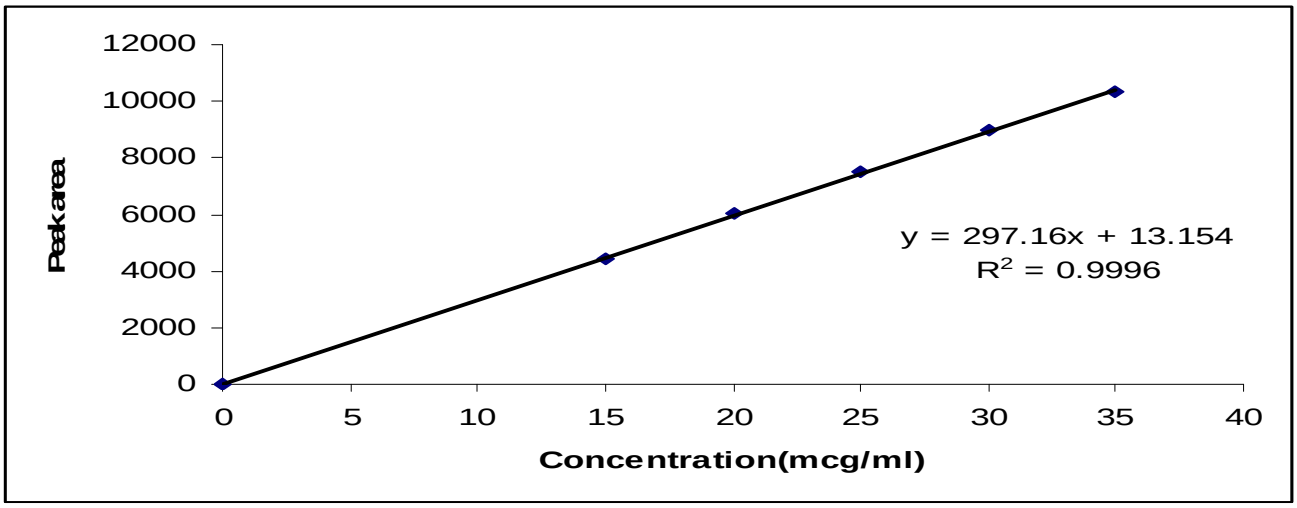

Figure No.9: Linearity Curve for the Drug Ramipril by HPTLC

CONCLUSION

The proposed HPTLC methods were found to be simple, specific, precise, accurate and rapid for determination of Telmisartan and Ramipril in combined tablet dosage form. The mobile phase is simple to prepare and economical. The sample recoveries in all formulations were in good agreement with their respective label claims and they suggested non - interference of formulation excipients in the estimation. Hence, this method can be easily and conveniently adopted for routine analysis of Telmisartan and Ramipril in combined tablet dosage form.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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