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FORMULATION AND EVALUATION OF NANOPARTICLES OF EPROSARTAN MESYLATE

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ABSTRACT

The work presented herewith has the aim to prepare and evaluate the nanoparticles of Eprosartan Mesylate ,an antihypertensive drug which is poor aqueous soluble and also having very less bioavailabily(13%) and higher dose(400-600mg).The reason behind to formulate it as nanoparticle is to increase its entrapment efficiency so that the dissolution of the drug will be improved. For this purpose Methapolyacrylate polymers(Eudragit L-100 or Eudragit S-100) are taken for slow release the drug with a suitable solvent(PEG-200) and stabilizers to increase compatibility of drug with polymers.The prepared Nanoparticles are evaluated from estimation of particle size to particle size distribution, drug-polymer interaction study by FTIR, compatibility study by DSC with short term stability analysis.

KEYWORDS: Nanoparticles,Eprosartan Mesylate,Eudragits, Particle Size Determination, Zeta Potential, FT-IR Study, DSC Study, Stability Analysis.

INTRODUCTION

The goal of any drug delivery system is to provide and maintain the desired drug concentration within its therapeutic range to its proper site of action at a predetermined rate dictated by the needs of the body over the period of time.[1] This objective can be fulfilled by designing different Novel drug delivery systems. Among the most promising systems to achieve this goal are colloidal drug delivery systems. Colloidal drug delivery systems include the drug carrier systems like liposomes, niosomes, nanoparticles and microemulsions. Nevertheless, the system has a number of different advantages and disadvantages as compared to other systems nanoparticles possess a better stability. Nanoparticles are solid colloidal particles ranging size from 10 nm to 1000 nm (1µm). They consist of

macromolecular materials in which the active principle (drug or biologically active material) is dissolved, entrapped or encapsulated and/or to which the active principle is adsorbed or attached. This definition includes not only nanopellets, but also "nanocapsules" with a shade-like wall as well as "microspheres". These particles are investigated primarily for site specific drug delivery, for controlled drug delivery and also for the enhancement of dissolution rate/bioavailability of poorly water soluble drugs. The primary route of administration under parenteral routes; however, other routes such as the oral, ocular, or topical routes are also investigated.[2]

MATERIALS AND METHODS

Materials: Eprosartan mesylate was obtained as a gift sample from MSN Labs, Hyderabad, India. Eudragit L 100, Eudragit S 100 were obtained from Evonik, India, Poloxamer 188 was a gift sample from Dr. Reddy's Laboratories, Hyderabad, Gellucire 44/14 was obtained from Gattefose, France, PEG 200 was obtained from Merk, India and other reagents were used of Indian pharmaceutical grade and standard.

Method of Preparation: Here the Nanoparticles are prepared by nanoprecipitation method. At first the specified amount of Polymers(Eudragit L100 or Eudragit S 100) are mixed with Specified amount of non-toxic solvent (PEG-200) with proper stirring in vortex mixer to form diffusing phase.[3] The specified amount of drug(Eprosartan Mesylate) was accurately weighed, added to the above polymeric solution and vortexed for few minutes and allowed to stand for few minutes to obtain air bubble free and clear solution.[4] In another container Specified amount of Aqueous solution of Stabilizers (Poloxamer 188, Gellucire 44/14)are prepared which constitute the dispersing phase.Accurately measured 1 ml of the diffusing phase is added to the 19 ml of the dispersing phase with the help of a syringe which was properly positioning the needle to immerse directly into the aqueous medium under moderate (1200 rpm) magnetic stirring at room temperature, resulted in the formation of nanoparticles.[5] As soon as the polymer containing solvent diffused into the dispersing medium, the polymer precipitated resulting in immediate drug entrapment. The rapid nanoparticles formation was governed by the so-called Marangoni effect, which is due to interfacial turbulences that take place at the interface of the solvent and non-solvent and result from complex and cumulated phenomena such as flow, diffusion and surface tension variations (Quintanar Guerrero et al, 1998).[6]

RESULT AND DISCUSSION

Preformulation Studies

Organoleptic properties: Eprosartan mesylate was found to be a white to off-white crystalline powder, odourless and with a characteristic taste.

Table. 1: Formulation design of Eprosartan Mesylate Nanoparticles.

Formulations	Drug (in mg)	Type of polymer	Drug/polymer ratio	Stabilizing agent	Concentration of stabilizing agent
F1	2	Eudragit L 100	1:1	Poloxamer 188	0.5%
F2	2	Eudragit L 100	1:3	Poloxamer 188	0.5%
F3	2	Eudragit L 100	1:5	Poloxamer 188	0.5%
F4	2	Eudragit L 100	1:7	Poloxamer 188	0.5%
F5	2	Eudragit L 100	1:9	Poloxamer 188	0.5%
F6	2	Eudragit S 100	1:1	Poloxamer 188	0.5%
F7	2	Eudragit S 100	1:3	Poloxamer 188	0.5%
F8	2	Eudragit S 100	1:5	Poloxamer 188	0.5%
F9	2	Eudragit S 100	1:7	Poloxamer 188	0.5%
F10	2	Eudragit S 100	1:9	Poloxamer 188	0.5%
F11	2	Eudragit L 100	1:5	Poloxamer 188	0.2%
F12	2	Eudragit L 100	1:5	Poloxamer 188	0.5%
F13	2	Eudragit L 100	1:5	Poloxamer 188	1.0%
F14	2	Eudragit L 100	1:5	Poloxamer 188	1.5%
F15	2	Eudragit L 100	1:5	Gellucire 44/14	0.2%
F16	2	Eudragit L 100	1:5	Gellucire 44/14	0.5%
F17	2	Eudragit L 100	1:5	Gellucire 44/14	1.0%
F18	2	Eudragit L 100	1:5	Gellucire 44/14	1.5%

(The volume of solvent and non-solvent were 1 ml and 19 ml respectively and were kept constant for all the formulations.).

IR Spectroscopy analysis

The IR absorption peak of eprosartan mesylate was taken in the range of 4000-400 cm^{-1} using KBr disc method. The major peaks were reported for evaluation of purity.[7]

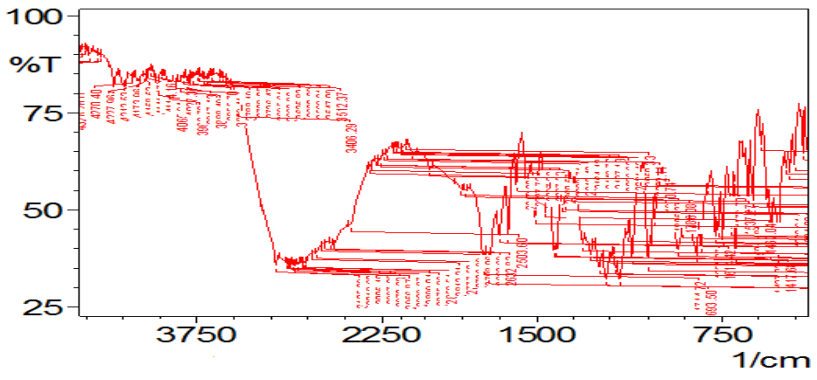

Fig. 1: FT-IR spectrum of eprosartan mesylate.

FT-IR spectrum of eproasrtan mesylate showed characteristic functional groups of drug along with some major peaks of functional groups, which indicated its purity.[8]

UV Spectroscopy analysis

Determination of λ_{max} of eprosartan mesylate in 0.1N NaOH

The absorption maximum (λ_{max}) was obtained from the UV-spectrum of the drug Eprosartan Mesylate in 0.1N NaOH as medium and it is found to be 232 nm.[9]

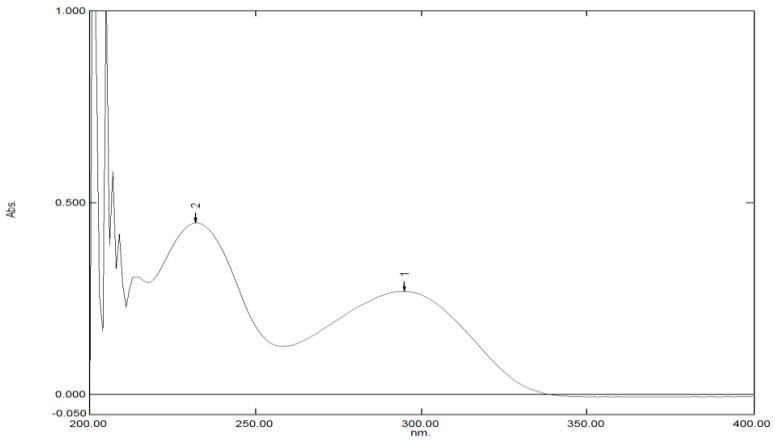

Fig. 2: UV Spectrum of eprosartan mesylate in 0.1N NaOH (λ_{max}= 232 nm).

Preparation of standard curve of Eprosartan Mesylate

The standard curve of eproartan mesylate was carried out in 0.1N NaOH solution, by measuring the absorbance at different concentrations at λ_{max} of 232nm, as shown in figure (6.2). The linearity was seen in the concentration range of 1-35 µg/ml.[10]

Table. (2): Absorbance of eprosartan mesylate at different concentration in 0.1N NaOH.

Sl. No.	Conc. (µg/ml)	Abs. at 232 nm
1	0	0
2	2	0.108
3	5	0.214
4	10	0.428
5	15	0.642
6	20	0.842
7	25	1.070
8	30	1.295
9	35	1.517

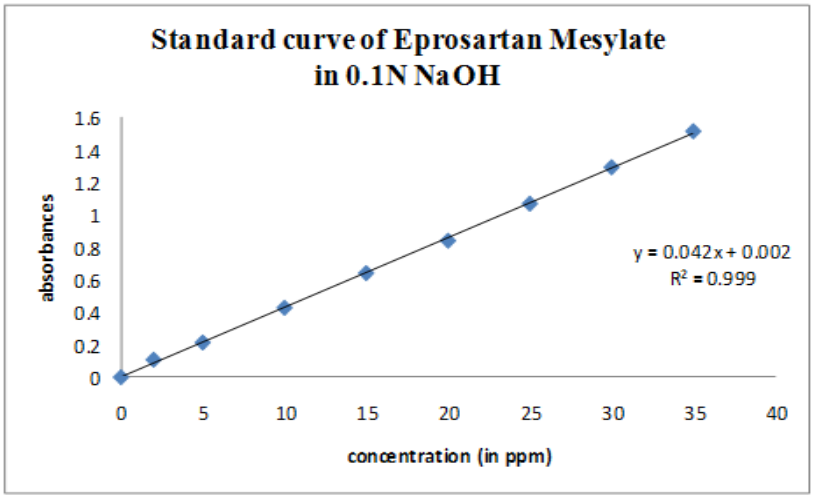

Fig. 3: Standard curve of eprosartsn mesylate in 0.1N NaOH.

Melting Point

Open capillary method: The melting point of eprosartan mesylate was determined by open capillary method and was found to be 249-253^{o}C.[11]

Differential scanning Calorimetry

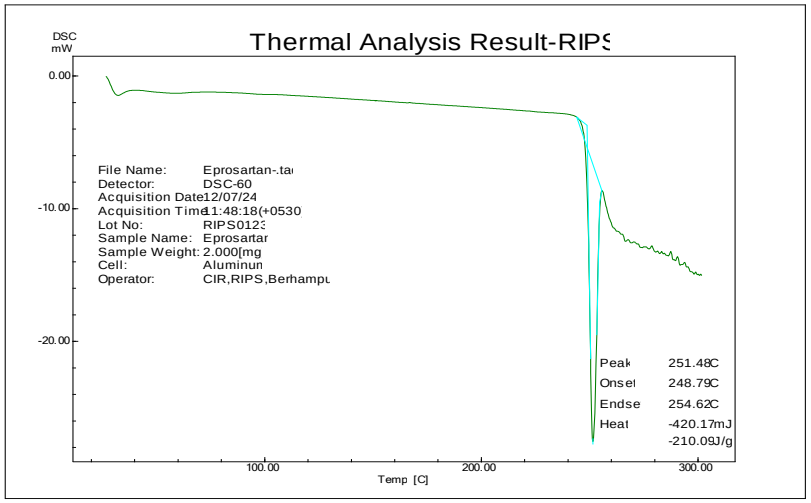

Fig. 4: Thermogram of eprosartan mesylate pure drug.

The melting point of eprosartan mesylate was also determined by DSC study and it was found to be a crystalline substance with a sharp melting point at 251.48^{o}C with a narrow melting range of 248.79 – 254.62^{o}C.[12]

Drug-Excipient compatibility

FTIR Compatibility study: FT-IR analysis of drug, drug-excipient mixture and excipient alone were carried out and spectra were obtained as follows.

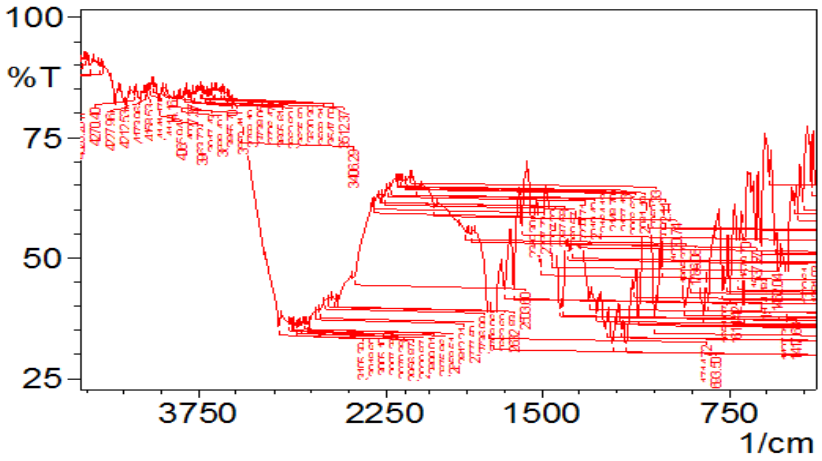

Fig. (5): FT-IR spectrum of eprosartan mesylate pure drug.

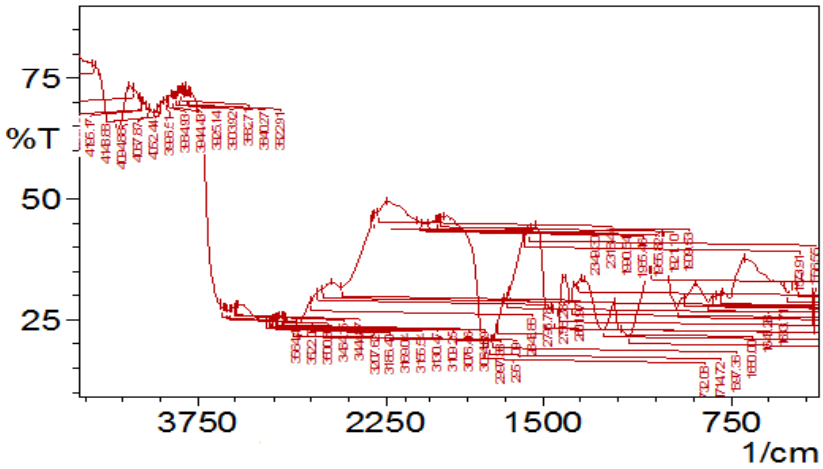

Fig. (6): FT-IR spectrum of Eutdragit L 100.

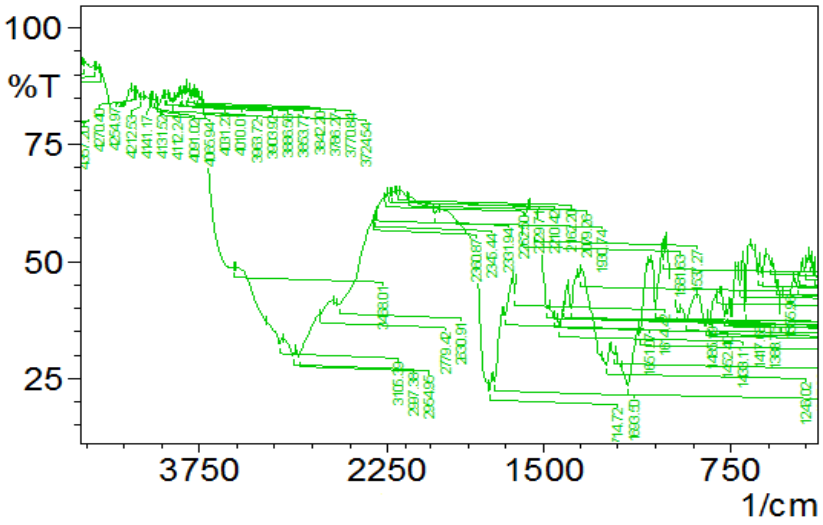

Fig. (7): FT-IR spectrum for the mixture eprosartan mesylate + Eudragit L 100.

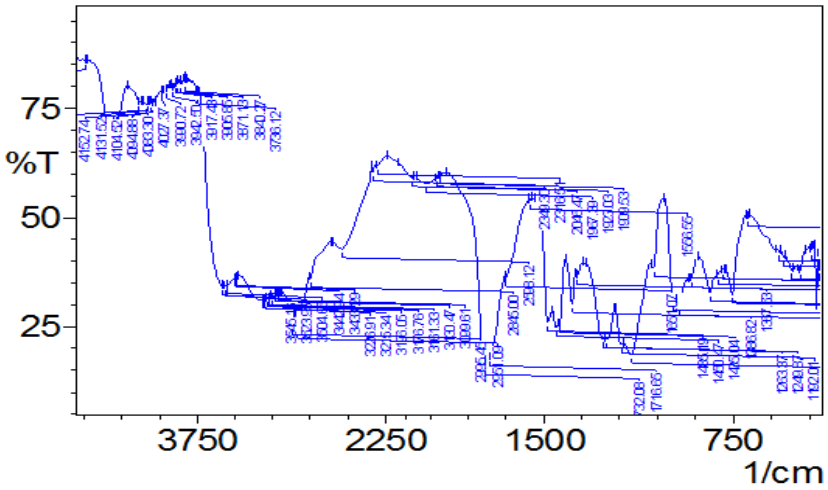

Fig. (8): FT-IR spectrum for Eudragit S 100.

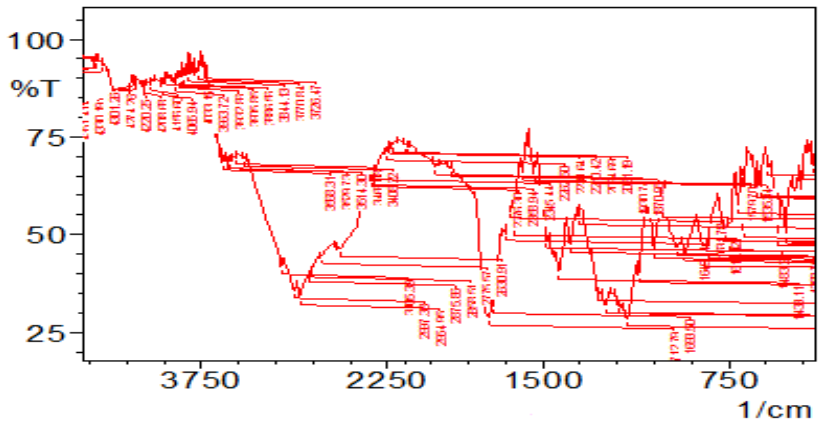

Fig. (9): FT-IR spectrum for the mixture of eprosartan mesylate + Eudragit S 100.

From the spectra the characteristic peaks were observed and reported in the following Table.

Table. (3): IR absorption peak table of drug and drug-polymer mixture.

Functional groups	Reported frequencies (cm^{-1})	Observed frequencies (cm^{-1}) for Drug	Observed frequencies for Drug + Eudragit L 100	Observed frequencies for Drug + Eudragit S 100
C=O (stretching)	1700 – 1725	1714.72	1714.72	1732.08
C-O (stretching)	1250 – 1350	1244.09	1246	1247.97
C=N (stretching)	1630 – 1690	1693.50	1693.50	1647.21
C-N vibration	1000 – 1400	1163.08	1163.08	1155.36
C=C (stretching)	1450 – 1600	1504.48	1485.19	1485.19
C=C (stretching)	1620 -1680	1651.07	1651.07	1651.07
C-H (bending)	700 – 850	690, 850	690.52, 850.61	839.03
C-H (stretching)	3010 – 3040	3019	2997.38	2951.09

There was no significant change observed in the FT-IR spectra of drug and the mixture of drug and polymers, as the characteristic peaks of the drug were found intact, indicating that the drug is compatible with the polymers.[13]

DSC compatibility study: DSC study of eprosartan mesylate pure drug and in combination with excipients in the ratio 1:1 for Eudragit L 100 and Eudragit S 100 were taken for analysis, and are shown in the following figures.[14]

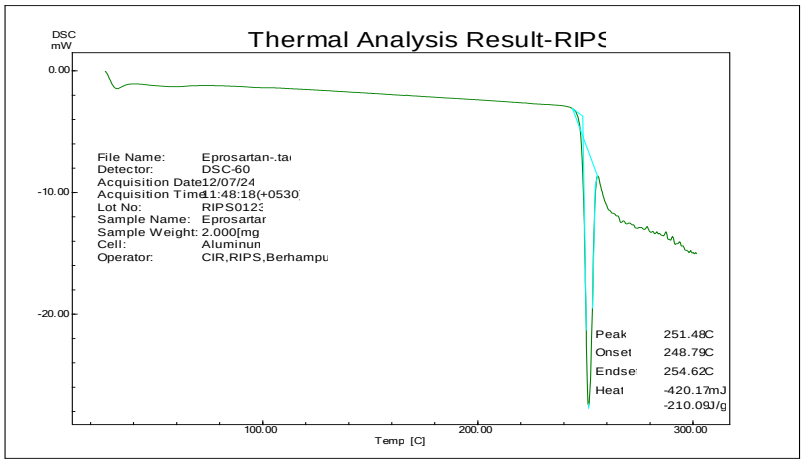

Fig. (10): Thermogram of eprosartan mesylate.

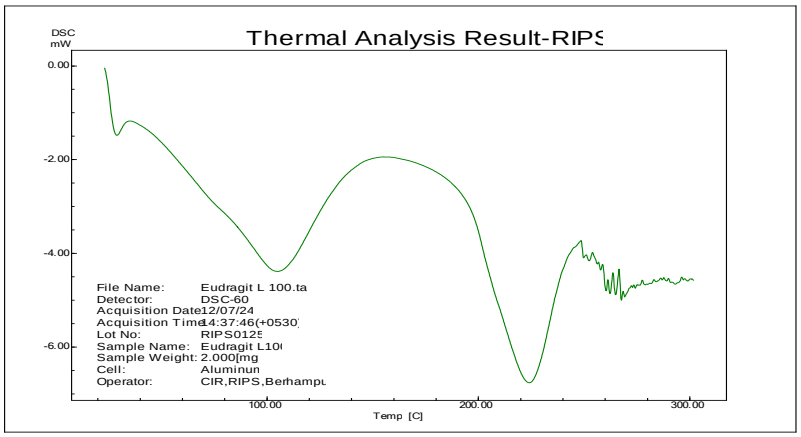

Fig. (11): Thermogram of Eudragit L 100.

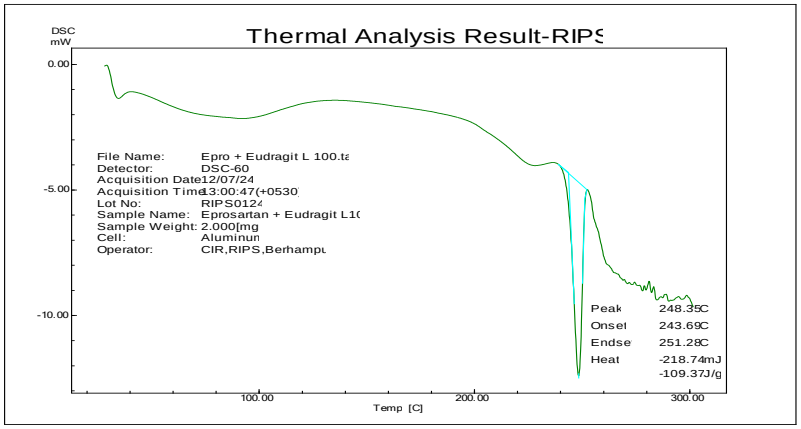

Fig. (12): Thermogram of eprosartan mesylate + Eudragit L 100.

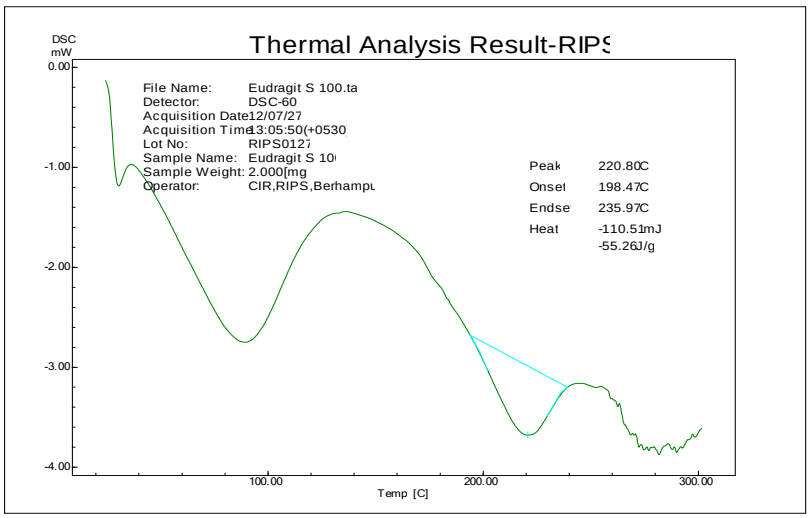

Fig. (6.13): Thermogram of Eudragit S 100.

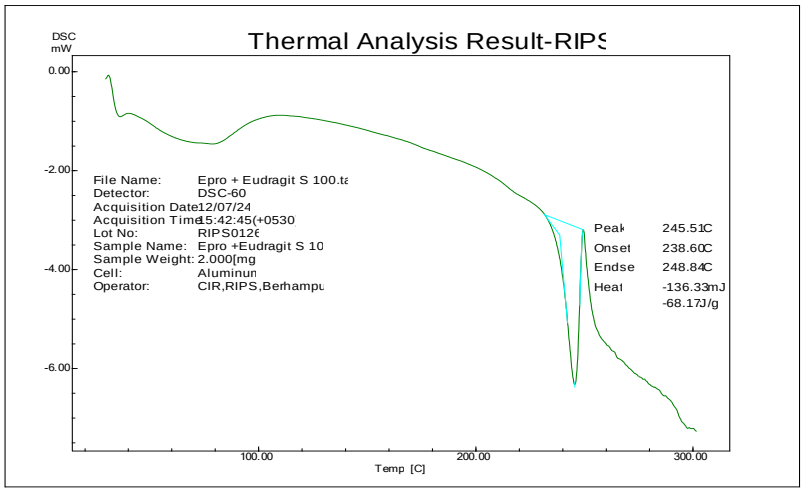

Fig. (14): Thermogram of eprosartan mesylate + Edragit S 100.

The thermogram of pure drug showed a sharp peak at 251.48^{0}C, with an onset of peak at 248.79^{0}C and endset at 254.62^{0}C.[15] This indicated that the drug was in crystalline form. The enthalpy of fusion observed was -420.17 mJ. The thermogram of the mixture of eprosartan mesylate and Eudragit L 100 showed a sharp peak at 248.3^{0}C, with an onset of peak at 243.6^{0}C and endset at 251.2^{0}C.[16] This indicated that the drug was in crystalline form. The enthalpy of fusion was observed from the graph and found to be -218.7 mJ.

The thermogram of the mixture of eprosartan mesylate and Eudragit S 100 showed a sharp peak at 245.51^{0}C, with an onset of peak at 238.60^{0}C and endset at 248.84^{0}C. This indicated that the drug is in crystalline form. The enthalpy of fusion observed was -136.33 mJ.[17]

There is no significance change observed between the melting points of the pure drug and the melting point of the drug-polymer mixtures, which indicated that the drug is compatible with the polymers. Sharp peaks showed that they were in crystalline form, but a small decrease in change in enthalpy of fusion, which may be the result of a small decrease in crystallinity in the mixtures than the pure drug.[18]

Characterization

Particle size and zeta-potential determination

Table. (4): Comparative particle size and zeta potential data of nanoparticulate formulations of Eudragit L 100 and Edragit S100 with varying drug/polymer ratios.

Formulations	Size in nm	Zetapotential in mV	PDI
F1	342	-10.5	0.539
F2	336.6	-13.4	0.428
F3	217.5	-13.2	0.373
F4	199.9	-12	0.289
F5	186.3	-11.6	0.297
F6	319.4	-17.6	0.627
F7	386.3	-17.9	0.513
F8	248.4	-8.14	0.406
F9	301	-10	0.319
F10	170	-15.9	0.298

The mean particle size with the polydispersity index (PDI) and the zeta potential values are noted in Table (6.4). In case of Eudragit L 100, the mean particle size was found with 0.5% poloxamer 188 as stabilizer to be in the range of 186.3 nm to 342 nm, having low PDI indicating more or less uniform size nanoparticles formed. The zeta potential was negative ranging from -15.5 mV to -18.4 mV.[19] In case of Eudragit S 100, the mean particle size was found with 0.5% poloxamer 188 as stabilizer to be in the range of 170.0 nm to 386.3 nm, having low PDI indicating formulation of more or less uniform size nanoparticles. The zeta potential was negative ranging from -8.14 mV to -17.9 mV. In case of Eudragit L 100 it can be seen that the particle size decreased gradually with the increase in the polymer ratio with the fixed amount of drug. Again at a constant drug/polymer ratio Eudragit L 100 showed lesser particle size than Eudragit S 100.[20]

Table. (5): Comparative particle size and zeta potential data of nanoparticulate formulations of Eudragit L 100 with varying concentrations of stabilizers.

Formulations	Size in nm	Zetapotential in mV	PDI
F11	321.7	-8.57	0.468
F12	217.5	-13.2	0.373
F13	644.9	-10.0	0.767
F14	1099	-7.79	0.918
F15	158.9	-9.94	0.291
F16	168.6	-5.97	0.269
F17	186.1	-2.21	0.250
F18	185.9	-1.36	0.157

It was also observed that at a fixed drug polymer ratio (1:5, Eudragit L 100), the particle size of the nanoparticles increased with the increase in the concentration of stabilizers (surfactant) in both the cases (Poloxamer 188 and Gellucire 44/14,). But the particle size obtained in case of Gellucire 44/14 was found to be smaller than the Poloxamer 188.[21] The PDI of formulations F15 to F18 (containing Gellucire 44/14) were found to be very small ranging from 0.157 to 0.291indicating comparatively more uniform size particles than formulations F11 to F14 (containing Poloxamer 188). But the Zeta potential values obtained in the case of Gellucire was much less than Poloxamer, may be due to which Poloxamer 188 gave more stable nanoparticles than Gellucire. The particles were sufficiently small to avoid sedimentation. The advantage of developing nanoparticles with Poloxamer 188, lies in its low toxicity even for parenteral administration (Schamolka, 1972; Koller and Buri, 1987).[22]

Entrapment efficiency

Table. (6): Entrapment efficiencies of nanoparticulate formulations.

Formulations	% Drug Entrapped
F1	33.5
F2	43.33
F3	48.74
F4	63.44
F5	34.65
F6	61.4
F7	64.2
F8	77.0
F9	80.7
F10	81.6

The drug entrapment efficiencies were determined for all the formulations and recorded in Table (6.6). It can be seen that the entrapment efficiency increased with the increase in the polymer ratio.[23] The entrapment efficiency increased from 33.5% for 1:1 drug-polymer ratio

to 63.44 for 1:9 ratio for eprosartan mesylate and Eudragit L 100 polymer. For Eudragit S 100 it increased from 61.4% to 81.6% for 1:1 to 1:9 ratios respectively, which are higher compared to Eudragit L 100. This could be due to higher hydrophobicity of Eudragit S 100 (with respect to Eudragit L 100) leading to larger particle size and higher entrapment efficiency.[24]

***In vitro* drug release study:** *In vitro* drug release study for eproartan mesylate nanoparticles was performed using dialysis bag diffusion technique.[25]

Dissolution data of formulations with Eudragit L 100

Table. (7): Dissolution data for F3 and F4.

Time (in hr)	Cumulative % Drug Release F3	Cumulative % Drug Release F4	Cumulative % Drug Release Ctrl.
0	0	0	0
0.25	20.63	14.28	4.76
0.5	33.33	31.74	9.52
1.0	44.44	41.26	19.04
1.5	57.14	52.38	19.04
2	69.84	63.49	19.04
3	85.71	73.01	19.04
4	98.41	84.12	19.04
6	98.41	98.41	19.04

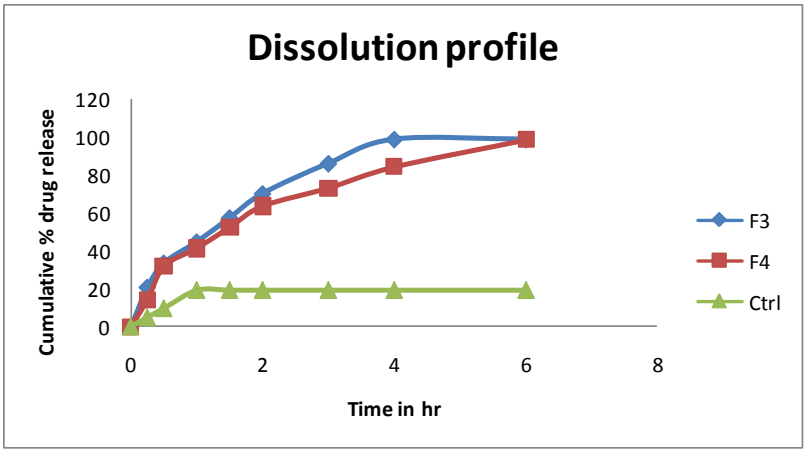

Fig. (15): Dissolution profile for F3 and F4.

The results were noted in Table (6.7) and shown in Figure (15) for formulations F3 and F4 in case of polymer Eudragit-L100 with Poloxamer 188 as stabilizer, the drug/polymer ratio of 1:5 and 1:7 respectively. The formulations displayed a sustained release profile with no initial burst effect.[26] The drug release rate decreased with the increase in the polymer concentration which could be due to retardation at high viscosity. About 98.4 % of drug release was seen in

4 hours for F3 and 6 hours or F4 where the drug release of control which was prepared in the same way without polymers shows release up to only 19.04 %. This study confirms that not only the dissolution of Eprosartan mesylate improved considerably, but also sustained the release in the nanoparticulate formulation.[27]

Fig. (16): Zero order plot for F3 and F4.

Table. (8): Dissolution data for first order plot for F3 and F4.

Time (in hr)	log % Drug Remaining F3	log % Drug Remaining F4	log % Drug Remaining Ctrl.
0	2.0	2.0	2.0
0.25	1.89	1.93	1.97
0.5	1.82	1.83	1.97
1.0	1.74	1.76	1.90
1.5	1.63	1.67	-
2	1.47	1.56	-
3	1.15	1.43	-
4	0.20	1.20	-
6	-	0.20	-

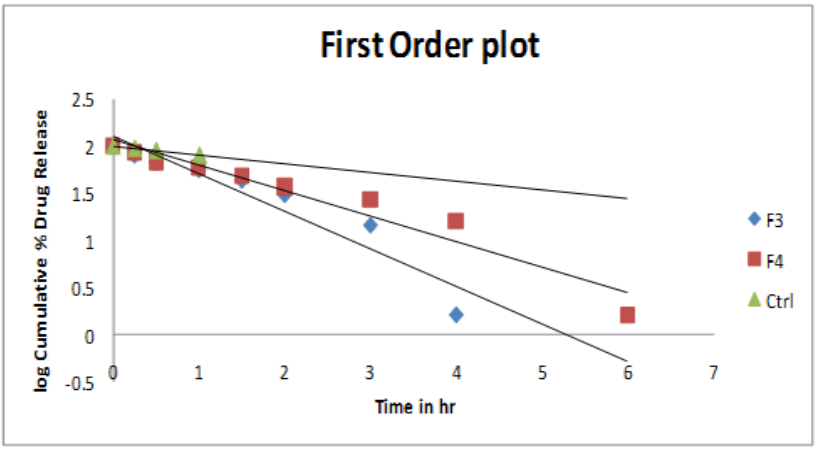

Fig. (17): First order plot for F3 and F4.

Table. (9): Dissolution data for Higuchi plot for F3 and F4.

Root Time (in hr)	Cumulative % Drug Release F3.	Cumulative % Drug Release F4	Cumulative % Drug Release Ctrl.
0	0	0	0
0.5	20.63	14.28	4.761
0.70	33.33	31.74	9.523
1.0	44.44	41.26	19.04
1.22	57.14	52.38	-
1.41	69.84	63.49	-
1.73	85.71	73.01	-
2.0	98.41	84.12	-
2.44	-	98.41	-

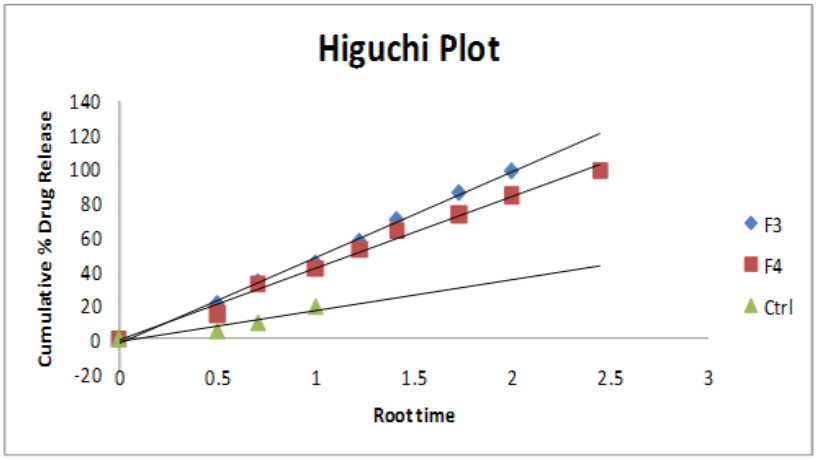

Fig. (18): Higuchi plot for F3 and F4.

Table. (10): Dissolution data for Koresmeyer Peppas plot for F3 and F4.

Log Time (in hr)	Log Cumulative % Drug Release F3	Log Cumulative % Drug Release F4	Log Cumulative % Drug Release Ctrl.
-0.60	1.31	-0.60	0.67
-0.30	1.52	-0.30	0.97
0.0	1.64	0	1.27
0.17	1.75	0.17	-
0.30	1.84	0.30	-
0.47	1.93	0.47	-
0.60	1.99	0.60	-
0.77	-	0.77	-

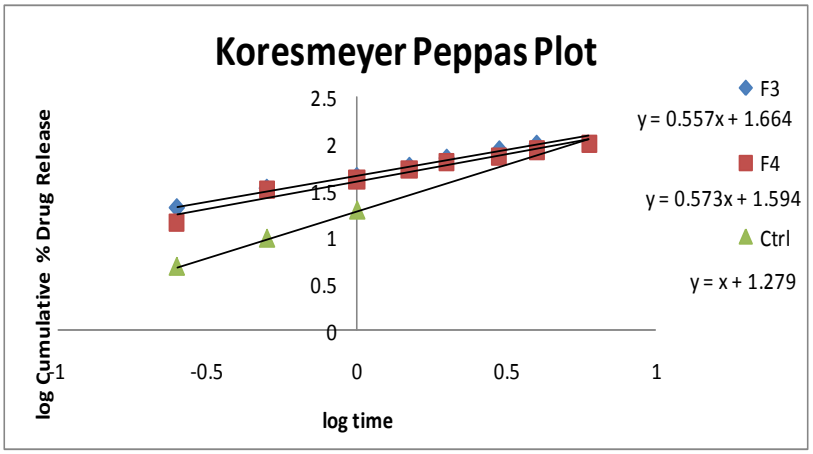

Fig. (19): Koresmeyer Peppas plot for F3 and F4.

Table. (11): Illustrative data of various kinetic models for F3 and F4.

Formulations	Zero Order (R^2)	First Order (R^2)	Higuchi order (R^2)	Koresmeyer Peppas (R^2)
F3	0.932	0.903	0.996	0.996
F4	0.876	0.935	0.989	0.961
Ctrl.	1	0.999	0.904	1

Analysis of drug release data from various plots such as Zero order, First order, Higuchi and Koresmeyer peppas plot and the R^2 value presented in the Table (6.11); it could be inferred that the drug release shows good correlation with square root of time indicating the drug release mechanism to be diffusion controlled. Different "n" values of F3, F4 and Ctrl were obtained from the equation of Koresmeyer peppas plot are 0.557, 0.573 and 1 respectively. This indicated that the nanoparticulate formulations of Eudragit L100 showed non-fickian diffusion and the control showed case-II transport.[28]

Dissolution data of formulations with Eudragit S 100

Table (12): Dissolution data for F8 and F9.

Time (in hr)	Cumulative % Drug Release F8	Cumulative % Drug Release F9	Cumulative % Drug Release Ctrl.
0	0	0	0
0.25	14.28	4.76	4.76
0.5	26.98	14.28	9.52
1	36.50	26.98	19.04
1.5	47.61	38.09	19.04
2	57.14	50.79	19.04
3	69.84	63.49	19.04
4	87.30	77.77	19.04
6	98.41	88.88	19.04
8	98.41	100.0	19.04

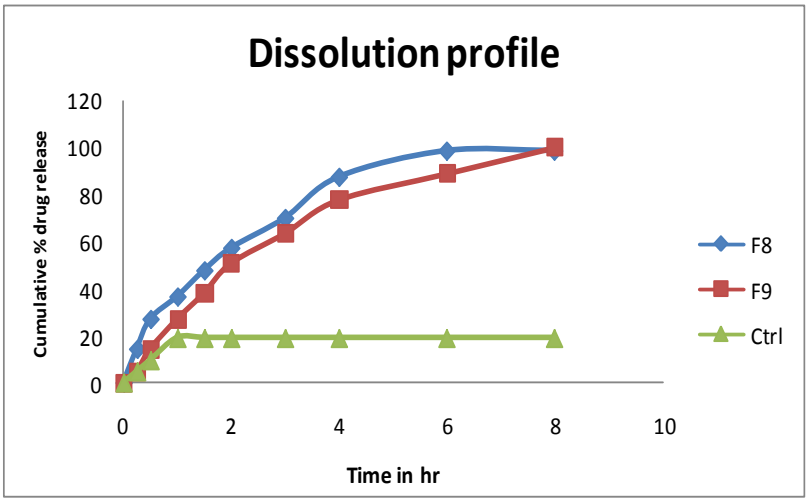

Fig. (20): Dissolution profile for F8 and F9.

The results were noted in Table (6.12) and shown in Figure (6.19) for formulations F8 and F9 in case of polymer Eudragit-S100 with Poloxamer 188 as stabilizer. The formulations displayed a sustained release profile with no initial burst effect. The drug release rate decreased with the increase in the polymer concentration which could be due to retardation at high viscosity. About 98.4 % of drug release was seen in 6 hours for F8 and 100 % in 8 hours for F9. It can be inferred that, not only the dissolution of eprosartan mesylate improved considerably but also the drug release was sustained in the nanoparticulate system. It is noted that Eudragit S 100 giving on one sustained release than Eudragit L 100 when used in same ratio.[29]

Fig. (21): Zero order plot for F8 and F9.

Table. (13): Dissolution data for first order plot for F8 and F9.

Time (in hr)	Log % Drug Remaining F8	Log % Drug Remaining F9	log % Drug Remaining Ctrl.
0	2.0	2.0	2.0
0.25	1.93	1.97	1.97
0.5	1.86	1.93	1.97
1.0	1.80	1.86	1.90
1.5	1.71	1.79	-
2.0	1.63	1.69	-
3.0	1.47	1.56	-
4.0	1.10	1.34	-
6.0	0.20	1.04	-

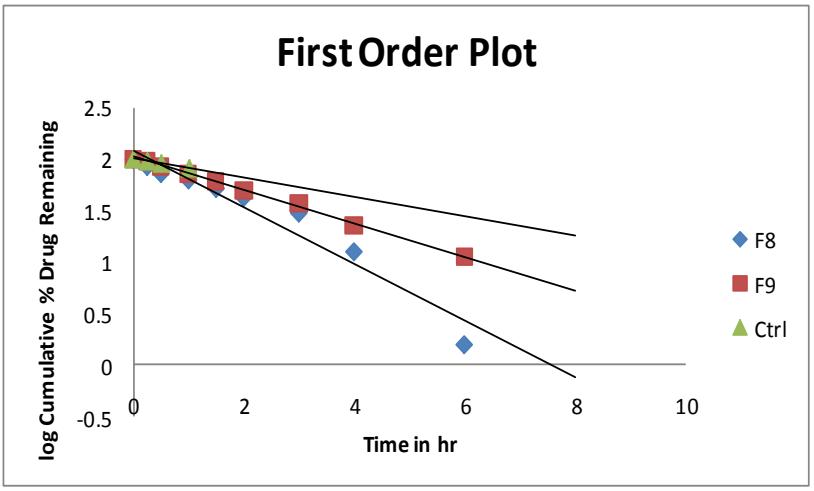

Fig. (22): First order plot for F8 and F9.

Table. (14): Dissolution data for Higuchi plot for F8 and F9.

Root Time (in hr)	Cumulative % Drug Release F8	Cumulative % Drug Release F9	Cumulative % Drug Release Ctrl.
0	0	0	0
0.5	20.63	14.28	4.76
0.71	33.33	31.74	9.52
1.0	44.44	41.26	19.04
1.22	57.14	52.38	-
1.41	69.84	63.49	-
1.73	85.71	73.01	-
2.0	98.41	84.12	-
2.4.	-	98.41	-

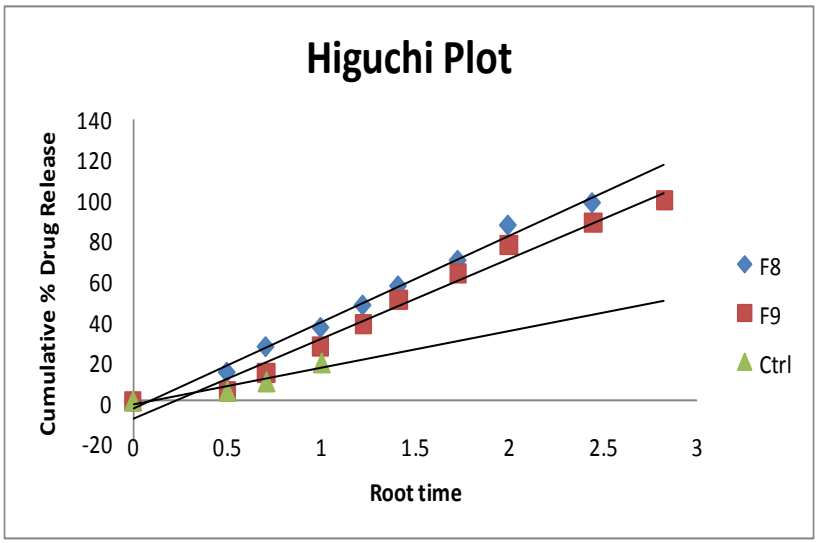

Fig. (23): Higuchi plot for F8 and F9.

Table. (15): Dissolution data for Koresmeyer Peppas plot for F8 and F9.

Log Time (in hr)	Log Cumulative % Drug Release F8	Log Cumulative % Drug Release F9	Log Cumulative % Drug Release Ctrl.
-0.60	1.31	-0.60	0.677
-0.30	1.52	-0.30	0.97
0.	1.64	0	1.27
0.17	1.75	0.17	-
0.30	1.84	0.30	-
0.47	1.93	0.47	-
0.60	1.99	0.60	-
0.77		0.77	-
-0.60	1.31	-0.60	-

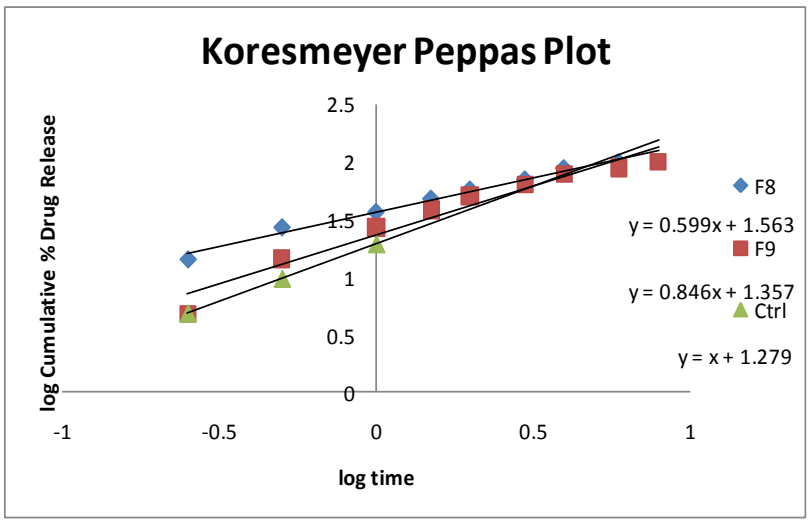

Fig. (24): Koresmeyer Peppas plot for F8 and F9.

Table (16): Illustrative data of various kinetic models for F8 and F9.

Formulations	Zero Order (R^2)	First Order (R^2)	Higuchi (R^2)	Koresmeyer Peppas (R^2)
F8	0.915	0.941	0.991	0.294
F9	0.904	0.930	0.978	0.548
Ctrl.	1	0.999	0.904	1

Analysis of drug release data from various plots such as Zero order, First order, Higuchi and Koresmeyer Peppas plot and the R^2 value presented in the Table (6.16); it could be inferred that the drug release shows good correlation with square root of time indicating the drug release mechanism to be diffusion controlled. Different "n" values of F8, F9 and Ctrl were obtained from the equation of Koresmeyer Peppas plot are 0.599, 0.846 and 1 respectively. This indicated that the nanoparticulate formulation showed a non-fickian diffusion/anomalous transport where as the control had shown case-II transport.Again, it shows that Eudragit-S 100 giving better sustained release than Eudragit-L 100 when used in same concentration.[30]

6.3.5. Short-term stability study

Selected four formulations were tested for particle size and zeta potential after 1 month of storage at room temperature shown in the Table (6.17) and compared with the data of fresh samples. This showed no significant occurred in the formulations during the storage, inferred that nanoparticulate systems having good stability.[31]

Table. (17): Comparative particle size and zeta potential data for stability study.

Formulations	Size in nm		Zetapotential in mv	
	Fresh sample	1 month old sample	Fresh sample	1 month old sample
F3	217.5	223.4	-18.2	-17.1
F4	199.9	153.3	-17.0	-18.0
F8	248.4	236.0	-14.14	-12.1
F9	301	210.0	-16	-14.9

CONCLUSION

From the above Research work, it can be concluded that, the average particle size of nanoparticles of eprosartan mesylate varied from 186.3 nm to 342 nm with the polymer Eudragit L 100 and it ranged from 170 nm to 386.3 nm with Eudragit S 100. The polydispersity index found to be less than 1, ranging from 0.157 to 0.918 for all the formulations. Basing on the particle size and entrapment efficiency four best formulations

was selected. The formulations included, PEG 200 as the solvent phase whereas aqueous solution of Poloxamer 188 at the concentration of 0.5% constituted the dispersing phase. the formulations F3, F4 and F8, F9 with ratios 1:5 and 1:7 (Eudragit L100 and Eudragit S 100) were found to be good. The entrapment efficiency increased significantly by increasing the polymer/drug ratio upto 7:1 and further increase in polymer ratio, no significant increase in entrapment efficiency was seen. The release of drug (in phosphate buffer pH 6.8) seemed to follow non-fickian analogous diffusion model with a higher correlation value for Higuchi equation indicated that the drug release mechanism was diffusion controlled. The IR spectra of the drug alone and the physical mixtures with the polymers did not show any shift in the major peaks and the DSC study indicated, that there was no interaction between the drug and polymers. This study confirms that not only the dissolution of eprosartan mesylate improved considerably, but also sustained the release in the nanoparticulate formulation upto 8 hours with good entrapment efficiency.

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