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Pharmaceutical Sciences **Research Article……!!!**

"FORMULATION AND EVALUATION OF COLON TARGETED MATRIX TABLETS CONTAINING SULFASALAZINE"

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KEYWORDS:

Colon targeted, ulcerative colitis , Eudragit S 100, guar gum.

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ABSTRACT

Sulfasalazine is used in the treatment of inflammatory bowel disease that is ulcerative colitis and Crohn's disease. The site of absorption of Sulfasalazine is in the whole GI tract and has a long half life of 7± 4 hrs. The aim of the study was to develop colon targeted compression coated tablets of Sulfasalazine using guar gum, HPMC, Eudragit S 100 as a polymer in the treatment of ulcerative colitis. All the formulations (F1 to F9) were evaluated for the physicochemical parameters and were subjected to in vitro drug release studies. The amount of Sulfasalazine released from tablets at different time intervals was estimated by UV spectrophotometer. The formulation F3 released 67.17% of Sulfasalazine. The results of the study showed that formulation F3 is most likely to provide targeting of Sulfasalazine for local action in the colon owing to its minimal release of the drug in the first 5hr compared to other formulation. The most satisfactory formulation was stable during stability studies conducted for 60 days as per ICH guidelines. It showed no significant changes in the physicochemical parameters, in vitro release pattern. The studies confirmed that, the designed formulation could be used potentially for colon delivery by controlling drug release in the small intestine.

INTRODUCTION:

Inflammatory bowel disease (IBD) is a group of inflammatory conditions of the colon and small intestine. Crohn's disease and ulcerative colitis are the principal types of inflammatory bowel disease. Ulcerative colitis is an idiopathic, chronic inflammatory disorder of the colonic mucosa, which starts in the rectum and generally extends proximally in a continuous manner through part of or the entire colon. Ulcerative colitis (UC) is a long-term condition that results in inflammation and ulcers of the colon and rectum. Complications may include mega colon, inflammation of the eye, joints, or liver, and colon cancer. Dietary changes, such as maintaining a high-calorie diet or lactose-free diet, may improve symptoms. Several medications are used to treat symptoms and bring about and maintain remission, including amino salicylates such as mesalazine or Sulfasalazine, steroids, immune suppressants. Removal of the colon by surgery may be necessary if the disease is severe, does not respond to treatment, or if complications such as colon cancer develop. Removal of the colon and rectum generally cures the condition. The first description of ulcerative colitis occurred around the 1850s. Together with Crohn's disease, about 11.2 million people were affected as of 2015. Each year it newly occurs in 1 to 20 per 100,000 people, and 5 to 500 per 100,000 individuals are affected. The disease is more common in North America and Europe than other regions. Often it begins in people aged 15 to 30 years, or among those over 60. Males and females appear to be affected in equal proportions. It has also become more common since the 1950s. Together, ulcerative colitis and Crohn's disease affect about a million people in the United States. With appropriate treatment the risk of death appears the same as that of the general population.

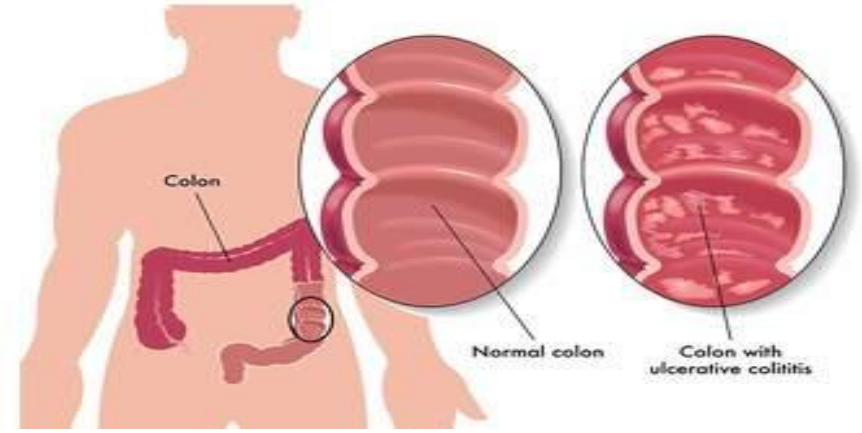


Fig.1: ulcerative colitis

SULFASALAZINE

Sulfasalazine has been a major agent in the therapy of mild to moderate ulcerative colitis for over 50 years. In 1977, Sulfasalazine (SSZ) is widely used to treat ulcerative colitis. Ulcerative colitis is caused

by inflammation of the large intestine, colon and/or rectum. Sulfasalazine (SSZ), sold under the trade name Azulfidine among others, is a medication used in the treatment of inflammatory bowel disease, including ulcerative colitis. Sulfasalazine is taken by mouth. It belongs to a class of drugs called sulfa drugs. It is a combination of 5-aminosalicylic acid (5-ASA) with sulfapyridine (SP) through an azo bond.

SUSTAINED RELEASE MATRIX TABLET

Matrix system is a promising approach for the establishment of extended and controlled release drug therapy as tablets. It may be defined as "oral solid dosage form in which the active ingredient is homogeneously dispersed throughout the hydrophilic and hydrophobic matrix which serve as release rate retardants procedure such as coating and pelletization during manufacturing and drug release rate from the dosage form is controlled mainly by the type and proportion of polymer used in formulation". These system release drug in continuous manner by diffusion controlled and dissolution controlled mechanism. Matrix tablets serves as an important tool for oral sustained release dosage forms. Sustained release dosage form is a modified dosage form that prolongs the therapeutic activity of the drug. Sustained release products provide an immediate release of drug that promptly produces the desired therapeutic effect which is followed by gradual release of additional amounts of drug to maintain this effect over a predetermined period of time. The basic rationale of a sustained drug delivery system is to optimize the Pharmacodynamics and Pharmacokinetic properties of a drug in such a way that its utility is maximized through reduction in side effects and cure or control of condition in the shortest possible time by using smallest amount of drug which is administered by the most effective route. Oral route has been the most popular and widely used for sustained delivery of drugs because of convenience and ease of administration, greater flexibility in dosage form design, ease of production and low cost. Sustained release dosage forms are designed to complement the pharmaceutical activity of the medicament in order to achieve better selectivity and longer duration of action. Sustained release preparations are helpful to reduce the dosage and improve patient's convenience. Sustained release easy to fabricate by incorporating drug molecules in slowly disintegrating or inert porous materials. The most commonly used method of modulating the drug release is to include it in a matrix system. The majority of oral sustained releases rely on dissolution, diffusion or a combination of both Mechanisms, to generate low release of drug to the gastrointestinal medium.

ORAL DRUG DELIVERY SYSTEM

Oral drug delivery is the most preferred and convenient option as the oral route provides maximum active surface area among all drug delivery system for administration of various drugs. Tablets are the most accepted dosage forms for oral administration as they are convenient to manufacture on large scale with reproducibility, stability and have high patient acceptability. Usually conventional dosage forms need to be administered several times a day as to maintain a therapeutically effective plasma level of the drug which produces a wide range of fluctuation in drug concentration in the blood stream and tissues with consequent undesirable toxicity and poor efficiency.

The maintenance of concentration of drug in plasma with in therapeutic index is very critical for effective treatment. The best new therapeutic entity in the world is of little value without an appropriate delivery system. Matrix tablets system can range from simple immediate release formulation to complex extended or modified release dosage forms.

MATERIALS AND METHODS

MATERIALS

Sulfasalazine sample obtained from **Yarrow Chem. products** Ltd, Mumbai. Guar gum, lactose, starch, talc, magnesium stearate, Eudragit S100, HPMC was obtained from Research Fine lab, Mumbai.

Table 1: composition of colon targeted matrix tablets containing Sulfasalazine

Ingredients (mg)	F1	F2	F3	F4	F5	F6	F7	F8	F9
Sulfasalazine	500	500	500	500	500	500	500	500	500
Guar gum	20	30	40	---	---	---	---	---	---
Eudragit RS100	---	---	---	20	30	40	---	---	---
HPMC	---	---	---	---	---	---	20	30	40
Lactose	156	146	136	156	146	136	156	146	136
Starch	10	10	10	10	10	10	10	10	10
Talc	7	7	7	7	7	7	7	7	7
Mg-stearate	7	7	7	7	7	7	7	7	7
Total	**700**	**700**	**700**	**700**	**700**	**700**	**700**	**700**	**700**

METHOD OF PREPARATION

Core tablets of Sulfasalazine were prepared by wet granulation method. The composition of core tablets is given in Table (1). Sulfasalazine was mixed with polymer and Lactose this powder blend was kneaded in the mortar and pestle for 15-20 min. The blend was granulated using Starch as a binder in API. Wet mass was formed; resulting wet mass was passed through sieve # 16. Granules were dried in oven at 50°C for 2 hrs. Dried granules were lubricated with magnesium stearate and talc. Then desired amount of blend was compressed in to the tablet using Rimek tablet punch machine equipped with 12 mm punch, Weight of the tablet was kept to700 mg. The prepared matrix tablets were finally coated with 4% (w/v) solution of Eudragit S-100 in 50 ml (1:3) mixture of ethanol 95% (v/v) and isopropyl alcohol and Dibutyl pthalate (10%, v/v) was added as the plasticizer.

EVALUATION OF COLON TARGETED MATRIX TABLETS CONTAINING SULFASALAZINE

Determination of Angle of Repose

Weighed quantities of powder (mix blend) were poured through the funnel from the fixed height onto the graph paper. The height of the heap was measured. The circumference of the heap was marked by pencil. The area of the circle formed was calculated on the basis of large squares and small squares present inside the circle and angle of repose was then calculated on the parameter "r" which was found out from the area of circle.

$$\text{Tan } \theta = h/r$$

Determination of Bulk Density and Tapped Density

20 g of the mixed blend (W) was introduced into a 100 ml measuring cylinder, and the Initial volume was observed. The cylinder was allowed to fall under its own weight onto a hard surface from the height of 2.5 cm at 2 sec intervals. The tapping was continued until no further change in volume was noted. The bulk density, and tapped density was calculated using the following formulae.

$$\text{Bulk density} = W / V_O$$

$$\text{Tapped density} = W / V_F$$

Hausner's Ratio

It indicates the flow properties of the granules and is measured by the ratio of tapped density to the bulk density.

$$\text{Hausner's Ratio} = \text{Tapped density/Bulk density}$$

Compressibility index (Carr's Index)

Compressibility index is an important measure that can be obtained from the bulk and tapped densities. In theory, the less compressible a material the more flowable it is. A material having values of less than 20% has good flow property.

$$\textbf{CI} = \frac{\textbf{(Tapped Density – Bulk Density)} \times \textbf{100}}{\textbf{Tapped Density}}$$

Post-Compression Parameters

Appearance, colour and odour of tablets

Organoleptic properties such as taste, colour, odour were evaluated ten tablets from each batch were randomly selected and taste tested, colour visually compared and odour checked.

Weight variation

All the prepared tablets were evaluated for weight variations as per USP monograph. Twenty tablets were randomly selected from each batch and individually weighed using an electronic balance. The average weight was calculated, individual tablet weight was then compared with the average value to find out the deviation in weight and percent variation of each tablet was calculated.

Tablet hardness

The resistance of tablets to shipping or breakage under conditions of storage, transportation and handling before usage depends on its hardness. The hardness of each batch of tablet was checked by using Monsanto hardness tester. The hardness was measured in terms of kg/cm2. 5 tablets were chosen randomly and tested for hardness. The average hardness of 5 determinations was recorded.

Friability

Friability was performed by using Roche Friabilator to determine friability It is expressed in terms of percentage (%). For friability testing 10 tablets were weighed and the initial weight of these tablets was recorded and placed in Roche friabilator and rotated at the speed of 25 rpm for 100 revolutions. Then tablets were removed from the friabilator dusted off the fines and again weighed and the weight was recorded.

$$\% \text{ Friability} = \frac{\text{Initial weight of the tablets} - \text{Final weight of the tablets}}{\text{Initial weight of the tablets}} \times 100$$

Tablet thickness

Thickness of the tablet is important for uniformity of tablet size. Thickness was measured using Vernier Calipers. It was determined by checking the thickness of ten tablets of each formulation.

Content Uniformity

Crush four (4) tablets and take average weight of tablet powder equivalent to 10 mg of Sulfasalazine and dissolve in 100 ml of pH 7.4 phosphate buffer .Tablets was allowed to dissolve in the solution and 5 ml of filtrate was dil to 50 ml with the same buffer and analysed spectrophotometrically at 359 nm.

***In-vitro* dissolution studies**

The enteric coated tablets of Sulfasalazine with polymer were evaluated for their integrity in the physiological environment of stomach and small intestine under conditions mimicking mouth to colon transit. These studies were carried out using a USP Type II test apparatus. The tablets were tested for the drug release for 2 hr in 0.1N HCl (900 ml), as the average gastric emptying time is about 2 hr. The dissolution media was replaced with phosphate buffer (pH 7.4, 900 ml), temperature of 37±0.5 ^{o}C, and stirring by paddle at rotation speed of 100 rpm and drug release study was continued for 12hrs. As

before, samples were withdrawn at regular time intervals and correspondingly replaced with fresh media. At the end of the time periods, samples were taken and analyzed for Sulfasalazine content using UV spectrophotometer.

Release kinetics

The results of *in-vitro* release profile obtained for optimized formulations were plotted in modes of data treatment as follows

1. Zero- order Kinetic model – Cumulative % drug released versus Time.
2. First- order Kinetic model – Log cumulative % drug remaining versus Time.
3. Higuchi's model- Cumulative percent drug released versus square root of time.
4. Korsmeyer equation / Peppa's model- Log cumulative percent drug released versus log time.

Stability Studies

Stability can be defined as the capacity of drug product to remain within specifications established to ensure its identity, strength, quality, and purity.

Purpose of stability studies

Stability studies are done to understand how to design a product and its packaging such that product has appropriate physical, chemical and microbiological properties during a defined shelf life when stored and used.

STORAGE CONDITIONS:

Table 2: Drug substances intended for normal storage

Study	Storage conditions	Minimum period of time
Long term	25ºC ±2 ºC/60%RH±5%RH	12 Months
	30 ºC±2 ºC/65%RH±5%RH	
Intermediate	30 ºC±2 ºC/65%RH±5%RH	6 Months
Accelerated	40 ºC±2 ºC/65%RH±5%RH	6 Months

The optimized formulation was subjected for three months stability study according to ICH guidelines. The selected formulations were packed in aluminium foil in tightly closed container. They were then stored at 40ºC / 75% RH for two months and evaluated for their permeation study.

RESULTS AND DISCUSSION

PREFORMULATION STUDIES:

Drug description

Description of drug were showed on below Table no:3

Table no.3: Description about drug

Drug	Sulfasalazine
Nature	Compact solid
Colour	brownish yellow
Odour	Odourless

Solubility Analysis

Solubility studies were carried out in different solvents and observations were showed Table no:4

Table 4: Solubility of Sulfasalazine in different solvents

Solvent	Sulfasalazine
Distilled water	Insoluble
Chloroform	Insoluble
Ethanol	Slightly Soluble
Alkali hydroxides(NaOH, KOH etc.)	soluble

Melting Point determination

Melting point of Sulfasalazine was determined by capillary method melting point was found to be 241.5°C, which showed that the procured pure drug is Sulfasalazine which is free from impurities.

Standard Calibration Curve Of Sulfasalazine

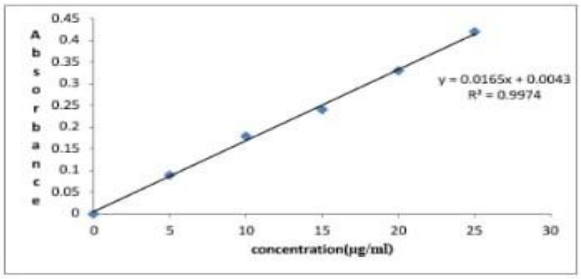


Table 5: Standard calibration curve for Sulfasalazine in phosphate buffer 7.4

S.No.	Concentration(µg/ml)	Average absorbance (at359nm)
0	0	0
1	5	0.09
2	10	0.18
3	15	0.24
4	20	0.33
5	25	0.42

Drug and excipients compatibility studies by FT- IR Spectroscopy

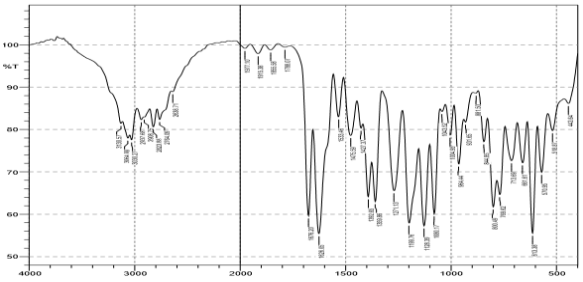


Figure 3: FTIR spectrum of Sulfasalazine

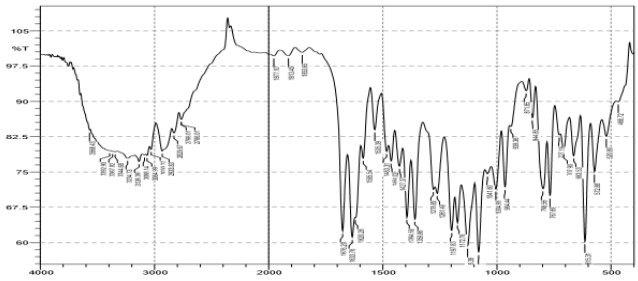


Figure 4: FTIR spectrum of Sulfasalazine with guar gum

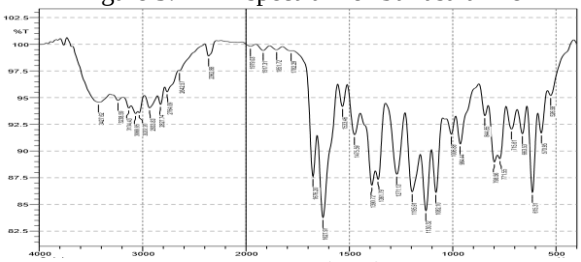


Figure 5: FTIR spectrum of Sulfasalazine with HPMC

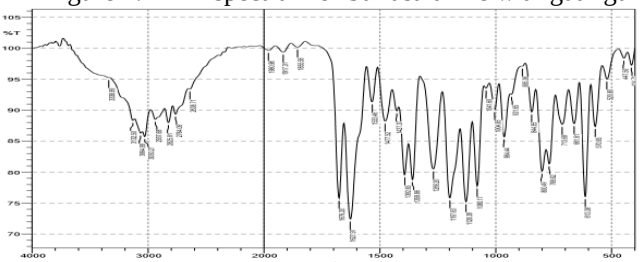


Figure 6: FTIR spectrum of Sulfasalazine with EUDRAGIT S100

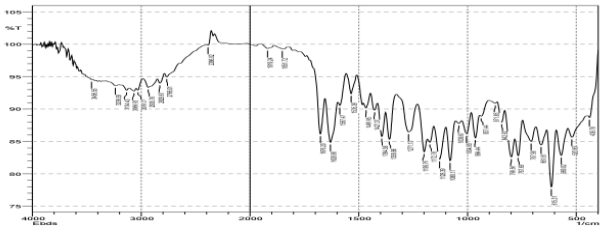


Figure 7: FTIR spectrum of Sulfasalazine with all polymers

FTIR peaks of Sulfasalazine are same as that of Drug and polymers are found there is no interaction.

Precompression evaluation parameters for powder mixture

Table no: 6 Precompression parameters results for formulation F1-F9.

Formulation	Angle of repose(°) Mean± S.D	Bulk density g/cm3 Mean± S.D	Tapped density g/cm3 Mean± S.D	Carr's index % Mean± S.D	Hausner's ratio Mean± S.D
F1	25.64±0.257	0.390±0.0007	0.425±0.0015	7.764±0.017	1.08±0.0173
F2	23.45±0.685	0.388±0.0015	0.439±0.0015	11.61±0.3141	1.13±0.0223
F3	27.95±0.723	0.381±0.0025	0.429±0.0035	11.18±0.2345	1.12±0.007
F4	23.74±0.285	0.385±0.001	0.440±0.0023	12.5±0.2835	1.14±0.0223
F5	24.77±1.261	0.384±0.0007	0.434±0.0031	11.5±0.212	1.13±0.02
F6	27.95±0.723	0.382±0.0015	0.431±0.0022	11.3±0.30	1.12±0.0141
F7	23.86±0.277	0.385±0.001	0.438±0.0021	12.1±0.2645	1.13±0.0033
F8	20.89±0.75	0.383±0.0012	0.433±0.0030	11.5±0.212	1.13±0.0141
F9	22.69±0.55	0.382±0.0015	0.428±0.0016	10.7±0.2	1.12±0.02

Precoating evaluation parameters of colon targeted tablets

Table 7: Data for Precoating evaluation parameters of colon targeted tablets

Formulation code	Average Weight (mg) Mean±S.D	Weight variation %	Hardness (kg/cm2) Mean±S.D	Thickness (mm) Mean±S.D	Friability (%) Mean±S.D	Drug content (%) Mean± S.D
F1	698.1±1.37	0.1318	6.1±0.212	5.82±0.255	0.33±0.002	98.27±0.614
F2	697.9±2.76	0.3041	6.0±0.236	6.02±0.084	0.33±0.005	96.40±0.782
F3	697.9±2.13	0.2206	6.1±0.249	6.02±0.067	0.34±0.001	94.40±0.974
F4	697.5±2.46	0.2580	6.3±0.128	6.04±0.073	0.20±0.005	97.40±1.170
F5	697.7±1.94	0.2149	6.1±0.360	6.04±0.113	0.34±0.001	98.29±0.538
F6	698.3±2.31	0.2720	6.3±0.152	5.98±0.077	0.34±0.002	97.45±0.815
F7	697.6±2.11	0.2580	6.1±0.292	6.03±0.084	0.33±0.008	93.50±0.678
F8	697.8±1.93	0.2006	6.2±0.205	6.04±0.086	0.35±0.000	98.32±0.763
F9	698.0±2.44	0.2578	6.3±0.179	6.02±0.112	0.38±0.001	99.12±0.517

Post coating evaluation parameters of colon targeted tablets

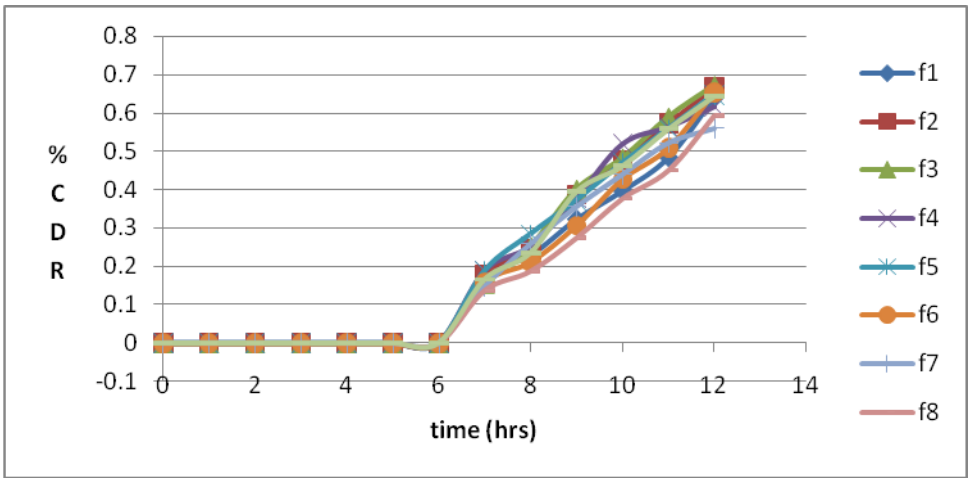
Table 8: Data for post coating evaluation parameters of colon targeted tablets

Formulation code	Average Weight (mg) Mean± S.D	Weight variation %	Thickness of coated tablet Mean± S.D
F1	702.4±1.5055	0.1594	6.93±0.088
F2	702.6±2.6331	0.3017	6.93±0.1435
F3	702.3±202632	0.2506	6.91±0.1280
F4	702.6±1.7126	0.1821	6.92±0.0751
F5	702.2±1.8737	0.2278	6.80±0.0877
F6	702.5±2.2236	0.2562	6.89±0.1122
F7	701.7±2.3117	0.2707	6.78±0.1146
F8	701.8±1.9321	0.2279	6.72±0.1383
F9	701.9±2.424	0.2735	6.67±0.0672

Table 9: *Invitro* Studies by Using Phosphate Buffer (pH 7.4)

Time (hr)	F1	F2	F3	F4	F5	F6	F7	F8	F9
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	17.56	18.02	15.50	18.77	18.78	15.83	14.63	13.74	16.59
8	22.94	24.54	25.29	25.24	28.41	21.08	25.78	18.79	23.49
9	32.35	38.70	40.12	37.71	37.29	30.60	35.49	27.44	39.46
10	39.72	47.70	48.27	51.84	46.94	42.65	43.87	37.72	46.17
11	48.45	57.26	58.91	56.29	55.93	50.78	52.10	45.08	55.83
12	64.06	66.71	67.17	61.60	64.86	65.26	55.87	59.35	64.35

***In-vitro* drug release study:**



Kinetics of drug release

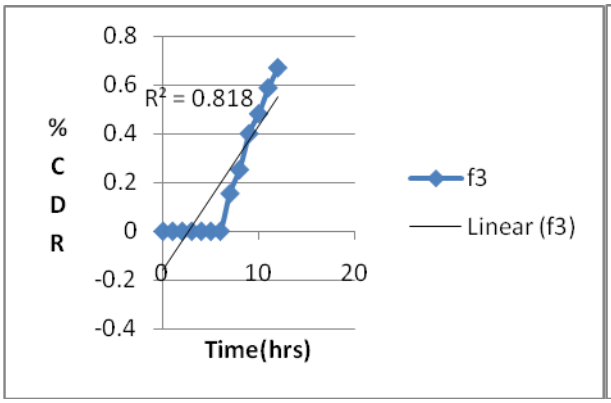


Fig8: Zero order kinetics

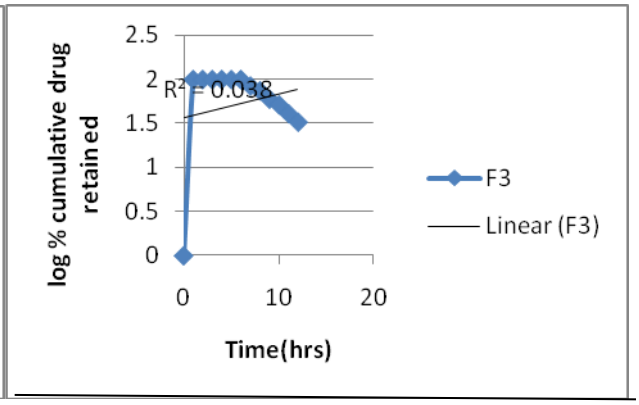


Fig 9: First order kinetics

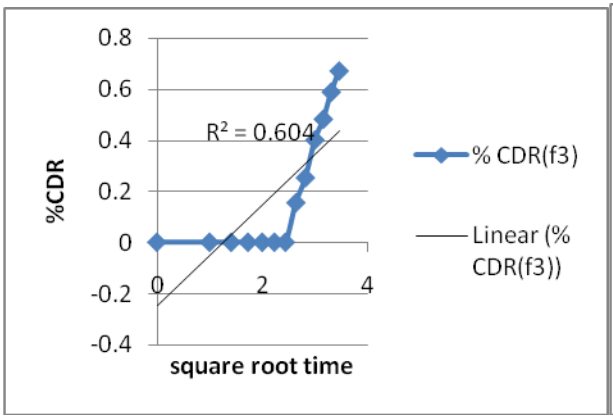


Fig 10: Higuchi Fig

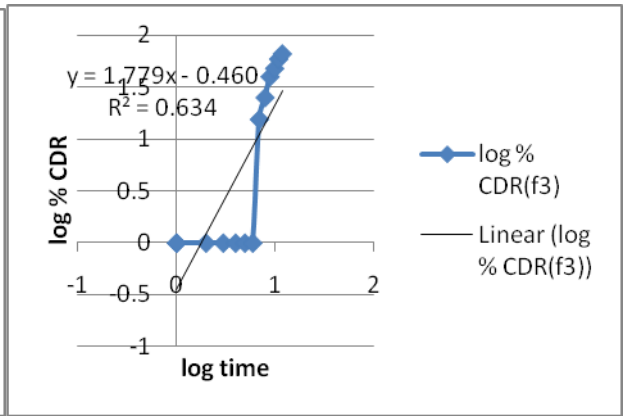


Fig11: Krosmeyer-peppas

Table 10: Kinetics modeling data

Formulation code	Zero order (r^2)	First order (r^2)	Higuchi (r^2)	Krosmeyer- peppas	
				(r^2)	(n)
F3	0.818	0.038	0.604	0.634	1.779

DISCUSSION

In the present study 9 formulations of Sulfasalazine matrix tablets were prepared using various polymers like eudrajitRS100, HPMC, guar gum in different ratios by wet granulation technique. SLS was added for the improvement of solubility of the drug. FT-IR study was done to ensure the compatibility of the Sulfasalazine with the selected polymers and excipients. Preformulation study was done before the tablet punching to study the flow property of the powder mixture so as to ensure the successful punching of the tablet. After tablet were punched, they were subjected to the general test for tablets like weight variation, hardness, friability, drug content, disintegration test and in vitro drug release test. Discussions of the results of the study done are given below

MELTING POINT OF SULFASALAZINE

The melting point of sulfasalazine was found 241.5°C, which is close to drug profile value 240°C (464° F to 473°F). The obtained value confirmed the drug was Sulfasalazine and used for further studies**.**

FT-IR STUDY

Drug polymer compatibility studies were carried out using FT-IR spectroscopy to establish the any possible interaction of polymer and excipients with the drug in the formulations. The FT-IR spectrum of drug alone as well as combination of drug with polymer and excipients were obtained and analyzed for the compatibility. No interaction was seen in FT-IR spectrums obtained which conformed drug compatibility to the polymer and excipients selected, hence the formulation process was run ahead with the confidence.

PREFORMULATION STUDY

Angle of repose

The results of angle of repose for formulation F1-F9 ranged between 20.89±0.75 to 27.95±0.723 which indicate excellent and good flow property**.**

Bulk density

The bulk density of powder was found to be in range of 0.381±0.0025gm/cm³ to 0.390±0.0007gm/cm³ which indicates good flow property. The tapped density was found to be in range of 0.425±0.0015gm/cm³ to 0.440±0.0023gm/cm³ which indicates excellent to good flow property.

Compressibility index and Hausner's ratio

The compressibility index of the powder was observed in range of 7.764±0.017-12.5±0.283, indicating excellent compressibility of the granules. The values of the Hausner's ratio were found to be in the range of 1.08±0.0173 to 1.14±0.0223 indicating excellent flow ability.

POSTCOMPRESSION STUDY

Tablet thickness

Thickness of the developed formulation F1-F9 ranged between 5.8±0.25mm to 6.04±0.11mm which indicates that all formulations have almost same thickness and processed for further studies.

Weight variation

All the formulations were subjected to weight variation test where formulation F1 to F9 shows less than 0.3041 % deviation and passes the test.

Tablet hardness

Hardness of developed formulations F1-F9 varied from 6.0±0.23kg/cm^2 to 6.3±0.17kg/cm^2 that lies in the ideal range of 4kg/cm^2 to 6 kg/cm^2 for matrix tablets. Thus, the tablets have ideal mechanical strength of matrix tablets.

Friability

The loss in total weight of the tablets due to friability was in the range of 0.20±0.005% to 0.38±0.001% in all the formulation and the friability value is less than 1% which ensures that formulated tablets were mechanically stable**.**

Uniformity of percentage drug content

The drug content in different tablet formulations was uniform and in the range of 93.50% to 99.12%. The drug content was found in the limits specified by IP**.**

***In vitro* dissolution study**

In vitro dissolution was carried out using 1.2 pH, 7.2 pH, 6.8 pH buffer solutions as dissolution medium. The formulations F1-F9 did not disintegrate or did not show any drug release for 6 hrs when the drug was subjected to 1.2 pH and 6.8 pH respectively and started showing drug release at the 7thhrs. which indicates that the tablets are suitable for colon release as they does not show drug release in 1.2 pH and 6.8 pH. The results showed %CDR from 64.06% to 67.17% for F1 to F3, 61.60% to 65.26% for F4 to F6, 55.87% to 64.35% for F7 to F9 from 7th hr to 12th hr in *In-vitro* dissolution studies. Hence, from the above data we could conclude that the F3 formulation which showed 67.17% CDR as the best formulation**.**

KINETIC MODELLING OF BEST BATCH (F3)

F3 was selected as best batch based on the drug release study. The *in vitro* drug release data was fitted in zero order, first order and Korsmeyer-Peppas kinetic model. The dissolution data was found best fitted in first order showing that the drug release is dependent on concentration of polymers.

STABILITY STUDIES

Stability studies were carried out for the most satisfactory formulation F3 showed highest drug release at 12th hour compared to rest of all formulations. Hence the formulation F3 were considered as most satisfactory formulation and their stability studies were carried out at 40 ± 2°C/75 ± 5% RH for 2months to assess their long-term stability as per ICH guidelines. At various time intervals of 1stmonth and 2ndmonth samples were evaluated. There was no change in color and shape. There was no significant difference in the various physicochemical parameters evaluated like hardness, drug content and *invitro* dissolution pattern at the various sampling points. There was no statistically significant difference between the initial values and the results obtained during stability studies.

CONCLUSION

- The aim of the present investigation is to design colon targeted matrix tablet of Sulfasalazine by using various polymers in different proportions by wet granulation technique for an effective and safe therapy of ulcerative colitis.
- The pre-formulation studies like melting point, flow properties, UV-analysis of Sulfasalazine were complied with IP standards.
- The FTIR spectra revealed that, there was no interaction between polymer and drug polymers used were compatible with Sulfasalazine.

Various 9 formulations, each containing 700mg as weight of tablet which was incorporated with 500 mg of active ingredient and 3 different polymers each containing 3 formulations along with excipients which involve SLS as solubility enhancer were formulated by wet granulation method. F1-F3 contained guar gum as polymer, F4-F6 contained Eudragit RS100 as polymer, F7-F9 contained HPMC as polymer. All the formulations were subjected to pre compression and post compression tests. All 9-formulations showed satisfactory results for all the evaluation tests which involve pre compression tests and post compression tests. Among all the 9 formulations, F1-F3 showed better results from which F3 showed the best result and was eventually selected as a best formulation. Based on the release data, formulation F3 showed a good release profile with maximum drug release. Release kinetics indicated that the release data was best fitted with first order kinetics showing that the drug release is dependent on concentration of polymer. Based on the evaluation parameters the best formulation F3 was subjected for the stability studies at 40°C ± 2°C and 75 ± 5 % RH for 2 months. There were no significant

changes in the physical appearance, in vitro drug release profile. Hence, it proved the selected formulation F3 was having enhanced dissolution profile and stability.

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