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Formulation, Optimization & Evaluation Of Dispersible Tablet Of Cefixime Trihydrate

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Abstract:

The present study focuses on the formulation and evaluation of dispersible tablets of Cefixime Trihydrate, a third-generation cephalosporin antibiotic widely used to treat various bacterial infections. The primary objective was to develop a patient-friendly dosage form with improved compliance, particularly for pediatric and geriatric populations who experience difficulty swallowing conventional tablets. Dispersible tablets were formulated using direct compression method, incorporating suitable superdisintegrants such as crospovidone, sodium starch glycolate, and croscarmellose sodium in varying concentrations. The prepared formulations were evaluated for pre-compression parameters including angle of repose, bulk density, and compressibility index, as well as post-compression parameters like weight variation, hardness, friability, disintegration time, wetting time, drug content, and in vitro dissolution. Among the various formulations, the batch containing crospovidone at 4% w/w demonstrated the best performance, with rapid disintegration (under 60 seconds), optimal mechanical strength, and over 95% drug release within 30 minutes. The study concludes that a stable, effective, and patient-compliant dispersible tablet of Cefixime Trihydrate can be successfully developed using appropriate formulation strategies and excipients.

Keywords: Dispersible Tablet, Cefixime Trihydrate, Direct Compression Method, Central Composite Design.

1. Introduction:

According to the Indian Pharmacopoeia Pharmaceutical tablets are solid, flat or biconvex dishes, unit dosage form, prepared by compressing a drug or a mixture of drugs, with or without diluents. Tablet is defined as a compressed solid dosage form containing medicaments with or without excipients. They vary in shape and differ greatly in size and weight, depending on amount of medicinal substances and the intended mode of administration.

Dispersible tablets of Cefixime trihydrate are solid oral dosage forms designed to disintegrate quickly in a small amount of water, making them ideal for pediatric and geriatric use. Cefixime trihydrate is a third-generation cephalosporin antibiotic with broad-spectrum activity against both Gram-positive and Gram-negative bacteria. It works by inhibiting bacterial cell wall synthesis, leading to cell lysis and death. These tablets offer ease of administration, especially for patients who have difficulty swallowing whole tablets. The formulation typically includes excipients such as disintegrants, sweeteners, flavoring agents, binders, fillers, and lubricants to ensure rapid dispersion, palatability, and uniformity. Upon contact with water, the tablet disintegrates within a few minutes, forming a smooth suspension for easy ingestion. Dispersible tablets of Cefixime are used to treat various infections such as respiratory tract infections, urinary tract infections, otitis media, pharyngitis, and

tonsillitis. They are generally well-tolerated and should be stored in a cool, dry place away from moisture. The convenient mode of administration and improved patient compliance make dispersible tablets a preferred choice in pediatric antimicrobial therapy.

2. Material & Method:

2.1 Material:

Cefixime Trihydrate is purchased from Jinendra Scientific Jalgaon, Microcrystalline Cellulose, Aspartame, Sodium Saccharin, sodium Starch Glycolate, Starch, Tartrazine Yellow Lake, Vanilla Flavour, Magnesium Stearate, Talc are were received as gift sample from Jinendra Scientifics, Jalgaon. Direct Compression Method are used to prepared dispersible tablet.

Determination of λ max:

Determining lambda max (λmax) is essential for identifying and characterizing substances, as it indicates the wavelength at which a compound shows maximum absorbance. This measurement is crucial for quantitative analysis in spectrophotometry, purity assessment, and monitoring chemical reactions. 10 mg of Cefixime trihydrate was dissolved in 100 ml phosphate buffer pH (1.2) to prepare 1 mg/mL stock solution. From this stock solution, a dilute (0.02 mg/ml) solution was prepared and scanned by a UV spectrophotometer at the range of 200-400 nm, in order to determine the wavelength of maximum absorbance (λmax) of Cefixime.

Preparation of calibration curve of Cefixime Trihydrate in 0.1 N HCI:

Accurately weighed 10 mg of Cefixime Trihydrate was transferred to 100 ml volumetric flask and dissolved in 100 ml of 0.1N HCI to obtained concentration 100 ug/ml. Aliquots 0.5, 1, 1.5, 2, 2.5 ml were pipetted out in 10 ml volumetric flask. The volume was made up to the mark with 0.1 N HCl. These dilutions 5,10,15,20, and 30 ug/ml concentration solution of Cefixime Trihydrate respectively. Absorbance of each solution was measured at 288 nm using UV visible spectrophotometer (Shimadzu 1800) and 0.1N HCl as reference standard and the standard curve was generated.

Drug Excipients Compatibility Study:

A drug excipient compatibility study is a crucial part of preformulation studies in pharmaceutical development. It evaluates the physical and chemical interactions between an active pharmaceutical ingredient (API) and excipients (inactive ingredient used in formulation). The goal is to ensure that excipients do not adversely affect the stability, efficacy, or safety of the drug. The drug excipient compatibility study was performed by DSC and FTIR.

Procedure for batches prepared using Direct Compression Method :

1. All the ingredients were accurately weighed.
2. All weighed ingredients sifted separately with appropriate sieve/mesh **(#60)**.
3. The Diluents (MCC PH 102) Were Passed Through Sieve No 22.
4. All the prepared powder fill in the Polyethylene Bag.
5. Compressed with Using 8mm Punch in Hydraulic press.

Fig no.1. Hydraulic Press

2.2 Experimental Method:

Table No. 1: Formulation Variables with Their Actual Coded Values

Independent Variable	Unit	Levels				
		-ᾱ	Low	Medium	High	+ᾱ
Sodium Starch Glycolate	%	1.58579	2.0	3.0	4.0	4.41421
Mcc	%	5.50253	20	55	90	104.497

Table No. 2: Response Variables with Their Actual Coded Values

Response Variable	Actual Coded Values	Unit
% Drug Release	Y1	%

Table No.3: Formulation Cefixime Trihydrate Dispersible tablet batches by DOE

Sr. No	Cefixime Trihydrae	Microcrystalline Cellulose	Sodium Saccharin	Aspartame	Sodium Starch Glycolate	Staechs	Tartrazine Yellow Lake	Vanilla Flavour	Magnesium Stearate	Talcss	Average. Weight
1.	52.5	76.9	0.5	4.0	5.1	18.5	0.3	2.7	3.0	6.5	170
2.	52.5	78.6	0.5	4.0	3.4	18.5	0.3	2.7	3.0	6.5	170
3.	52.5	75.2	0.5	4.0	6.8	18.5	0.3	2.7	3.0	6.5	170
4.	52.5	75.2	0.5	4.0	6.8	18.5	0.3	2.7	3.0	6.5	170
5.	52.5	76.9	0.5	4.0	5.1	18.5	0.3	2.7	3.0	6.5	170
6.	52.5	79.3	0.5	4.0	2.68	18.5	0.3	2.7	3.0	6.5	170
7.	52.5	78.8	0.5	4.0	3.4	18.5	0.3	2.7	3.0	6.5	170
8.	52.5	76.9	0.5	4.0	5.1	18.5	0.3	2.7	3.0	6.5	170
9.	52.5	74.5	0.5	4.0	7.49	18.5	0.3	2.7	3.0	6.5	170

***All ingredients are in mg**

2.2.1 Preformulation Studies of Cefixime Trihydrate:

- **Characterization of Cefixime Trihydrate:-**

The characterization of drug was carried out by conducting various physico-chemical tests including.

1. Organoleptic Properties:

Determining the organoleptic properties of drug powders-like taste, smell, colour, and textures vital for quality control, patient acceptance, and adherence. These evaluations help identify stability issues and inform formulation development, ensuring safety and efficacy in pharmaceutical practice.

2. Solubility:

A small quantity of drug sample was taken in a test tube and the solubility was determined by dissolving the drug in 1 ml of various solvents.

3. Drug excipients interaction study:

To detect possible chemical interactions, the mixtures were analyzed using Fourier-transform infrared spectroscopy (FTIR), where any changes in characteristic absorption peaks indicated possible interactions. Differential scanning calorimetry (DSC) was also employed to assess thermal behavior and detect potential incompatibilities based on shifts or disappearance of melting points.

- **FTIR Spectroscopy:**

The FTIR spectral analysis of the cefixime alone and Cefixime with excipients were carried out by using KBr pellet method and the spectra. All the characteristic peaks appeared for the pure Cefixime and its physical mixtures indicating no interaction between cefixime and excipients.

- **DSC Analysis:**

DSC is one of the most common analytical techniques used to characterize pharmaceutical solids. This technique is used to study what happens to polymers/ samples upon heating Drug and excipients in the ratio 1:1 was analyzed for DSC. The DSC spectrum of pure Cefixime Trihydrate were showed in fig no. 6.6.8 and the DSC spectrum of mixture of Cefixime Trihydrate with MCC,SSG were shown in fig no. 6.6.9 respectively.

4. Pre-compression parameters of powder blend:

1) Angle of repose:

Angle of repose was measured by using funnel method. The precisely weighed blend was taken in a funnel. The height of the funnel was balanced in such a way that the tip of the funnel just touches the apex of the heap of blend. The drug-excipient blend was permitted to flow through the funnel freely on to the surface. The diameter of the powder cone was determined and angle of repose was calculated using the following equation.

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

$$\text{Angle of repose } \theta = \tan^{-1} (h/r)$$

Where, h = height of the powder pile

r = radius of pile circle.

2. Bulk density:

Bulk density was determined by pouring a weighed quantity of tablet blend into graduated cylinder and measuring the height. Bulk density is the ratio of mass of tablet blend to bulk volume. It was calculated by using following equation,

$$BD = \text{Mass in gm/Untapped volume in ml}$$

3. Tapped Density:

Accurately weighed amount of tablet blend poured in graduated cylinder and height is measured. Then cylinder was allowed to 100tap under its own weight onto a hard surface. The tapping was continued until no further change in height was noted. It was calculated by using following equation,

$$TD = \text{Mass in gm/ Tapped volume in ml}$$

4. Carr's index/compressibility index:

Compressibility is the ability of powder to decrease in volume under pressure using bulk density and tapped density the percentage compressibility of powder was determined. It was calculated by using following equation,

Carr's Index = Tapped density - Bulk density/Tapped density x 100

2.2.2 Post Compression Parameters of Dispersible Tablet:

1) Appearance:

The tablets were visually observed for capping, chipping and lamination.

2) Tablet dimensions/thickness:

The thickness of the tablets was determined by using vernier callipers. Randomly 10 tablets selected were used for determination of thickness that expressed in Mean ± SD and unit is mm.

3) Hardness:

The hardness of a tablet determines its resistance to shipping, breakage, storage, transportation, and handling before use. The hardness of 20 tablets from each formulation was determined using the Monsanto Hardness Tester. The tablet was held in between the tester's two jaws along its oblong axis. At this point, the reading should be zero kg/cm^2. Then constant force was applied by rotating the tablet fractured.

4) Friability:

Friability is the loss of weight of tablet in the container due to removal of fine particles from the surface during transportation or handling. Roche friabilator was employed for finding the friability of the tablets. For tablets with an average weight of 0.65 g or less take a sample of whole tablets corresponding to about 6.5 g and for tablets with an average weight of more than 0.65 g take a sample of 20 whole tablets. Roche friabilator was rotated at 25 rpm for 4 minutes for 100 rounds. A loss of less than 1% in weight in generally considered acceptable. Percent friability was calculated as follows,

Percent Friability % F = Initial weight - Final weight/ Initial weight x 100

5) Weight variation test:

20 random tablets are selected from the lot and weighted separately to check for the weight variation. Mean of the weight is calculated and deviation from the mean weight is calculated for each tablets.

6) Drug content:

Ten tablets from each batch were precisely weighed and powdered. The powdered equivalent to 10 mg Cefixime Trihydrate was weighed and shaken in 100ml of Phosphate Buffer pH 1.2 in a volumetric flask, and 1ml was pipetted out and diluted up to 10 ml. The resulting solution was filtered and measured at 288 nm, and the Cefixime Trihydrate content was calculated. It was calculated by using formula,

Drug Content = Test absorbance/Standard absorbance X 100

7) Diameter:

Like the tablet thickness test, the diameter of tablets is also measured using vernier calipers. If tablets are round simply, we measure the diameter by placing round tablets in the jaws of the vernier caliper one by one and take readings displayed on the digital vernier caliper.

8) Dispersibility Test:

Place One Tablets in 100ml of Water and Stir Gently Until Completely Dispersed. A Smooth Dispersion is Obtained Which Passes Through a Sieve Screen with a Normal Mesh Aperture of Sieve Number No.22.

9) In-vitro dissolution studies:

The USP dissolution test apparatus (apparatus II paddle type) was used to study the drug release from the tablets. The dissolution medium was 900ml of 0.1 N HCl. The release was performed at 37±0.5°C, with rotation speed 50 rpm. 5ml of sample was withdrawn at predetermined time intervals and replaced with fresh medium. The samples were analyzed after appropriate dilution by UV spectrophotometer 1800 at 288 nm and drug release was determined by following formula,

%Drug Release= (Test abs. / Std. abs.) x Std. Dilution x Test Dilution x Purity/ label claim

- **Dissolution Parameters:**

a. Dissolution machine – Electrolab (TCT-08L)
b. Dissolution apparatus – Paddle type (USP type-II)
c. Product – Cefixime Trihydrate Dispersible Tablet
d. Dissolution medium – 0.1 N HCL (1.2 pH)
e. RPM – 50 rpm
f. Temperature - 37˚C ± 0.5 ˚C
g. Sampling time – 5, 10, 15, 20, 30 min
h. Wavelength – 288nm
i. Dissolution medium volume - 900 ml
j. Sample volume withdrawn – 5 ml sample

Fig. No.2: Dissolution Test Apparatus

10) Stability Studies:

Stability is defined as the ability of particular drug or dosage for in a specific container to remain within its physical, chemical, therapeutics and toxicological specification. Accelerated stability studies on promising formulation **B5** were carried out by storing tablets in bottle at 40°C± 2°C / 75% ± 5% RH for 3 months in humidity chamber. At the one month the tablets were examined physical and chemical changes hardness, friability, disintegration time, drug content and in- vitro dissolution study.

3. Result & Discussion:

3.1 Characterization of Cefixime Trihydrate:

3.1.1 Organoleptic properties of Cefixime Trihydrate:

Sr. No.	Properties	Specification	Observation
1	Colour	A white crystalline powder	A crystalline powder
2	Odour	Odourless	Odourless
3	Taste	Bitter	Bitter

Table No.4: Organoleptic properties of Cefixime Trihydrate

3.1.2 Melting point determination:

Drug (Cefixime Trihydrate)	Melting point apparatus	DSC (sharp peak)
Standard	218 ˚C - 225 ˚C	218 ˚C - 225 ˚C
Observed	232 ˚C	213.25 ˚C

Table No. 5 Melting point of Cefixime Trihydrate

3.1.3 Solubility:

Sr. No.	Media	Required Amount to Dissolve 1g of Cefixime (ml)	Solubility (mg/ml)
1.	0.1 N HCL	729.8	1.37
2.	pH 4.5 acetate Buffer	138.0	7.24
3.	pH 6.8 Phosphate Buffer	132.7	7.54
4.	pH 7.2 Phosphate buffer	65.6	15.23
5.	Purified Water	1525.2	0.66

Table No.6: Solubility of Cefixime Trihydrate

3.1.4 Estimation of Cefixime Trihydrate:

- **Determination of Cefixime Trihydrate:**

A solution of Cefixime Trihydrate was prepared in 0.1 N HCL & UV spectrum was recorded using UV visible spectrophotometer (Shimadzu 1800). The spectra of Cefixime Trihydrate in 0.1 N HCL scanned in the range of 250-300 nm & wavelength was observed at 288 nm.

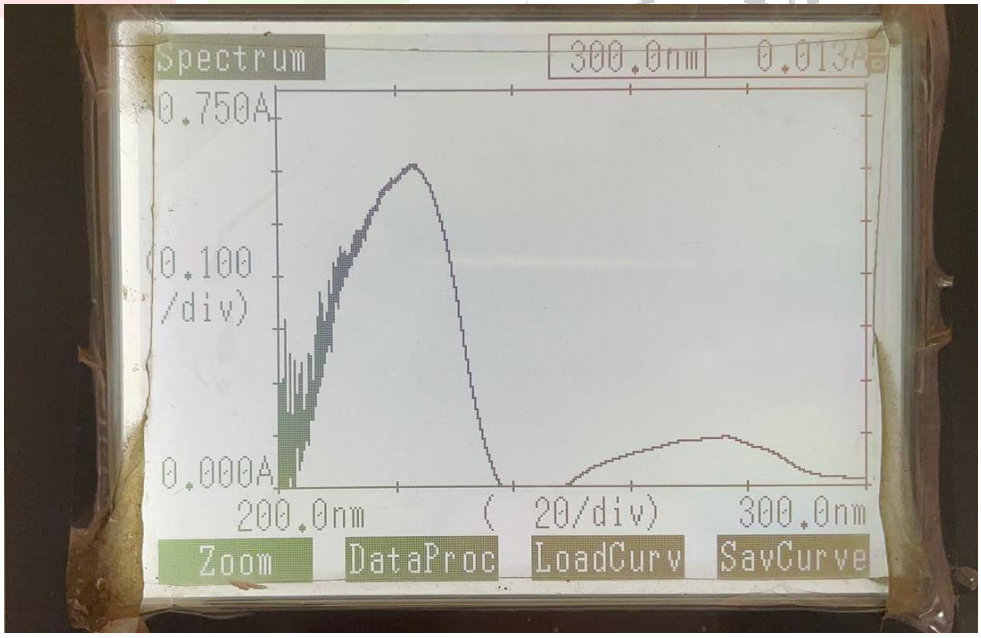

Fig. No.3: Spectrum of Cefixime Trihydrate

Sr.No	Concentration	Absorbance
1.	5	0.112
2.	10	0.224
3.	15	0.344
4.	20	0.395
5.	30	0.548

Table No.7.Absorbance of Cefixime Trihydrate

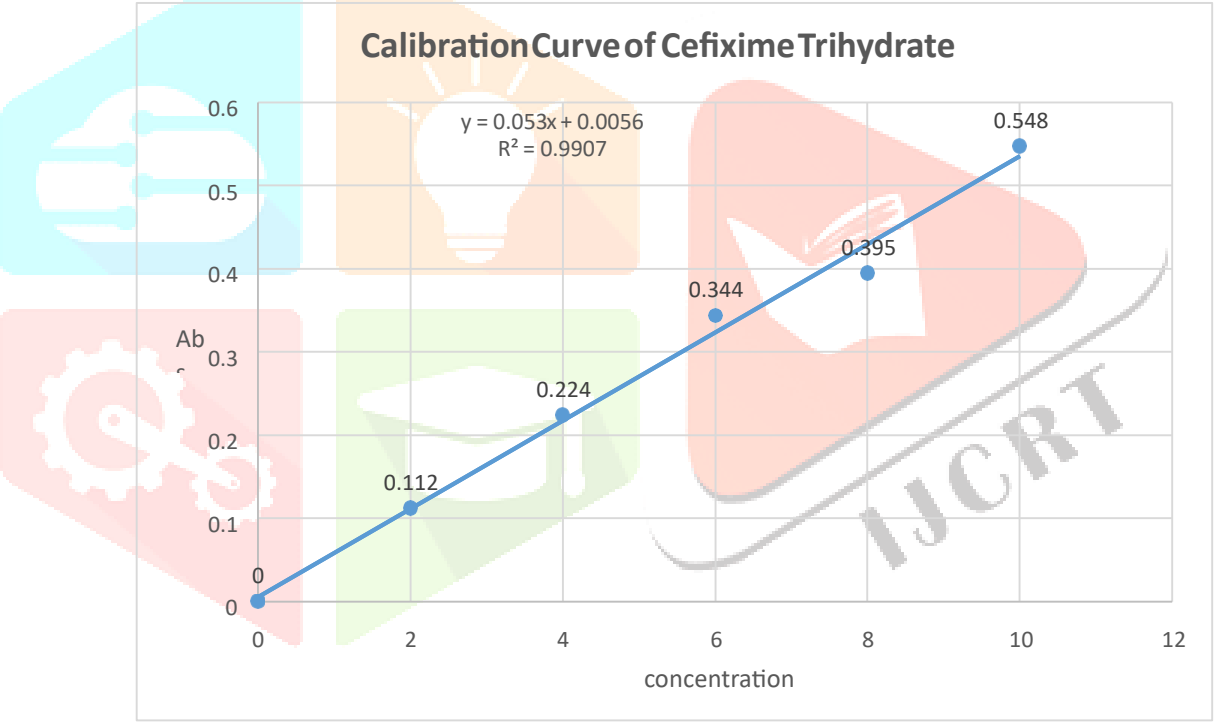

Fig No.4 : Calibration Curve of Cefixime Trihydrate

The standard calibration curve of Cefixime Trihydrate was obtained by plotting the absorbance of the standard solution against its concentration at **288 nm**.

3.1.5 Fourier Transform Infrared Spectroscopy:

3.1.5.1 Cefixime Trihydrate:

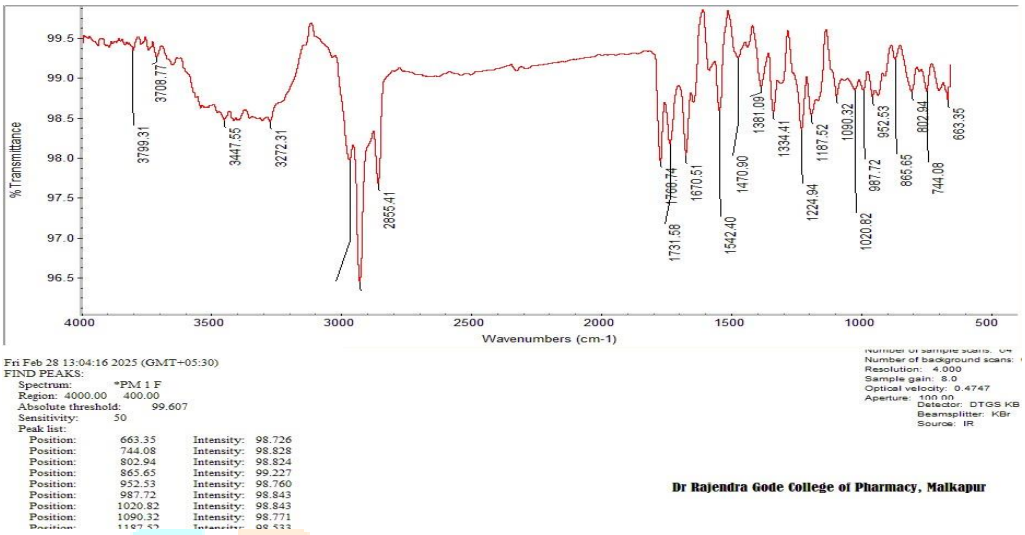

Fig No. 5 FTIR of Cefixime Trihydrate

3.1.5.2 FTIR spectrum of Sodium Starch Glycolate

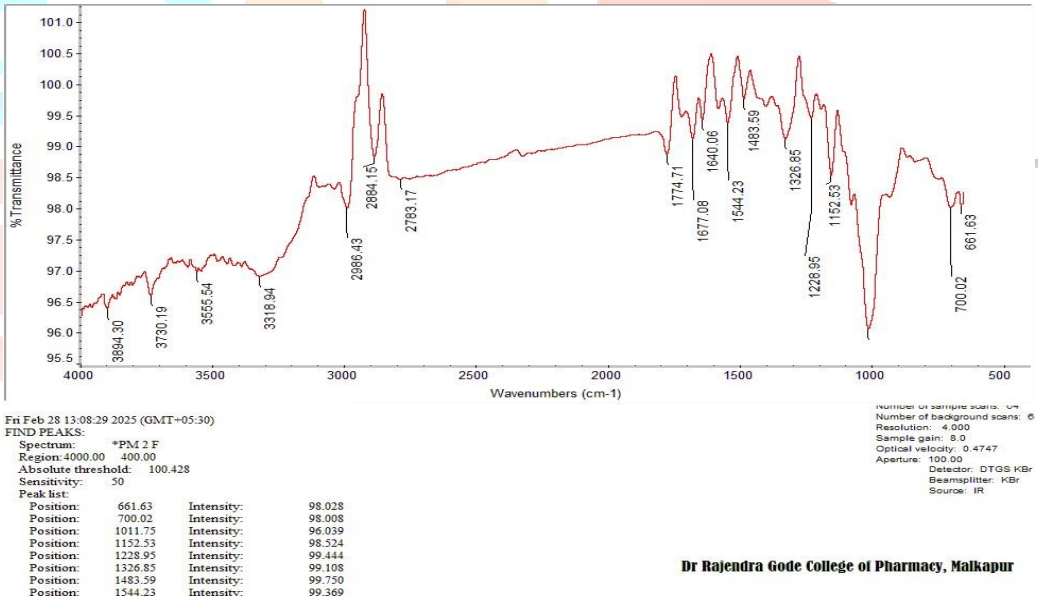

Fig no. 6 FTIR spectrum of Sodium Starch Glycolate

3.1.5.3 FTIR Sppectrum of Cefixime Trihydrate + Sodium Starch Glycolate

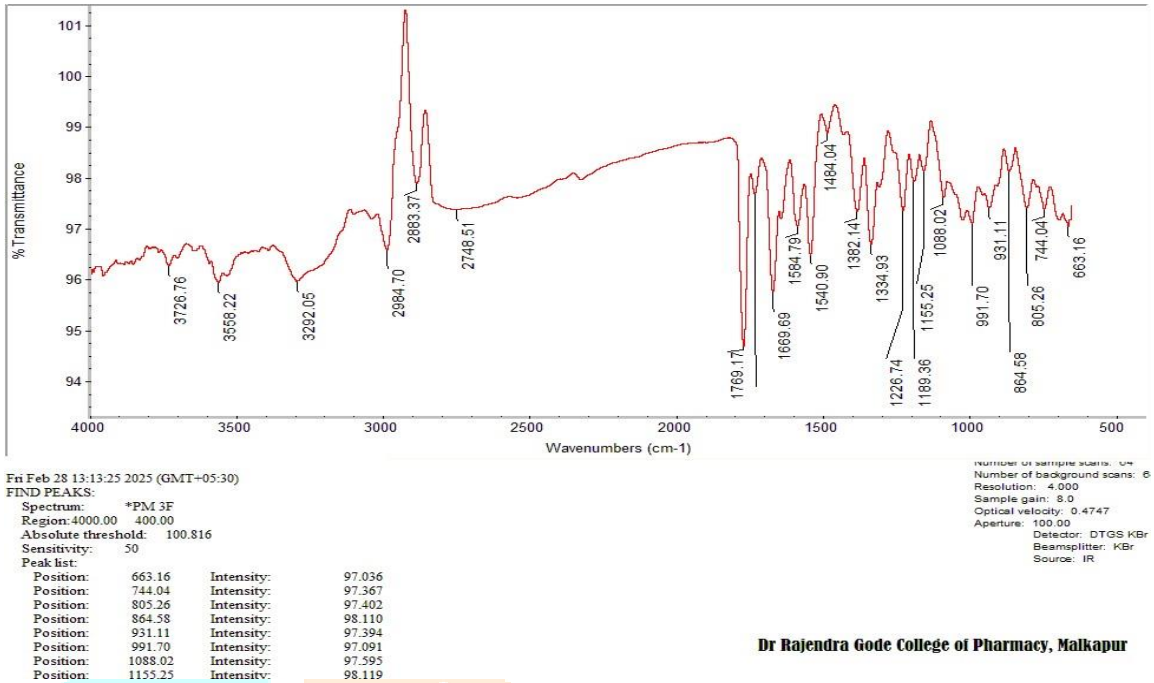

Fig No. 7 FTIR spectrum of Cefixime Trihydrate + Sodium Starch Glycolate

3.1.6 Differential scanning colorimetry: -

The DSC thermogram showed the sharp endothermic peak at 213.25 ˚C represented the melting point of Cefixime Trihydrate.

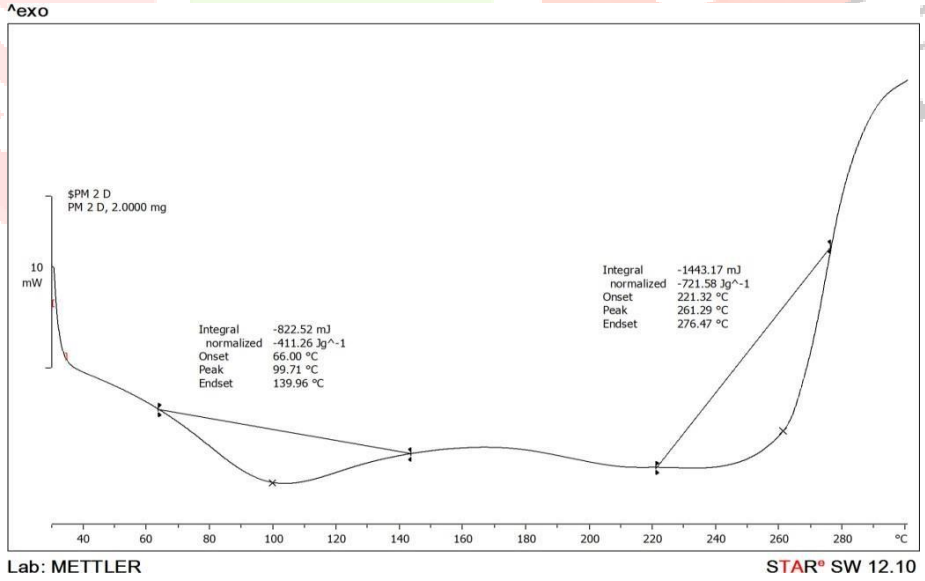

Fig No.8: DSC Thermogram of pure Cefixime Trihydrate

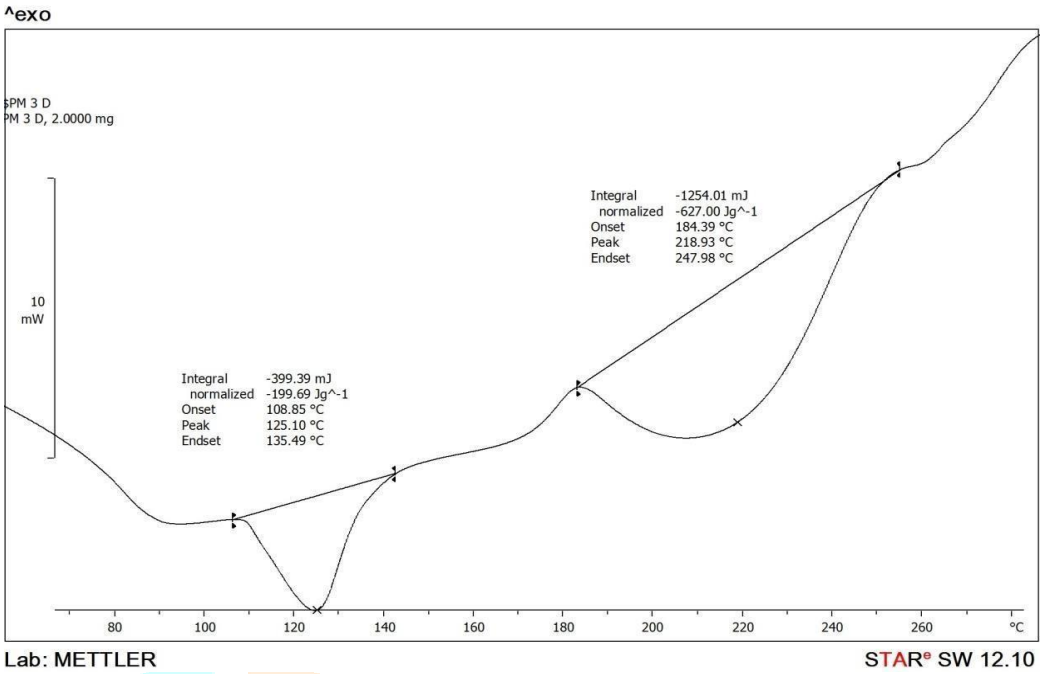

Fig No.9 :DSC Thermogram of Cefixime Trihydrate+Sodium Starch Glycolate

3.1.7 Pre-compression parameters of preliminary trial batches of Cefixime Trihydrate Dispersible tablet.

Batches	Angle of repose (θ)	Bulk density (gm/ml)	Tapped density (gm/ml)	Carr`s index (%)	Hausner`s ratio
B1	32.4	0.38	0.45	15.6	1.18
B2	28.5	0.42	0.48	12.5	1.14
B3	35.1	0.35	0.42	16.7	1.20
B4	30.2	0.40	0.46	13.0	1.15
B5	**29.8**	**0.39**	**0.44**	**11.4**	**1.13**
B6	33.9	0.36	0.43	16.3	1.19
B7	27.4	0.44	0.50	12.0	1.14
B8	31.6	0.37	0.44	15.9	1.19
B9	34.5	0.33	0.40	17.5	1.21

Table No.8: Pre-compression parameters of preliminary trial batches of Dispersible tablets of Cefixime Trihydrate.

All precompression parameters of preliminary trial batches shown satisfactory results as per their standard limits.

3.1.8 Evaluation of Post-compression parameters of preliminary trial batches of Dispersible tablets of Cefixime Trihydrate.

Batches	Thickness (mm)	Hardness (kg/cm^2)	Weight variation (mg)	Friability (%)	Drug content (%)
B1	3.16	4.5	168	0.62	88.76
B2	3.23	5.2	166	0.41	91.82
B3	3.25	3.8	169	0.81	85.82
B4	3.29	4.9	167	0.55	96.77
B5	**3.22**	**5.5**	**170**	**0.32**	**92.91**
B6	3.36	4.1	168	0.71	88.97
B7	3.15	4.7	167	0.49	89.78
B8	3.27	3.9	166	0.75	94.56
B9	3.29	5.0	168	0.46	89.73

Table No.9: Post compression parameters of preliminary trial batches of Dispersible tablets of Cefixime Trihydrate.

Batches	Diameter (mm)	Wetting Time (sec)	Disintegration Time	Dispersible Test
B1	8.09	45	57	Passes
B2	8.07	38	48	Passes
B3	8.05	52	56	Passes
B4	8.06	42	47	Passes
B5	**8.06**	**35**	**46**	**Passes**
B6	8.04	48	52	Passes

B7	8.08	40	56	Passes
B8	8.07	50	51	Passes
B9	8.05	36	43	Passes

The post compression parameters of preliminary trial batches showed satisfactory results among all batches (B1-B9)

Table No.10 : Post compression parameters of preliminary trial batches of Dispersible tablets of Cefixime Trihydrate.

3.1.9 In-vitro drug release of preliminary trial batches of Cefixime Trihydrate Dispersible tablet.

Time (Min)	B1	B2	B3	B4	B5	B6	B7	B8	B9
0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
5	45.1	52.3	38.5	48.9	58.2	42.6	50.8	47.6	55.6
10	65.2	72.1	69.8	67.8	77.6	62.8	72.6	66.8	78.8
15	87.4	88.2	91.6	90.4	94.5	88.4	93.6	91.3	96.7

Table No.11: %In Vitro Drug Release

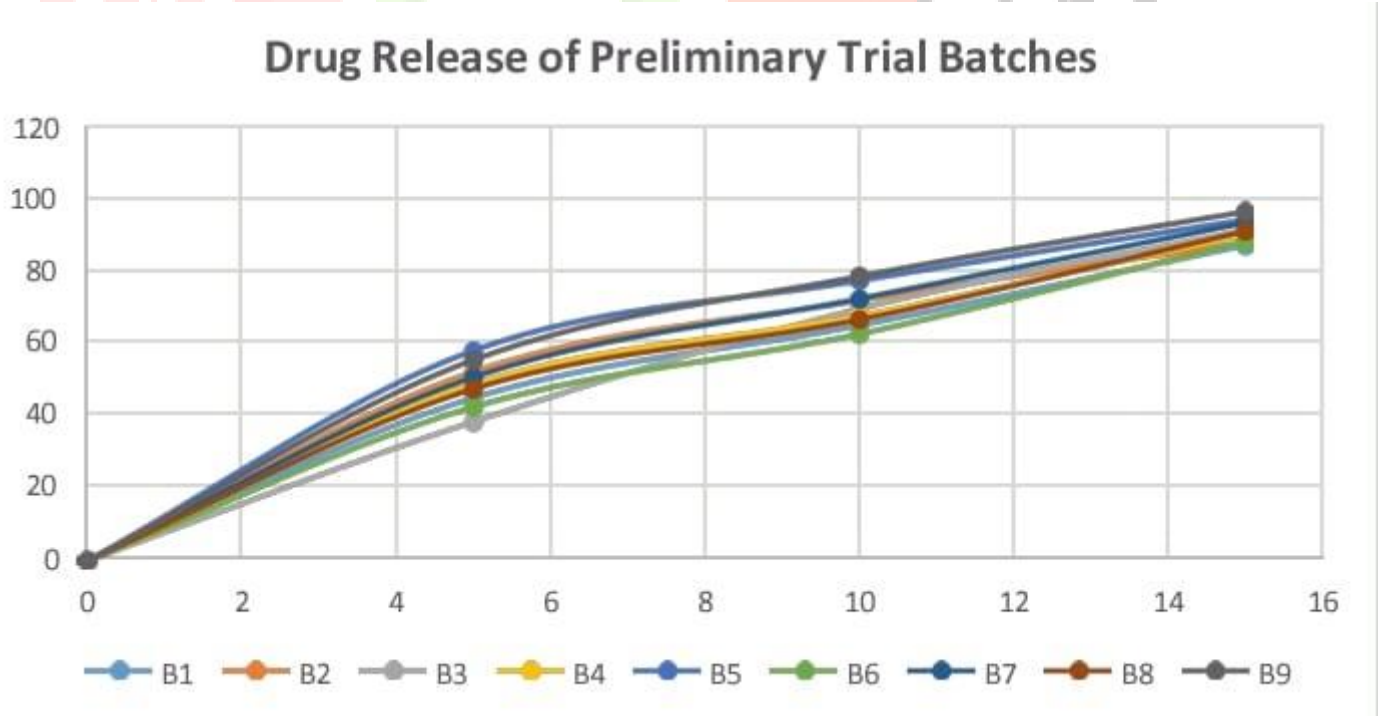

Fig No.10 : In-vitro Drug Release Profile of Preliminary Trial Batches of Dispersible Tablet of Cefixime Trihydrate (B1-B9) Batches.

3.1.10 Evaluation of batches of Dispersible Tablet of Cefixime Trihydrate generated by CCD: -

Batches	Bulk density (gm/ml)	Tapped density (gm/ml)	Carrs index (%)	Hausner`s ratio	Angle of Repose (θ)
Cef1	0.37	0.52	13.6	1.13	27.4
Cef2	0.41	0.47	17.8	1.20	32.6
Cef3	0.38	0.49	14.5	1.18	33.9
Cef4	0.36	0.53	18.6	1.14	34.9
Cef5	0.39	0.51	17.6	1.17	29.4
Cef6	0.34	0.49	16.3	1.16	27.5
Cef7	0.31	0.47	13.8	1.12	28.3
Cef8	0.35	0.49	15.6	1.10	24.2
Cef9	0.40	0.46	17.2	1.18	32.8

Table No.12 Pre-compression Parameter of Batches Generated by CCD

Batches	Hardness (kg/cm^2)	Thickness (mm)	Weight variation (mg)	Wetting time (sec)
Cef1	5.1	3.01	168	36
Cef2	5.6	3.12	167	48
Cef3	5.4	3.18	165	47
Cef4	5.7	3.13	169	52
Cef5	5.3	3.17	168	43
Cef6	5.7	3.10	167	41
Cef7	5.2	3.07	169	42

Cef8	5.9	3.09	166	39
Cef9	5.4	3.11	167	48

Table No.13: Post-compression Parameter of Batches Generated by CCD

Batches	Friability (%)	Diameter (mm)	Disintegration Time(Sec)	Drug Content (%)	Dispersible Test
Cef1	0.48	8.06	57	91.57	Passes
Cef2	0.52	8.05	55	89.56	Passes
Cef3	0.43	8.04	47	94.63	Passes
Cef4	0.39	8.03	44	88.49	Passes
Cef5	0.34	8.07	41	83.67	Passes
Cef6	0.57	8.06	39	85.43	Passes
Cef7	0.69	8.09	49	93.89	Passes
Cef8	0.67	8.04	46	97.61	Passes
Cef9	0.72	8.06	58	87.23	Passes

Table No.14: Post-compression Parameter of Batches Generated by CCD

Time (min)	% Drug Release Batches								
	Cef1	Cef2	Cef3	Cef4	Cef5	Cef6	Cef7	Cef8	Cef9
0	0	0	0	0	00	0	0	0	0

5	70.03	60.69	63.66	63.66	70.03	64.08	68.75	70.03	71.30
10	74.70	70.88	79.36	79.36	74.70	78.52	73.85	74.70	77.24
15	88.28	84.78	85.31	85.31	88.28	87.43	89.55	88.28	86.16

Table No.15: % In-vitro drug release of batches By DOE Software

4. Optimization and Data Analysis:

4.1 Optimization:

Batches	X1	X2	% Drug Release (%)	Disintegration time
Cef1	+1	+1	88.28	59
Cef2	+α	0	84.78	58
Cef3	-1	+1	85.31	57
Cef4	-α	0	85.31	54
Cef5	0	0	88.28	58
Cef6	-1	-1	87.43	55
Cef7	0	+α	89.55	57
Cef8	+1	-1	88.28	57
Cef9	0	-α	86.16	52

Table No.16: Result of optimization batches by Central Composite Design

4.2 Data Analysis:

A) %Drug Release:

Final equation in terms of coded form,

% DR= +75.96+0.9210 X1+2.34 X2.

B) **Disintegration Time (Sec):**

Final equation in terms of coded form,

DT = +56.33 +1.21 X1 + 1.38 X2

Response 1: %Drug Release

Source	**Sum Of Squares**	**df**	**Mean Squares**	**F Value**	**P Value**	
Model	128.19	3	42.73	7.28	0.0284	Significant
Residual	29.36	5	5.87	_	_	_
Total	157.55	8	_	_	_	_

Table No.17: Result of Analysis of Variance Of %Drug Release for Batches by CCD of Cefixime Trihydrate Dispersible Tablet.

Response 2: Disintegration time

Source	**Sum Of Squares**	**df**	**Mean Squares**	**F Value**	**P Value**	
Modal	56.16	5	11.23	16.35	0.0219	Significant
Residual	2.06	3	0.6871	-	-	-
Total	58.22	8	-	-	-	-

Table No.18: Result of Analysis of Variance Of Disintegration Time for Batches by CCD of Cefixime Trihydrate Dispersible Tablet.

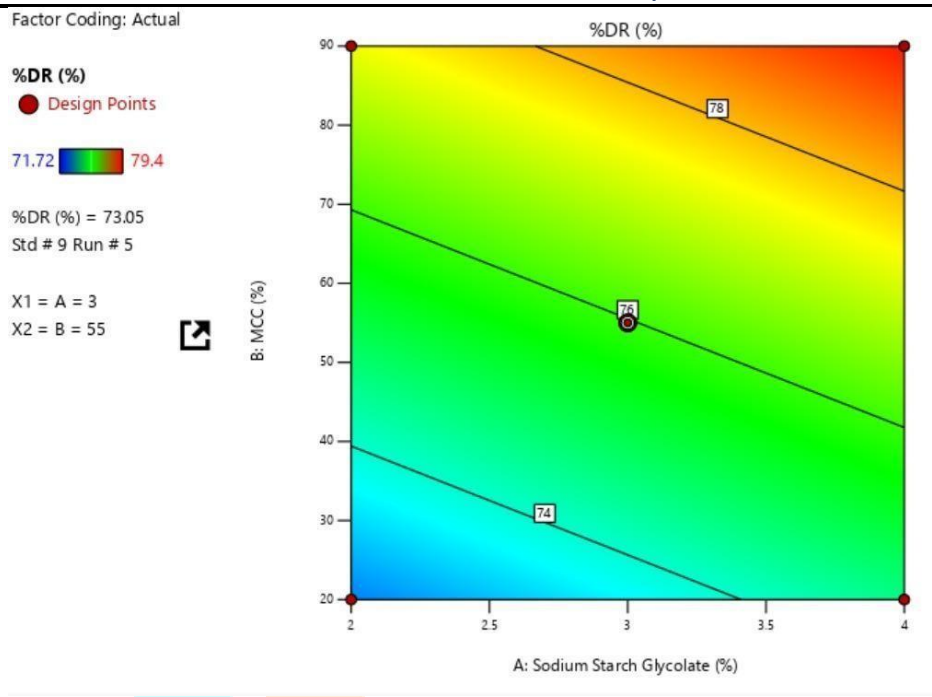

Fig No.11: Response Surface Contour Graph Showing the Influence Sodium Starch Glycolate (A1) and MCC (B1) on % Drug Release (Y1).

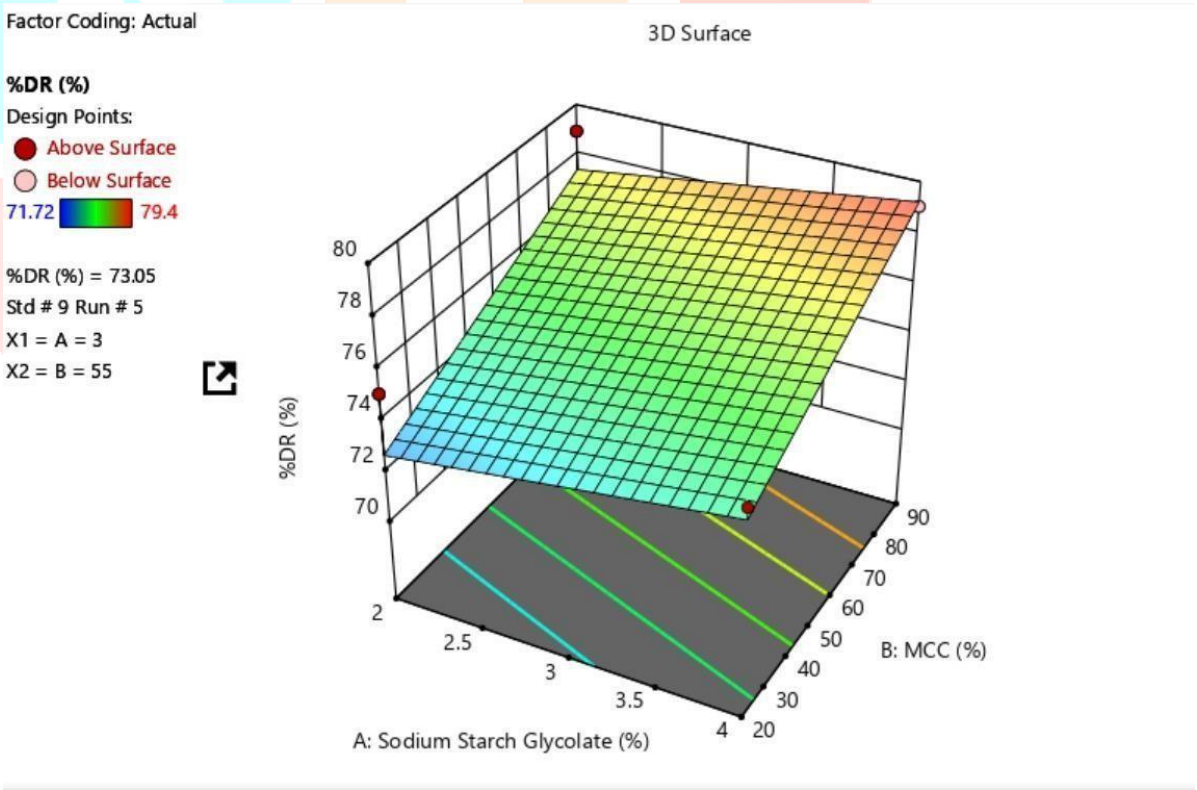

Fig No.12 3D Response Surface Graph Showing the Influence of Sodium Starch Glycolate(A1) and MCC (B1) on % Drug Release (Y1)

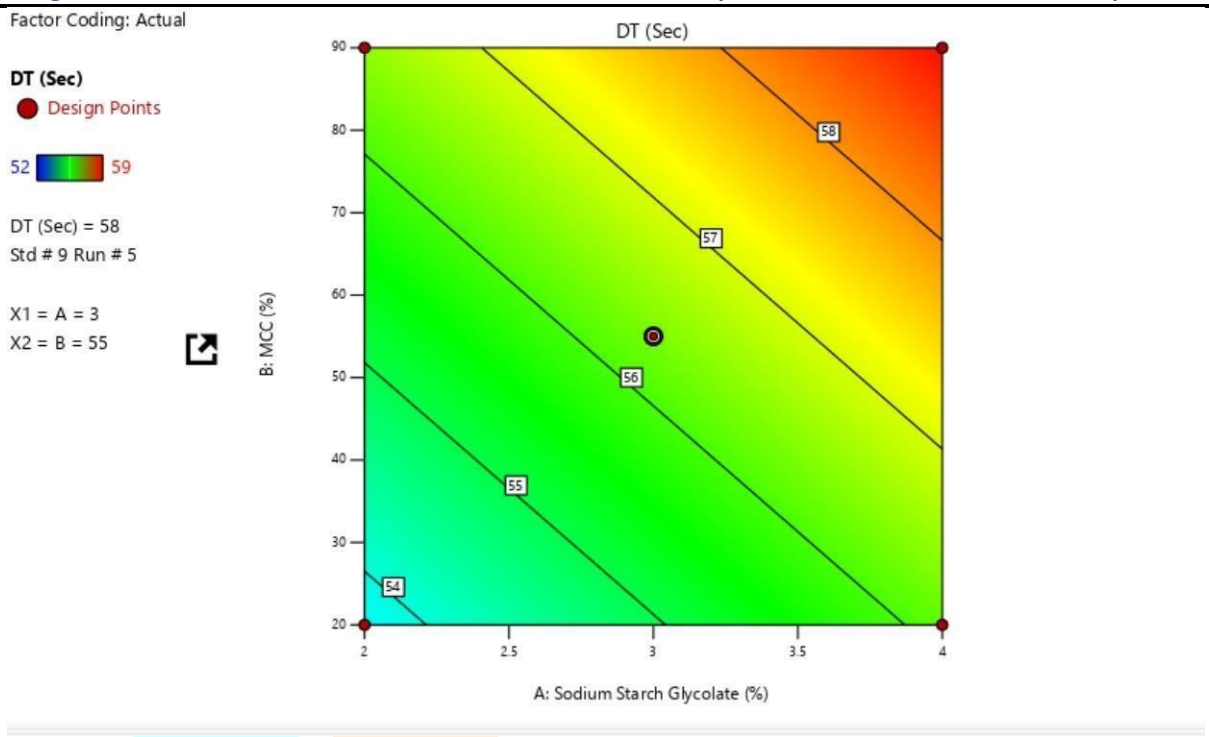

Fig No.13: Response Surface Contour Graph Showing the Influence Sodium Starch Glycolate (A1) and MCC (B1) on Disintrgration Time (Y1).

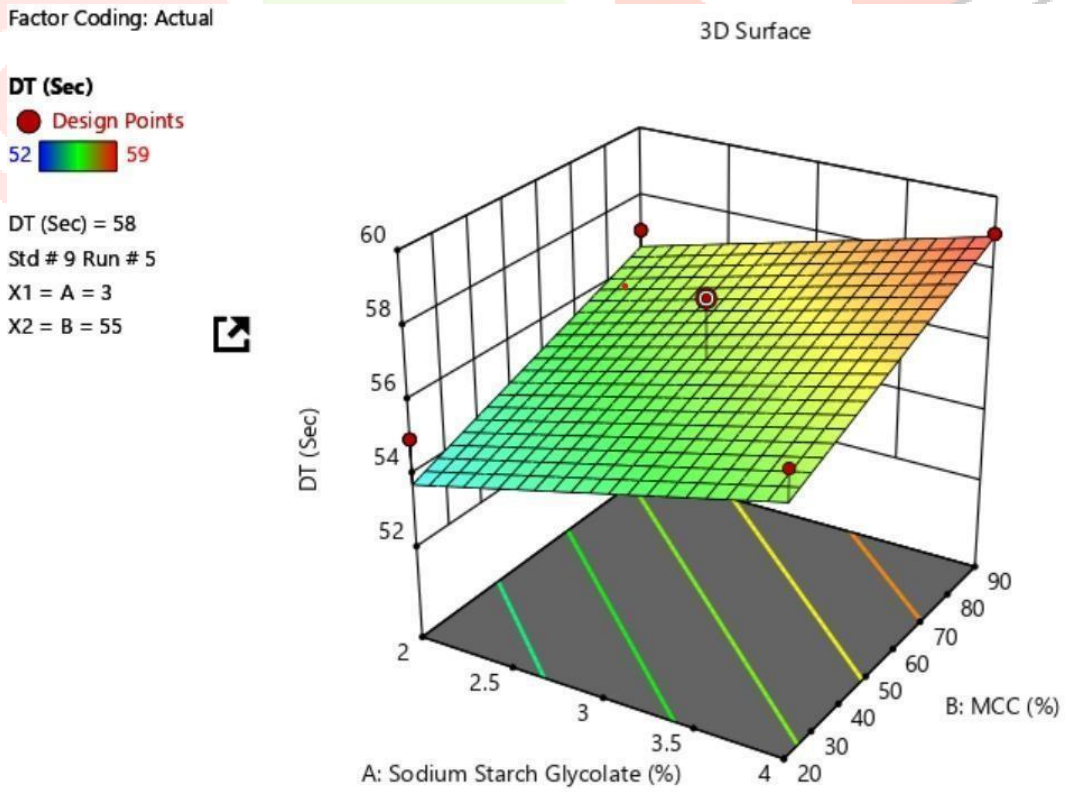

Fig No. 14: 3D Response Surface Graph Showing the Influence of Sodium Starch Glycolate(A1) and MCC (B1) on Disintegration Time (Y1)

5. Stability Study:

I) Accelerated Stability Study

Product Name:- Cefixime Trihydrate Dispersible Tablet

Parameters		Condition 40±2^{0}C/75%±5%RH		
		Initial	1 Month	2 Month
Physical	Average Weight (mg)	170	168	167
	Thickness (mm)	3.23	3.23	3.24
	Hardness (Kg/Cm^2)	5.6	5.7	5.7
	Friability (%)	0.52	0.52	0.50
	DT. Sec.	48	51	53
Chemical	% Drug Release	96.00	96.00	96.00
	Drug Content (%)	98.20	99.15	99.76

Table No.19: Accelerated Stability Data for B5 Optimized Batch of Cefixime Trihydrate Dispersible Tablet.

II) Long term Stability Study

Product Name:- Cefixime Trihydrate Dispersible Tablet

Parameters		Condition 30±2^{0}C/65%±5% RH		
		Initial	1 Month	2 Month
Physical	Average Weight (mg)	170	168	166
	Thickness (mm)	3.23	3.23	3.24
	Hardness (Kg/Cm^2)	5.5	5.6	5.6
	Friability (%)	0.52	0.54	0.55
Chemical	% Drug Release	99.39	99.10	98.67
	Drug Content (%)	98.20	99.78	101.35

Table No.20: Accelerated Stability Data for B5 Optimized Batch of Cefixime Trihydrate Dispersible Tablet.

III) Long Term Stability Study (Store in Refrigerator)

Product Name: - Cefixime Trihydrate Dispersible Tablet

Parameters		Condition 2±8^{0}C		
		Initial	1 Month	2 Month
	Average Weight (Mg)	170	168	167
Physical	Thickness (mm)	3.23	3.23	3.24
	Hardness (Kg/Cm^2)	5.23	5.23	5.24
	Friability (%)	0.50	0.52	0.52
Chemical	% Drug Release (%)	99.39	99.02	98.84
	Drug Content (%)	98.20	98.17	98.16

Table No.21: Long Term (Stored in Refrigerator) Stability Data for B5 Optimized Batch of Cefixime Trihydrate Dispersible Tablet.

6. Conclution:

- The conclusion drawn from the investigation was summarized below.
- In present study an attempt has been made to prepare sustained release tablet. Cefixime Trihydrate was used as model drug.
- Suitable analytical method based on UV Visible spectrophotometer was developed for estimation of Cefixime Trihydrate.
- The polymer selected for the sustaining the release i.e MCC, SSG is compatible with Cefixime Trihydrate confirmed by FT-IR analysis.
- Direct Compression technique was established for preparation of Dispersible tablet of Cefixime Trihydrate.
- Preliminary trail batches of Dispersible tablets of Cefixime Trihydrate were successfully prepared using MCC, SSG.
- From the results of preliminary batches helps to find out optimum concentration of release retarding polymer.
- The CCD designs were selected & can be successfully applied for formulation of factorial batches using combination of polymer.
- The pre & post compression parameter were evaluated and was found within acceptable limit.
- The selected independent variable exhibit the significant effect on dependent variables.
- The polymer used showed better control over the percentage drug release.
- Chosen experimental design was found to be very useful tool in the development of Cefixime Trihydrate and allow minimum possible number of experimental run and rapid systematic and reliable screening to identify and quantitively define the significant formulation factor influencing the drug release.
- The response surface study of formulation variable was done to get the response over whole experimental domain and this surface relationship was found useful to predict the best values for formulation composition and predicted response.
- The polymer used showed better control over the percentage drug release and **B5** Batch was found to be Optimized batch. Which shows **88.28%** drug release , which is higher among all other batches.
- The dispersibility test confirmed that the cefixime dispersible tablets rapidly disintegrated in water within the specified time. This indicates good dispersibility and suitability for pediatric and geriatric use.
- Graphical presentation of data using response surface plot helped to show relationship between the response and the independent variable.
- Thus a successful attempt was made to preparation of Dispersible Tablet of Cefixime Trihydrate.

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