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Sachet Formulation of Taste Masked Antibiotic Drug For Pediatrics Use

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ABSTRACT

The major problem of bitter drug is to restrict greatly the further development of oral preparations and clinical application of these drugs. The current study was aimed to prepare taste masked granules by using fluidized bed processor (Miniquest F). In this study ciprofloxacin HCl along with HPMC (6cps), Aspartame (6%) and flavour (0.6%) was granulated and passed through sieve no.30# to get optimized size of granules. The key variables were identified as spray rate, inlet temp, atomization air pressure & air flow in fluidized bed processor to obtain required size of granules. Air flow range for the process was decided on the basis of fluidization of API (0.7-0.9 bar) used. Ciprofloxacin being a poorly fluidized drug air flow was kept at 0.7-0.9 bar. The obtained granules were coated with different taste masking polymers vizEudragit EPO (70%) &Eudragit L100 (40%&30%). Complete taste masking was observed with Eudragit L100 (40%). The coated granules were then evaluated for its micromeritic properties, taste masking &*in-vitro* dissolution. The coated ciprofloxacin granules were filled in a sachet manually along with other excipients to make a unit dose weight of 1 gm.

Key-words: Ciprofloxacin HCl, Eudragit L100, Sachet, Fluidized bed Processor

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Introduction

Coating is one of the most industry friendly processes for taste masking .Number of bitter drugs are formulated as coated dosage forms. In coating process, core material is coated with appropriate materials which prevents rapid release of the drug in saliva, but allow release of drug in the gastrointestinal tract where the drug is expected to be absorbed. Coating not only masks the taste but also improves patient compliance by improving aesthetic quality. Polymers have been exclusively used as coating material, either's alone or in combination as single or multi-layer coat in the taste masking of bitter drug .combination of pH independent water insoluble polymer such as include hydroxypropyl cellulose, ethyl cellulose, polyvinyl acetate and water soluble polymer such as cellulose acetate butyrate, polyvinylpyrollidone, hydroxyethyl cellulose have been used to attain a balance between the taste masking and *in vitro* release. Hydrophobic polymers have been popularly used for coating bitter medicaments to achieve taste masking.(1)

Methods used for polymer coating:

Fluidized bed/spray coating: In fluidized bed coating, powders as fine as fifty micrometer fluidized in an expansion chamber by means of heated, high velocity air and the drug particles coated with a coating solution as a spray through the nozzle.

Taste masking is defined as perceived reduction of undesirable taste that would otherwise exist. Taste of drug is a potential tool for governing patient compliance and quality of treatment in Pediatrics patient. Taste can be separated into five primary taste qualities sweet, sour, salty, bitter and umami or savory.(2)

Two approaches are commonly utilized to overcome bad taste of drug.

1. Reduction of drug solubility of in saliva where balance between reduced solubility and bioavailability must be achieved
2. second approach is to alter to ability of the drug to interact with taste receptor

Taste masking Technologies:

Fluid Bed Technology

1. Technique used for taste masking –coating tech.
2. Instrument used for coating – fluidized bed processor
3. Top spray technique
4. Bottom spray technique(3)

Fig:1.1- MiniQuest F (ACG pharma)

Material and methods:

Material

Ciprofloxacin was provided from ACG Pharma Tech.Pvt.Ltd, Shirwal, Eudragit L100 was provided from Evonik Pvt Ltd, Mumbai.

Characterization of Ciprofloxacin hydrochloride:

I. Physical properties:

The ciprofloxacin hydrochloride powder was examined for physical properties.

III. Solubility:

The Ciprofloxacin hydrochloride solubility study was carried in distilled water, 0.1N HCl, Methanol and ethanol.

III. Melting point:
The melting point of Ciprofloxacin hydrochloride was determined by melting point apparatus.

IV. Calibration Curve of ciprofloxacin:

Calibration curve in 0.1N HCl
A stock solution of Ciprofloxacin HCl (100 µg /ml) was prepared by dissolving 10 mg of drug in 30 ml of methanol and final volume was made upto 100 ml with the distilled water and further dilutions were made by 0.1 N HCl in the concentration range of 2 to 16 µg /ml. The UV absorbances of these solutions were measured by UV-Visible spectrophotometer at λmax.

Calibration curve in phosphate buffer pH 6.8
A stock solution of Ciprofloxacin HCl (100 µg /ml) was prepared by dissolving 10 mg of drug in 30 ml of methanol and final volume was made upto 100 ml with the distilled water and further dilutions were made by phosphate buffer pH 6.8 in the concentration range of 2 to 16 µg /ml. The UV absorbances of these solutions were measured by UV-Visible spectrophotometer at λmax.

V. Fourier Transform infrared (FTIR) spectroscopy:
IR absorption spectrum of ciprofloxacin HCl was recorded by potassium bromide dispersion technique using FTIR spectrophotometer (Make – Shimadzu) wherein 1-2mg of drug sample and Potassium bromide were mixed uniformly and the powder blend was placed in sample holder and an IR spectrum was recorded.

VI. Scanning electron microscope:
Scanning electron microscopy (SEM) images of dried Ciprofloxacin hydrochloride were recorded by using a (Brucker Instruments) microscope after the chromium sputter coating on dried samples.

VII. Determination of threshold bitterness concentration:
Various concentrations (10-30 µg/ml) of Ciprofloxacin HCl were prepared in phosphate buffer pH 6.8. Mouth was rinsed with water and then, l0 ml of the most dilute solution was tasted by swirling it in the mouth mainly near the base of the tongue for 30 s. If the bitter sensation was no longer felt in the mouth after 30 s, the solution was spat out and waited for 1 min to ascertain whether this is due to delayed sensitivity. Then rinse with safe drinking water. The next highest concentration should not be tasted until at least 10 min have passed. The threshold bitter concentration was the lowest concentration at which a material continues to provoke a bitter sensation after 30 sec.[4,5]

Formulation of sachet:
Formulation of sachet was carried out in three step process. In first step granulation of ciprofloxacin was done and in second step coating of ciprofloxacin granules was done by using taste masking polymer. In third step the final sachet formulation was done. First two steps were performed in Miniquest fluidized bed processor.

1. Granulation of ciprofloxacin HCL:

In these process granulation of ciprofloxacin was done by using (60%) ciprofloxacin and (0.9%) aerosil in dry mix and in binder 30% ciprofloxacin , HPMC(6 cps), Aspartame (6%), and vanilla flavour (0.6%) was used .In these trial air flow, spray rate of binder and inlet temperature and atomization air was optimized. The ciprofloxacin and aerosil in dry mix before granulation was sifted through mesh size 60#.Binder was sifted through mesh size 100. Then finally sieve analysis was done of that coated granules to obtained desire size granules.[6,7]

Table: 1.1 Granulation Batches with different binder

Material	Batches (% concentration)									
	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Ciprofloxacin(gm)	60	60	60	60	60	60	60	60	60	60
CCS(gm)	2	2	2	2	2	-	-	-	-	-
Lactose(gm)	11	-	-	11	11	11	13	-	-	-
MCC(gm)	-	11	-	-	-	-	-	-	-	-
Aerosil(gm)	-	0.2	-	0.2	-	-	-	0.9	0.9	0.9

Starch(gm)	-	-	11	-	-	-	-	-	-	-
Aspartame*	-	-	-	-	-	-	-	-	4%	6%
Vanilla flavor %	-	-	-	-	-	-	-	-	0.5%	0.6%
HPMC(6CPS)*	-	-	-	5%	7%	7%	7%	5%	5%	5%
Ciprofloxacin(gm)	-	-	-	-	-	-	-	30	30	30
PVPK-30*	5%	5%	5%	-	-	-	-	-	-	-
Ethanol (gm)	-	-	-	-	-	-	-	30	30	30

* indicates dissolved in binder solution %w/v in water.

Selection of batch for granules formulation:

Table 1.2: Ciprofloxacin granules batches

Sr. no.	Batch code	Ciprofloxacin (gm)	Aerosil (gm)	HPMC (6Cps)	Vanilla flavour	Aspartame (gm)	Ciprofloxacin (gm)	Ethanol (gm)
1.	B9	60	0.9	5%	0.5%	4	30	30
2.	B10	60	0.9	5%	0.6%	6	30	30

Coating of ciprofloxacin granules:

In these step the granules are coated with different taste masking polymers to obtain taste masked granules. The taste masking polymer selection was done on the basis of taste masking property of polymer. In these trials the different taste masking polymers i.eEudragit EPO, Eudragit L100, Surelease:opadry combination, and ethyl cellulose dispersion in different concentration was used. Sieve analysis was done for that taste masked granules to obtain desired size granules. Taste masking analysis of coated granules was done.[8,9]

Table 1.3 : Coating trials with different taste masking polymer

Material	Trials					
	T1	T2(40%wg)	T3(45%wg)	T4(70%wg)	T5(30%wg)	T6(40%wg)
Ciprofloxacin granules(gm)	100	100	100	100	50	100
Ethyl cellulose(gm)	20.47	-	-	-	-	-
HPMC(5Cps) (gm)	6.83	-	-	-	-	-
TEC(gm)	2.7	-	-	-	1.5	4
MDC(gm)	352.5	-	-	-	-	-
IPA(gm)	117.5	-	-	154	79.35	211.6
Surelease(gm)80%	-	128	144	-	-	-
Opadry(gm) 20%	-	8	11.25	-	-	-
Eudragit EPO(gm)	-	-	-	60	-	-
Talc(gm)	-	-	-	6	7.5	20
Water(gm)	-	120	144	-	5.28	14.4
Eudragit L100(gm)	-	-	-	-	6	16
Acetone(gm)	-	-	-	-	50.28	134

SELECTION OF BATCH FOR TASTE MASKED GRANULES FORMULATION:

Sr.No.	Batch code	Ciprofloxacin Granules(gm)	Eudragit EPO(gm)	Eudragit L100(gm)	Talc (gm)	IPA (gm)	TEC (gm)	Acetone (gm)	Water (gm)
1.	T4	100	160	-	6	154	-	-	-
2.	T5(30%)	50	-	6	7.5	79.54	1.5	50.28	5.28
3.	T6(40%)	100	-	16	20	211.6	4	134	14.4

Formulation of sachet:

In these step, sachet formulation was done by using different excipients as per following formula (Table1.4) along with coated taste masked granules. For sachet formulation all ingredient were passed through 40# sieve. All the ingredients were mixed thoroughly. The sachet which is formed is pour into teaspoon and add sufficient water before use.[10,11]

Table 1.4 : List of excipients used for formulation of sachet

Ingredient	Weight (Mg)
Ciprofloxacin coated granules	435
HPC	75

Flavors(Strawberry)	490
Color(Red)	0.052

Each sachet is equivalent to 0.250 gm of ciprofloxacin.

EVALUATION OF CIPROFLOXACIN GRANULES:

The granules were evaluated for its flow property

Bulk density & tapped density : were calculated by taking the granules in measuring cylinder and tapping for 100 times manually and using the formula,

Bulk density = mass/ bulk volume

Tapped density= mass / tapped volume

Particle size determination (PSD): Done by using #30 to #80 sieves, so as to determine retention on each sieve and in turn particle size.

SEM analysis: Taste masked granules were sputtered with chromium then observed with scanning electron microscopy at voltage of 15 KV.

***In-vitro* dissolution studies:**

Table 1.5: Dissolution test details for dissolution of Ciprofloxacin granules (USP XXVI)

Sr No.	Specification	Standard value
1	Apparatus	USP dissolution apparatus II
2	Speed	100rpm
3	Volume of media	900 ml
4	Dissolution media used	0.1N HCl
5	Stirrer	Paddle type
6	Aliquot taken at each time interval of 5 minutes	5 ml
7	Temperature	37 ± 0.5º C.

Evaluation of taste masked ciprofloxacin granules:

Evaluation of ciprofloxacin taste masked granules were evaluated for bulk density, tapped density and particle size:

***In vitro* evaluation of taste Masked granules :**

An accurately weighed (250 mg drug equivalent) granules and 10 ml of pH 6.8 phosphate buffer (0.1 M) was taken in series of volumetric flask and stirred at 50 rpm. The stirring was stopped at different time intervals such as 0, 10, 30, 60, and 120 sec, and after completion of the respective intervals, dispersion was immediately filtered and the concentration of Ciprofloxacin hydrochloride in filtrate was determined by analysing the content at 268 nm using UV- visible spectrophotometer.Time for the granule to achieve drug concentration corresponding to threshold bitterness in 10 ml phosphate buffer is recorded.[12,13]

SEM analysis:

Taste masked granules were sputtered with chromium then observed with scanning electron microscopy at voltage of 15 KV.

Dissolution testing:

In-vitro dissolution studies:

Table 1.5: Dissolution test details for dissolution of taste masked(T5,T6) Ciprofloxacin granules (USP XXVI)

Sr No.	Specification	Standard value
1	Apparatus	USP dissolution apparatus I
2	Speed	100rpm
3	Volume of media	900 ml
4	Dissolution media used	0.1N HCl for 2 hrs and Phosphate buffer ph 6.8 for 5.5 hrs
5	Stirrer	Basket type
6	Aliquot taken at each time interval of 30 minutes	5 ml
7	Temperature	37 ± 0.5º C.

Evaluation of sachet:
Evaluation of ciprofloxacin HCl sachet
The sachet were evaluated for bulk density, tapped density and particle size

***In vitro* evaluation of Sachet:**
An accurately weighed (250 mg drug equivalent) sachet mixture and 10 ml of pH 6.8 phosphate buffer (0.1 M) was taken in series of volumetric flask and stirred at 50 rpm. The stirring was stopped at different time intervals such as 0, 10, 30, 60, and 120 sec, and after completion of the respective intervals, dispersion was immediately filtered and the concentration of Ciprofloxacin hydrochloride in filtrate was determined by analysing the content at 268 nm using UV- visible spectrophotometer. Time for the granule to achieve drug concentration corresponding to threshold bitterness in 10 ml phosphate buffer is recorded.[14,15]

Dissolution testing:
In-vitro dissolution studies:

Table 1.6: Dissolution test details for dissolution of Sachet (USP XXVI)[16,17]

Sr No.	Specification	Standard value
1	Apparatus	USP dissolution apparatus I
2	Speed	100rpm
3	Volume of media	900 ml
4	Dissolution media used	0.1N HCl for 2 hrs. Phosphate buffer pH 6.8 for 5.5 hrs
5	Stirrer	Basket type
6	Aliquot taken at each time interval of 30 minutes	5 ml
7	Temperature	37 ± 0.5º C.

Result and Discussion:

Preformulation study
Identification and characterization of drug
Description:
Ciprofloxacin hydrochloride was white, crystalline powder.

Melting point :
The melting point of drugs is reported in following table:

Sr.No.	Drug	Observed Melting point range	Standard melting point range
1)	Ciprofloxacin Hydrochloride	306-315°C	311-320°C

Table 1.7 : Melting point details of drug

FT- Infra red spectroscopy:
The IR spectra of drug andEudragit were recorded. Spectra are given in figure 1.2&1.3.
Obtained interpretations of peak is given in table no.(1.8).

Drug's Solubility
Ciprofloxacin hydrochloride is sparingly soluble in water, it is soluble in 0.1 N HCl, It is practically insoluble in acetone, It is soluble in ethanol and methanol.[19,20]

Analytical method development:
UV spectrophotometric method for Ciprofloxacin hydrochloride:

Selection of solvent:
After considering drug solubility, stability and cost of various solvents 0.1 N HCl and pH 6.8 phosphate buffer were selected as solvents to solubilise Ciprofloxacin HCl for analytical purpose, as this was to be used as a media for dissolution studies.

Study of spectra and selection of analytical wavelengths:

UV spectrum for Ciprofloxacin HCl in different solvents was carried out for selection of wavelength. Absorption maxima in different solvents are shown in Table 1.9 For phosphate buffer pH 6.8 analytical wavelength selected was 268 nm.[20,21]

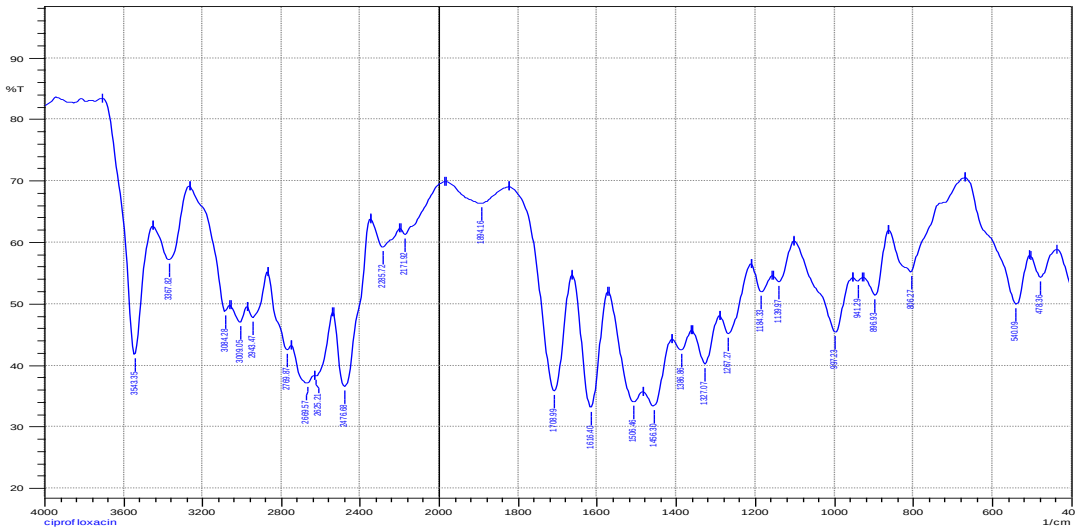


Fig. No.1.2- IR spectrum of Ciprofloxacin Hydrochloride

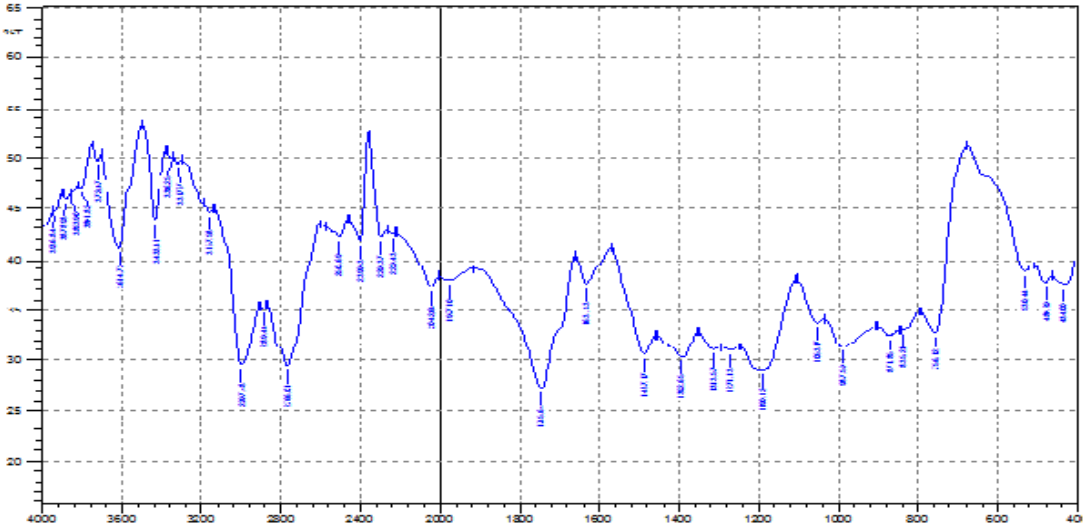


Fig no 1.3. IR Spectrum of Eudragit L 100

Table1.8: Interpretation of FTIR spectrum of pure CiprfloxacinHCl, and Eudragit L 100

Material	Vibrations			
Ciprfloxacin HCL	3009.05 (3095-aromatic CH stretching)	3367.82(3300-OH carboxylioc acid)	1139.97(1128-C=O stretching of COOH acid)	1327.07(1215-aromatic C-N stretching)
Eudragit L 100	1745.64(1750 C=O OF ester)	1487.17 (1454-CH3-O bending	3356.25(3330 O-H carboxyloic acid)	1190.12(1100 C-O ester)

Calibration of ciprofloxacin:

Calibration curve in 0.1N HCl

The calibration curve for Ciprofloxacin was done by obtaining the linearity between the concentrations of Ciprofloxacin is 2 µg/ml to16 µg/ml

Table 1.9.1: Concentration and absorbance values for Ciprofloxacin HCl in 0.1 N HCl.

Sr. No.	Concentration (µg/ml)	Absorbance at 273.40 nm
1	2	0.266
2	4	0.453
3	6	0.682
4	8	0.887
5	10	1.019
6	12	1.216
7	14	1.399

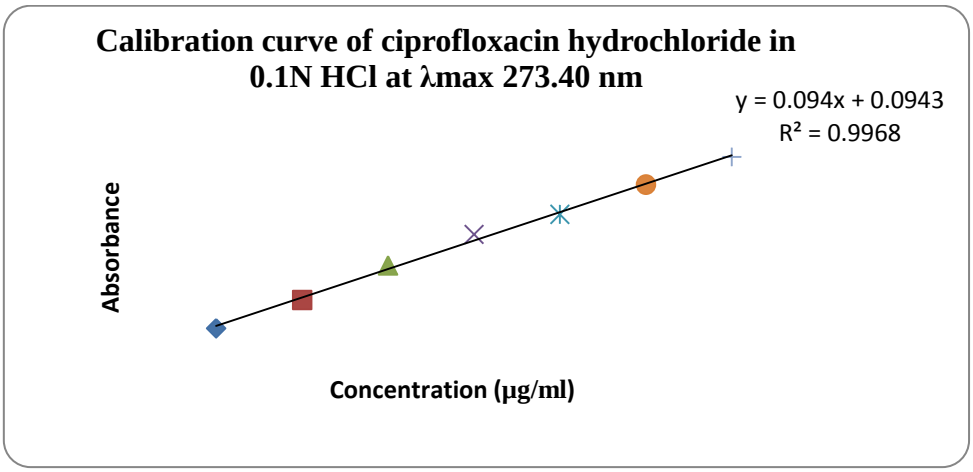


Fig no. 1.4 Calibration curve for ciprofloxacin HCl in 0.1N HCl at λmax 273.40nm.

Calibration curve in phosphate buffer Ph 6.8

The calibration curve of pure Ciprofloxacin was done by obtaining the linearity between the concentrations of Ciprofloxacin is2µg/ml to 16 µg/ml.

Table:1.9.1 Concentration and absorbance values for Ciprofloxacin HCl in phosphate buffer pH 6.8

Sr. No	Concentration (µg/ml)	Absorbance at 268 nm
1	2	0.246
2	4	0.449
3	6	0.720
4	8	0.837
5	10	0.888
6	12	1.188
7	14	1.275

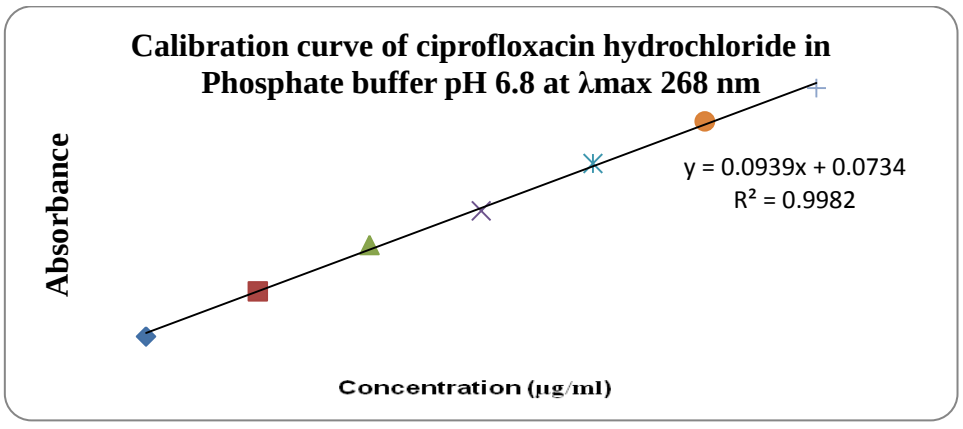


Fig no.1.5 Calibration curve for ciprofloxacin Hcl in phosphate buffer pH 6.8 at λmax 268nm

Scanning electron microscope:

Scanning electron microscopy (SEM) images of dried Ciprofloxacin hydrochloride was recorded by using a microscope after the chromium sputter coating on dried samples. Shape, morphology and particle size of granules are an important consideration in the drug coating particularly in coating process.From the SEM pictures of figure 1.6 Ciprofloxacin HCl drug substances with particle size less than 20 µm exists as rod and needle like crystals.[22,23]

Determination of threshold bitterness concentration:

Concentration of drug solution(µg/ml)	Bitter intensity rating
10	Bitterness
20	Bitterness
30	Extremly bitterness

Table 1.9.2: Bitter intensity of aqueous solution of ciprofloxacin HCl

The threshold bitterness concentration was found to be 10 µg/ml

Physical Evaluation of Granules:

Micromeritic properties	Batches									
	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
Bulk density(g/cm3)	0.48	0.28	0.31	0.43	0.42	0.41	0.44	0.48	0.46	0.41
Tapped density (g/cm3)	0.50	0.31	0.47	0.46	0.46	0.43	0.47	0.51	0.53	0.45
PSD										
Sieve no.(#)										
30	29	0	5	0	0	0	0	0	2	2
40	10	0	50	3	2	1	0	5	11	14
60	9	6	41	14	15	14	34	17	24	24
80	1	22	2	7	6	6	15	10	7	5
Pan	5	39	3	25	44	39	3	17	16	7

SEM analysis:

Shape, morphology and particle size of granules are an important consideration in the drug coating particularly in coating process. From the SEM pictures of figure 1.5. Uncoated Ciprofloxacin Hcl drug substances with paricle size less than 20 µm exists as rod and needle like crystals.[24,25]

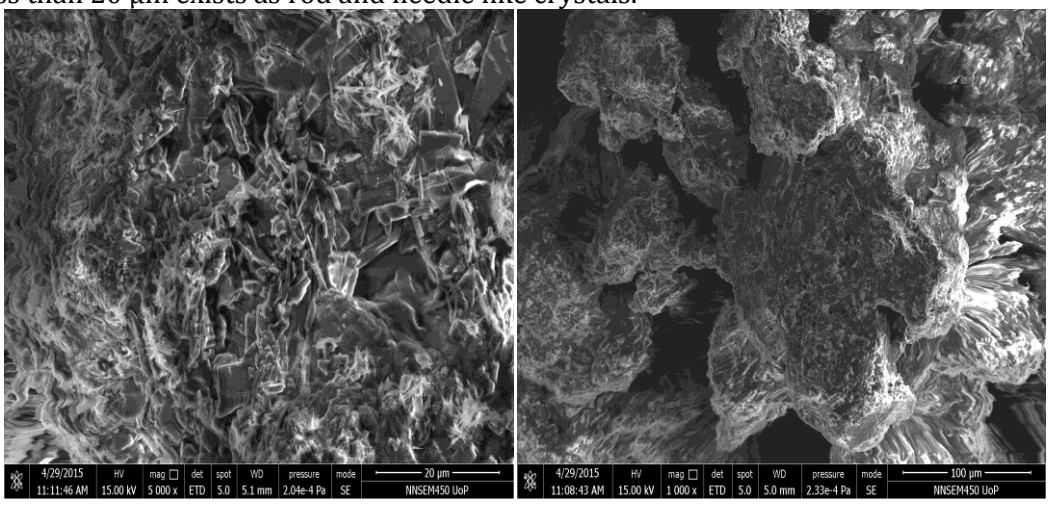


Fig.no.1.5 SEM pictures of uncoated Ciprofloxacin HCL with different particle size

Dissolution test details for dissolution of Ciprofloxacin granules:

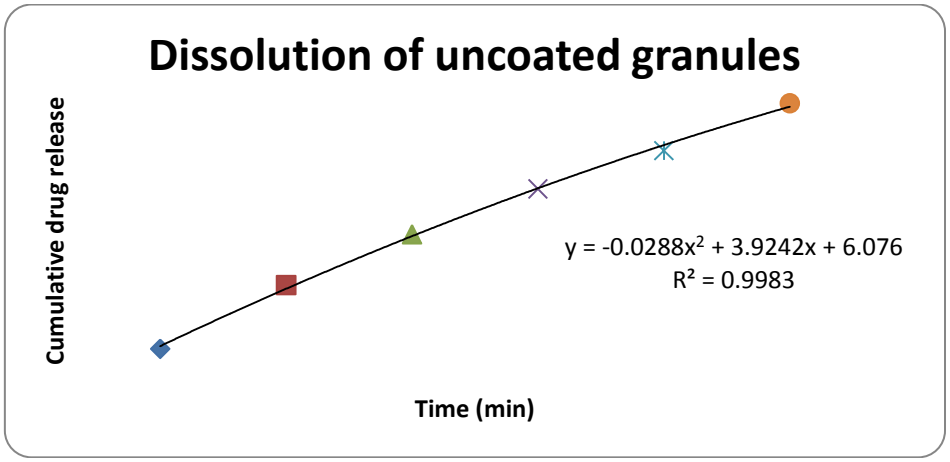


Fig no.1.6: Dissolution profile of uncoated granules of ciprofloxacin HCl.

Evaluation of Coating granules:

Physical Evaluation of taste masked granule:

Table : 1.9.3 Physical evaluation parameters of taste masked granules

Micromeritic properties	Trials		
	T4	T5	T6
Bulk density(g/cm3)	0.52	0.46	0.55
Tapped density (g/cm3)	0.57	0.84	0.65
PSD			
Sieve no.(#)			
30	0	3	0
40	18	18	4.3
60	58	27	28
80	13	4	12
Pan	7	2	7

SEM analysis:

Shape, morphology and particle size of granules are an important consideration in the drug coating particularly in coating process. From the SEM pictures of figure (1.7) 40% Eudragit L100,Eudragit EPO coated Ciprofloxacin Hcl drug substances shows surface characteristics. It was shows that due to taste masking polymer coating plane surface was formed no rod or needle like structure formed.So it was present that ciprofloxacin Hcl masked sufficiently by using Eudragit L 100 polymer as compared to Eudragit EPO.

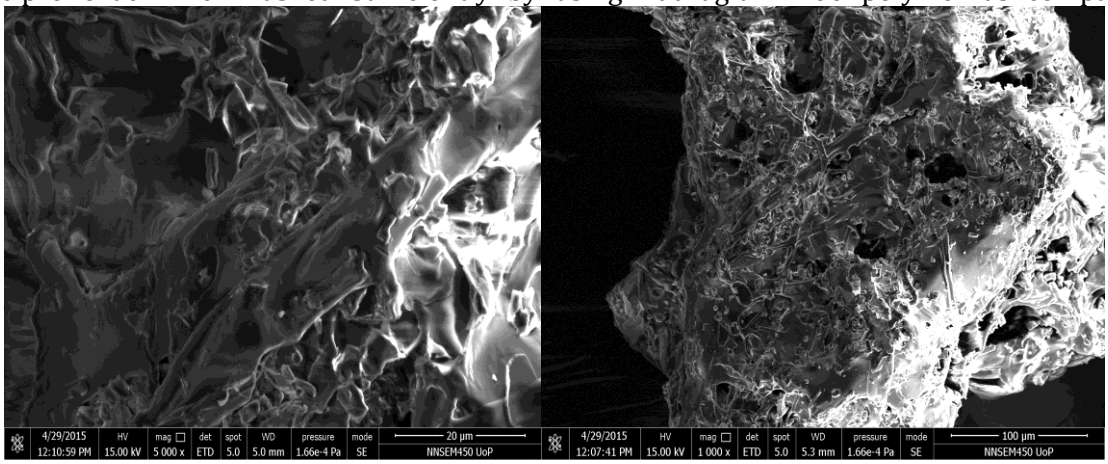


Fig.no. 1.7. SEM pictures of 70% wt of Eudragit EPO coated Ciprofloxacin HCl Granule with different particle size

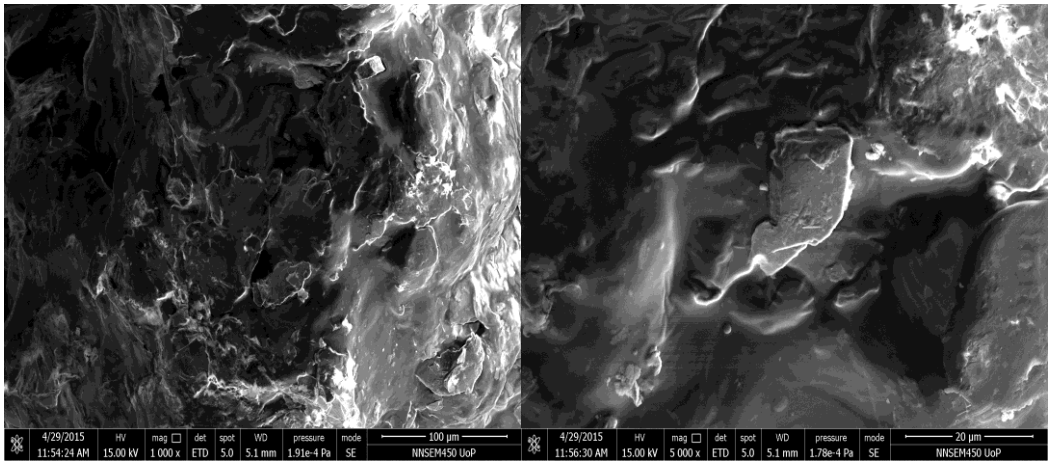


Fig.1.8: SEM pictures of 40% wt of Eudragit L100 coated Ciprofloxacin HCl Granule with different particle size

Taste evaluation:

In –vitro taste evaluation: The following results of table no1.9.5 shows the concentration of ciprofloxacin HCl released from taste masked pellets at different time intervals.[26,27]

Table : 1.9.4 Determination of threshold bitterness concentration

Trials	**Concentrations in µg/ml**						
	0 sec	10 sec	30sec	60 sec	120 sec	180 sec	240 sec
T6	0	1.78	4.6	5.8	7.68	8.75	9.56
T5	0	2.21	5.7	6.4	7.96	8.98	9.87
T4	0	3.41	5.9	6.7	7.97	8.95	9.65

Table 1.9.5 :*In vitro* and evaluation of taste of the prepared granules

Trials	**In-vitro taste evaluation**
Ciprofloxacin HCL Pure	< 1 min
T4	< 1 min
T5	< 2 min
T6	>4 min

In vitro dissolution:

Dissolution of taste masked granules was done using USP I (Basket) apparatus. Dissolution conditions were set asDissolution media : 900ml of 0.1 N HCl and 900 ml phosphate buffer pH 6.8

Dissolution condition: 100 rpm for 2 hours in 0.1 N HCl and 5 hrs 30 min in phosphate buffer pH 6.8 at 37.5°C temperature. The sample was withdrawn at the time intervals of 15,30,60,120 min. from 0.1 N HCL analyzed by UV spectrophotometer (Shimadzu). After 2 hours 900 ml of phosphate buffer 6.8 was replaced and used to carry out dissolution with the basket at 100 rpm. The withdrawn samples were filtered immediately through filter paper and diluted with same solvent. The absorbance was taken at about 273.4 nm for 0.1 N HCl and 268 nm for phosphate buffer pH 6.8 and cumulative drug release was calculated.[28,29]

Table : 1.9.5 In –vitro release profile of taste masked granules

Time(min)	% Cumulative drug release	
	T5	T6
30	7.6	5.2
60	16.28	13.65
90	25.36	20.17
120	35.45	30.54
150	50.21	45.69
180	58.96	53.25
210	67.36	62.35

240	75.36	68.95
270	78.92	73.65
300	80.25	75.28
330	84.65	77.14
360	86.36	80.25
390	89.62	83.25
420	90.26	85.56
450	95.75	87.96

Fig.1.9- Comparison Dissolution profile of trial no T5 and T6

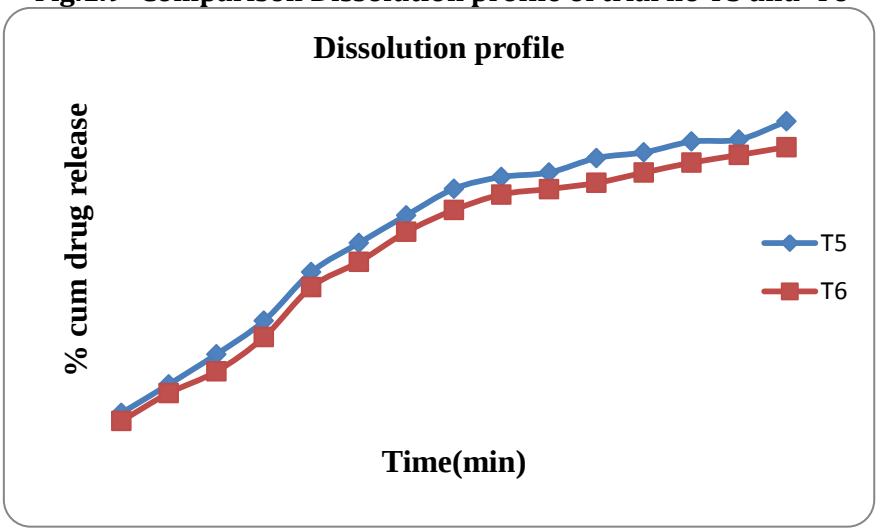
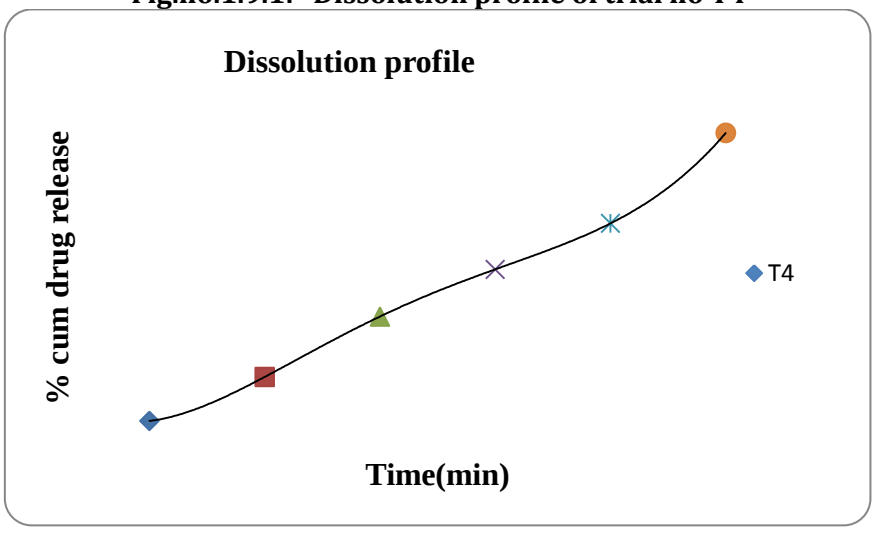


Table : 1.9.6: In –vitro release profile of taste masked granules

Time(min)	Cumulative drug relese(%)
	T4
5	9.86
10	15.63
15	23.56
20	29.75
25	35.78
30	47.65

Fig.no.1.9.1: Dissolution profile of trial no T4



From the above dissolution profile and taste masking analysis of trials T4,T5 and T6 it was concluded that proper taste masking with effective drug release was found to be in T6 formulation.

Evaluation of sachet:

Physical evaluation of sachet:

Micromeritic properties	Bulk density(g/cm3)	Tapped density (g/cm3)	PSD Mesh size#				
			30	40	60	80	Pan
Sachet	0.66	0.79	0	0.8	27.6	4.7	15

Table: 1.9.7 Determination of threshold bitterness concentration

Formulation	Concentrations in µg/ml						
	0 sec	10sec.	30 sec	60sec	120sec	180sec	240sec
sachet	0	1.25	3.5	5.2	9.26	11.75	13.65

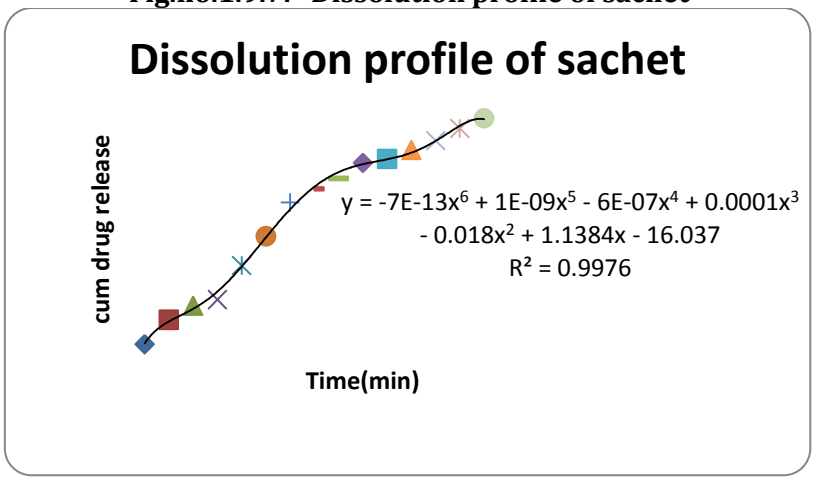
Table 1.9.8: *In vitro* and evaluation of taste of the sachet

Formulation	In-vitro taste evaluation
sachet	> 4min

Table: 1.9.9: In –vitro release profile of sachet

Time(min)	% Cumulative drug release
30	5.2
60	13.65
90	18.56
120	20.65
150	32.41
180	42.56
210	54.23
240	58.96
270	62.53
300	67.95
330	69.32
360	72.45
390	75.63
420	79.85
450	83.41

Fig.no.1.9.7: Dissolution profile of sachet



Conclusion:

Formulation of dosage form involves considerable amount of trials to optimize the taste masking polymer blend ratio (40%, 50%, 70%, 75:25, 80:20) among the Eudragit L100, Eudragit EPO and Surelease:opadry which were exploited for their taste masking properties. Polymer blend of 40%, 30% and 70% for Eudragit L100 and Eudragit EPO were found to be optimum. All formulations were evaluated for flow properties, Particle size analysis and drug release the values of which were found satisfactory. Effect of Taste masking polymer was studied on the optimized formulation which showed significant impact on taste masking.Morphological studies were carried out with Scanning electron microscopy (SEM) which showed Granule had good coating. These taste masked granules along with HPC as stabilizer, flavour,and colour mixed uniformlyand formulate a sachet for Pediatricss.These taste masked sachet are evaluated for it's flow properties, Particle size analysis,and taste masking analysis along with drug release.Satisfactory results were found.Taste masked granules of ciprofloxacin HCl were successfully developed into sachet formulation for better patient compliance

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