Formulations of Ciprofloxacin HCl Pellets 22%

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ABSTRACT

The present study aimed at developing a stable and effective taste masked formulations of Ciprofloxacin HCL Pellets-22% containing the drug Ciprofloxacin hydrochloride. Since Ciprofloxacin hydrochloride is water soluble drug, variations in the integration and taste were observed while changing the pH .Ciprofloxacin HCl taste masked pharmaceutical composition pellets- 22% that includes Inorganic carrier and sweetener along with flavour, these methods attempt to restrict the bitter taste sensed by the patient.

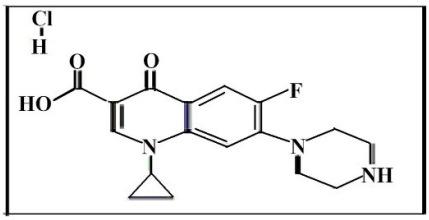
Keywords: Ciprofloxacin; Taste masking; Antibacterial agent, Anti Biotic, urinary track infection.

INTRODUCTION

Activity of Ciprofloxacin hydrochloride is killing the bacteria which is caused for infection and acts as a antibacterial agent. It's functionality is antibiotic used for treatment of bacterial infections for instance urinary track infections (UTIs) for this ciprofloxacin HCL is uncomplicated whereas remaining antibiotics are complicated and not suitable for urinary track infections (UTIs). Chemically ciprofloxacin Hydrochloride is known as 1-cyclopropyl-6-fluoro-4-oxo-7-(piperazin-1-yl)-1,4-dihydroquinoline-3-carboxylic acid hydrochloride. Ciprofloxacin hydrochloride taste masked formulations dosage forms containing drug ciprofloxacin hydrochloride .It is a water soluble drug, distinctions in the integrations and taste were observed with altering pH. Ciprofloxacin hydrochloride taste masked pharmaceutical formulations includes inorganic carrier, sweeteners along with diluents, binders, flavour to restrict the bitter taste sensed by the patient. It is reported in Drug and Tablet USP, BP, of the pharmacopoeias available. Ciprofloxacin HCl taste masked

formulations dosage forms pellets 22% containing drug ciprofloxacin HCl, tasted masked material heavy magnesium oxide along with excipients and it' s dissolution profile is discussed in this article.

STRUCTURE OF CIPROFLOXACIN HYDROCHLORIDE



EXPERIMENTAL.

Process used Ingredient: Ciprofloxacin Hydrochloride 220grams, heavy magnesium oxide 220 grams,30-40# size sugar 80 grams, Starch-200grams,sugar-280 grams, Methyl paraben sodium 2grams, Propyl paraben sodium 0.5grams, Total 1002.5grams.

PROCUREMENT OFACTIVE PHARMACEUTICAL INGREDIENTS AND EXCIPIENTS

*Ciprofloxacin hydrochloride procured from CRYSTAL PHARMA IP grade, Heavy magnesium oxide procured from Kakatiya Industries Pvt.Ltd. 30-40# sugar, Pharma grade sugar procured from Dhanraj sugar Pvt.Ltd. starch procured from Ocean Biotech Pvt Ltd. Hyderabad, methyl paraben sodium and propyl paraben sodium- IP procured from Aster industries.

FORMULATION DEVELOPMENT OF CIPROFLOXACIN HYDROCHLORIDE PELLETS-22%

EXCIPIENTS COMPATIBILITY STUDY:

During development of the Ciprofloxacin hydrochloride pellets following compatibility studies were performed.

1.0. Change in appearance when mixed with the excipients in dry and wet form.

2.0. Change in assay of Ciprofloxacin hydrochloride when mixed with the excipients and stored at room temperature for 12 months

3.0. The resulted showed that the excipients have no physical and chemical effects on the formulations and color remains unchanged. Assay of Ciprofloxacin hydrochloride showed no changed.

These facts were confirmed during stability studies of the product at room temperature. Storage at 25℃ for 36 months) and during the accelerated stability studies at 40℃ for 6 months.

From this it was concluded that the excipients are compatible with API Ciprofloxacin hydrochloride

The manufacturing process development

Literature Survey:

All available Literatures such as patents, journal articles, research papers, Chemical abstracts were thoroughly screened and process described under was thoroughly studied.

Manufacturing at R&D Batches

R&D batches:

Step-1 : Initially drug and heavy Magnesium oxide were taken 1: 1 Ratio (220 gram Ciprofloxacin hydrochloride and 220 grams heavy magnesium oxide) and make a slurry with appropriate demineralized water using stirrer and dried using hot air oven(make :Thermo labs) .After drying make a fine powder .Bitter taste of Ciprofloxacin hydrochloride was masked.

Step-2: Strach-200 grams and sugar 280 grams sieved with 80 mesh and blended using blender it is used as diluent.

Step-3; Take Core 30#40 sugar 80 grams and loaded with taste masked Ciprofloxacin hydrochloride drug and starch , sugar blended material using coating pan capacity five kg.

One kg Ciprofloxacin hydrochloride drug pellets were prepared. And these were tested for assay and dissolution.

Requirements:
Instrument:

High Performance Liquid Chromatograph (Shimadzu lC-2010), Dissolution test apparatus (Electro labs), pH Meter (Ana lab) ,Analytical weighing balance(Centurion scientific).

Reagents:

Hydrochloric acid (AR grade), Acetonitrile (AR grade), Ethanol (AR grade), Dibasic sodium phosphate (AR grade), Sodium hydroxide (AR grade), Monobasic sodium phosphate (AR grade), Sodium borate (AR grade), Purified water.

Conditions:

Apparatus	: USP-23 method-2 (paddle)
Medium	: 0.01 N Hydrochloric acid,
Volume	: 900 mL
RPM	: 50
Time	: 30 minutes

Preparation of 0.01N HCl (Hydrochloric acid):

Take 0.85 ml of Hydrochloric acid and make up to 1000 ml water

Standard Preparation:

Weigh accurately 20 mg of Ciprofloxacin HCl Working Standard into a 100 mL volumetric flask, dissolve and dilute with 0.01N Hydrochloric acid to volume and mix. Transfer 5 mL of this solution into a 100 mL volumetric flask and dilute with 0. 01N Hydrochloric acid to volume and mix.

Test Preparation:

Weigh and transfer pellets equivalent to 20 mg of ciprofloxacin HCl in each of the 6 dissolution Bowels, containing 900 ml of 0.01N Hydrochloric acid which has been equilibrated to the temperature of 37±0.5°C. Immediately start the Apparatus and run for specified interval. After completion of specified interval immediately collect the sample from the zone mid-way and filter. Transfer 5 mL of this solution into a 10 mL volumetric flask and dilute with dissolution medium to volume and mix.

Procedure:

Measure the absorbance's of standard and sample at 276 nm using 0.01N HCl as a blank. Calculate the amount of Ciprofloxacin HCl dissolved in 0.01N HCl.

Calculation:

$$\text{Drug release} = \frac{\text{Spl Abs}}{} \times \frac{\text{Std wt}}{} \times \frac{5}{} \times \frac{900}{} \times \frac{10}{} \times \frac{100}{} \times \text{Std purity}$$

Std Abs	100	100	Spl wt	5	Assay

Determination of Assay:

Solution A:
0.025 M phosphoric acid. Adjust with triethylamine to a pH of 2.0±0.1.

Preparation of Solution B:
Use filtered and degas the mixer of Acetonitrile and solution A in the ratio of 13:87.

Chromatographic Parameters:

Column : 4.6 mm x 25-cm, 5µ packing L1 or Equivalent

Wave length : 276 nm

Flow rate : 1.5 mL /minute

Injection volume : 10 µL

Blank solution:

Inject the diluent solution and record the chromatogram. Examine the chromatogram for any extraneous peaks. There should be no interference from the blank at the retention time of analyte peak.

Standard Preparation:

0.2mg/ml of ciprofloxacin HCl working standard in solution B

Test Preparation:

Transfer the pellets in to a 500 mL volumetric flask, add 400ml solution B, and sonicate for about 20mi. Dilute with solution B to volume and mix. Filter the solution through a membrane filter 0.45 µ filter. Prepare the equivalent of 0.2 mg/ml of ciprofloxacin form the filtrate with solution B.

System Suitability:

% of RSD of standard solution is not more than 2.0%, Theoretical plates is not less than 2000,
Tailing factor is not less than 0.8 and not more than 2.0.

Procedure:

Separately inject equal volume of the standard preparation and the Test preparation into the liquid chromatograph, record the chromatograms, and measure the peak area responses. Calculate the quantity, in % of Ciprofloxacin HCl by the given formula.

Calculation:

$$\text{Result} = (r_u/r_s) \times Cs/Cu) \times 100$$

Which Cs is the concentration in mg/ml of Ciprofloxacin HCl in the Standard preparation,

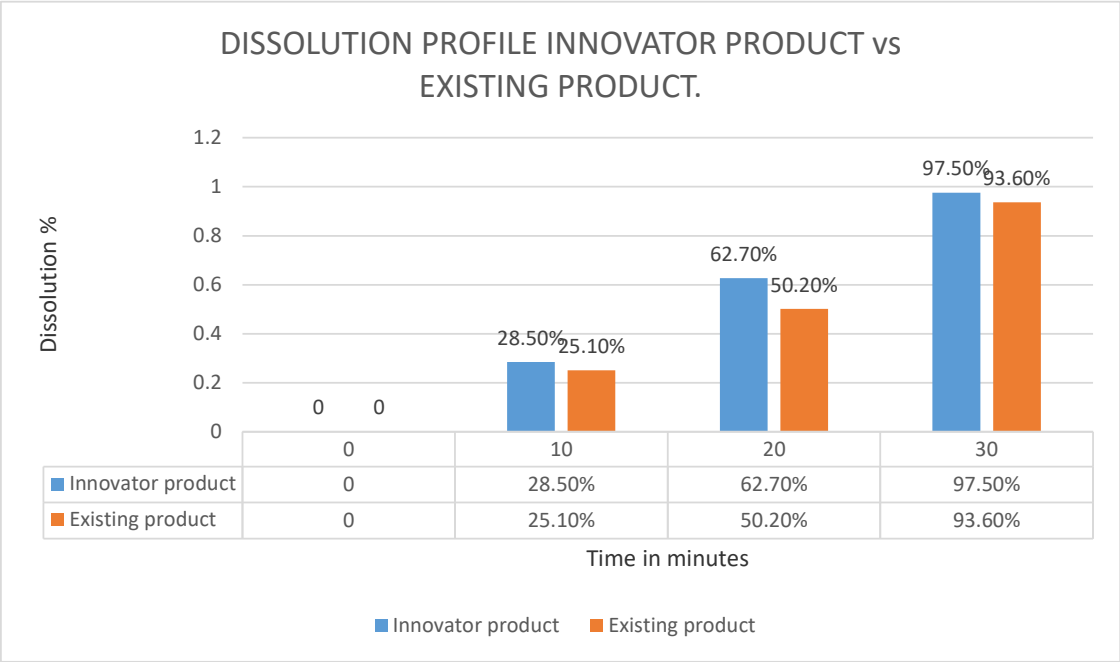
Cu is the concentration in mg/ml of Ciprofloxacin HCl in the sample preparation,

And r_u, rs - are the Ciprofloxacin HCl peak responses obtained from the test solution and standard Solution respectively**.**

RESULTS AND DISCUSSION:

Compare the dissolution profile and assay of the of the innovator product and existing product-Merix laboratories innovator product dissolution profile is good comparatively existing product manufactured by Merix laboratories. Results were given below table-1

S.NO	Time interval Minutes	Innovator product	Existing product(MERIX) Laboratories
1	0	0	0
2	10	28.5%	25.1%
3	20	62.7%	50.2%
4	30	97.5%	93.6%



From the experimental dissolution profile results, the proposed formulated method for Ciprofloxacin hydrochloride pellets is use full for the commercial manufacturing of ciprofloxacin hydrochloride pellets.

REFERENCES:

1. P.V. Kumar and N.K. Jain. Suppression of Agglomeration of Ciprofloxacin-Loaded Human (2007)

2. M Isabel Pascual-Reguera, Gertrudis Pérez Parras and Antonio Molina Díaz, Micro Chemical Journal, 77, Issue 1, 79-84 (May 2004)

3. J. Kreuter. J. Drug Target, 3, 171 (1995).Analytical Sciences, .20, 6, 967 (2004).

4. Esimone C.O, Nwafor S.V, Okali C. O, Chah K.F, Uzuegbu D.B, Chibuindu C, Eche M.A, Adikwu M.U. , Am. Jour. Ther, 9(4), 275-280 (2002).

5. Kathleen Dillen, J O Vandervoort, Guy Van den Mooter, Loes Verheyden and Annick Ludwig, International Journal of Pharmaceutics, 275, 2, 171-187 (2004).

6. Jeremy P.K Tan., Q Wang, and Kam C.Tam., Journal of Controlled Release, 116, 1, 1-27 (2006)