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Formulation & Evaluation of Mouth Dissolving Tablet of Levocetrizine Dihydrochloride

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Abstract: ***The purpose of the present study was formulation & evaluation of mouth dissolving tablet of levocetrizine dihydrochloride. Orodispersible tablets are those that dissolve or disintegrate quickly in the oral cavity, resulting in solution or suspension. This is a third generation H1 receptor antagonist used as antihistaminic and anti allergic drug. The low oral bioavailability of levocetirizine dihydrochloride due to its high first pass metabolism, led to the formulation development of fast dissolving tablets that disintegrate with-in seconds in oral cavity. The tablet was prepared using Crospovidone as super disintegrant and the optimized its concentration. The Veegum was used to mask the bitter taste of drug. Direct compression method was used for the preparation of mouth dissolving tablet. Total nine formulations were prepared, to formulate a optimized mouth dissolving tablet. three formulations F1, F 2, and F9 were prepared using drug and Veegum 1:1, 1:5 and 1:2 in ratio respectively. The taste evaluation results showed that F9 has the good promising taste masking properties for bitterness in drug. The remaining five formulations F3, F4, F5, F6, F7 and F8 were prepared for the optimization of concentration of superdisintegrant (Crospovidone) by taking it in 2.0%, 3.0%, 3.5%, 4.0%, 4.5%,and 5.0% concentration respectively and the concentration of Veegum was same in all five formulations. The percent levocetirizine dihydrochloride released form mouth dissolving tablet in formulation F3 was found to be 6.28 ± 0.93 (minimum) and F9 was found to be 91.86 ± 1.52 (maximum) after 10 minutes. At the same time formulation F8 released 91.57 ± 0.74 which is very closed to formulation F9 and be said almost equal. So it was concluded that F8 was the optimized formulation contained drug and veegum in 1:2 ratio, pearlitol and M.C.C in 1:3 ratio and 5.0 % crospovidone with all other excipients which are common for all formulation.***

Keywords: Orodispersible tablet, Antihistaminic agents, Superdisintegrants, Allergic rhinitis

1. Introduction

Allergic Rhinitis

Rhinitis is defined as inflammation of the membranes lining the nose, and is characterized by nasal congestion, rhinorrhea, sneezing, itching of the nose and/or postnasal drainage.

Levocetirizine is the active R-enantiomer of Cetirizine and represents a new second-generation histamine H_1 antagonist, which exhibits an excellent benefit/risk ratio in the treatment of Allergic Rhinitis and Urticaria. It has a high affinity and selectivity for H_1 receptors. It shows superior H_1 receptor binding affinity over its racemate, Cetirizine. Levocetirizine has a favorable pharmacokinetic profile; it is rapidly and extensively absorbed, minimally metabolized, and has a lower volume of distribution (V_d) than some other second-generation antihistamines.(Day J.H.et al.2004, Molimard M.et.al 2004). It reduces the treatment cost of allergic rhinitis and improves the health related quality of life.(KD Tripathi.2009) It has also been found to be effective in relieving symptoms of seasonal and perennial allergic rhinitis, including nasal congestion, and its side effects are minor.Gandon J.M.et.al 2002)

Mouth dissolving tablets are also called as fast dissolving tablets, melt-in mouth tablets, orodispersible tablets, rapimelts, porous tablets, quick dissolving etc. Mouth dissolving tablets are those when put on tongue, disintegrate instantaneously releasing the drug which dissolves or disperses in the saliva. Faster the drug into solution, quicker the absorption and onset of clinical effect.(Induwade N.H.et.al 2002)

MDDDS are a new generation of formulations which combine the advantages of both liquid and conventional tablet formulations and at the same time, offer added advantages over both traditional dosage forms. They provide the convenience of a tablet formulation and also allow the ease of swallowing provided by a liquid formulation. MDDDS offer the luxury of much more accurate dosing than the primary alternative, oral liquids. This segment of formulation is especially designed for dysphasic, geriatric, paediatric, bed-ridden, travelling and psychotic patients who are unable to swallow or refuse to swallow conventional oral formulations. They do not require water for administration, thus are good alternative for travellers and for bed ridden patients. They simply vanish when placed in the mouth, so cannot be hidden in mouth by psychotic patients. These products not only increase the patient‟s compliance but also fetch large revenues to manufacturers due to line extension of the existing formulation. In the recent past, several new advanced technologies have been introduced for the formulation of mouth dissolving tablets (MDTs) with very interesting features, like extremely low disintegration time, exceptional taste masking ability, pleasant mouth feel and sugar free tablets for diabetic patients. The technologies utilized for fabrication of MDDDS include lyophilisation, moulding, direct compression, cotton candy process, spray drying, sublimation, mass extrusion, nanonization and quick dissolve film formation. These techniques are based on the principles of increasing porosity and/or addition of super disintegrants and water soluble excipients in the tablets. The formulations prepared from these techniques differ from each other on the basis of the factors like mechanical strength of final product, drug and dosage form stability, mouth feel, taste, rate of dissolution of the formulation in

saliva, rate of absorption from saliva and overall drug bioavailability. (Shukla Det.al 2009)

2. Material and Method

Table 1: List of materials and their source used in the formulation of levocetirizine dihydrochloride MTDs.

Material	*Source*
Levocetrizine dihydrochloride	Sheetal Pharma, Mumbai
Veegum	Sheetal Pharma, Mumbai
Crosprovidone	Signet Chemicals corporation Ltd.
Pearlitol	HEBEI Huaxu Pharmaceuticals Co. Ltd, China.
Micro crystalline cellulose	Albert David Ltd, Kolkata.
Aspartame	SD Fine Chemicals Pvt. Ltd, Mumbai
Colloidal silicon dioxide	Cabot Sun Mark Ltd.
Talc	Signet Chemicals corporation Ltd.
Magnesium stearate	Albert David Ltd, Kolkata.
Flavour Pepermint Orange	Givavdan India Private Ltd.
Flavour Pepermint Orange	Givavdan India Private Ltd.
Colour Sun Set Yellow	Narmada Colours Pvt. Ltd, Gujarat

Pre-formulation study

Pre-formulation is a branch of pharmaceutical sciences that utilizes biopharmaceutical principles in the determination of physicochemical properties of a drug substance. The goal of pre-formulation studies is to choose the correct form of the substance, evaluate its physical properties and generate a thorough understanding of the material's stability under various conditions, leading to the optimal drug delivery system. The pre-formulation study focuses on the physiochemical parameters that could affect the development of efficacious dosage form.

Melting Point

Melting point of levocetrizine dihydrochloride was determined by using digital auto melting point apparatus. A capillary fused at one end was taken and a small quantity of levocetrizine dihydrochloride was pushed in through the free end of capillary. The capillary was then placed in digital melting point apparatus. The temperature at which the drug started to melt was noted.

Solubility

The solubility of levocetrizine dihydrochloride was determined in different solvent systems. Solubility was estimated by keeping the amount of drug constant (1.0g.) and gradually increasing the amount of solvent (ml). The solubility of drug was determined in various solvents like distilled water, methanol, ethanol, hydrochloric acid, acetone, and methylene chloride.

Drug-excipients interaction studies using FTIR

Levocetrizine dihydrochloride and various important individual excipients are mixed in 1:10 ratio separately and those blends were allowed to stand at 40 ± 2°C & 75 ± 5% RH for 3 months in stability chamber. Then all of these blends were subjected to FTIR spectroscopy to observe any significant change from the drug and excipients FTIR spectrum.

Preparation of Solution and Calibration Curve

Preparation of Buffer (pH 6.8)

24.5 ml of 0.2 M dibasic sodium phosphate and 0.2 M 25.5 ml of monobasic sodium phosphate was placed in 100 ml volumetric flask, and the add distilled water q.s. to make 100 ml.

Preparation of Stock solution

Levocetrizine dihydrochloride (5 mg) was weighed accurately and dissolved in 5 ml of methanol in a 100 ml of volumetric flask and volume was made up to with the buffer (pH 6.8). 10 ml of this solution was diluted to 100 ml with buffer (pH 6.8) to obtain a stock solution of 50µg/ml.

Preparation of calibration curve

The stock solution was further diluted in phosphate Buffer (pH 6.8). Serial dilutions were carried out to get different concentration 4, 8, 12, 16, 20 and 24µg/ml. The absorbance of these solutions was measured at 230.1 nm against a blank buffer (pH 6.8). The calibration curve was plotted between concentration and absorbance.

Formulation and preparation mouth dissolving tablets

Preparation of mouth dissolving tablet of taste masked levocetirizine dihydrochloride using direct compression method

Direct compression is the simplest and least expensive tableting process. The formulation ingredients of mouth dissolving tablets were selected as such they supposed to show high compressibility. So mouth dissolving tablet were prepared by using the direct compression method as follows:-

Procedure

- API and excipients used in MDTs formulation were sifted through sieves no. 80, prior to mixing (M.C.C and Mg. stearate using # 40 sieves).
- Then excipients were properly mixed with help of blender.
- The powder blend was compressed on a 12 station mini single rotary press tableting machine using 8.0 mm round flat punch.
- Each compressed tablet should be of weight 175.0 mg ±7.5 %.

Table 2: Contents for formulation of levocetirizine dihydrochloride tablet

S. no	Ingredients	F1	F2	F3	F4	F5	F6	F7	F8	F9
1	Levocetirizine dihydrochloride	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25
2	Veegum	5.25	7.88	10.5	10.5	10.5	10.5	10.5	10.5	10.5
3	Crospovidone	3.5	3.5	3.5	5.25	6.14	7	7.87	8.76	9.64
4	Pearlitol(sd 200)	63.5	83.9	91.32	90	89.31	88.68	88.02	87.35	86.69
5	M.C.C(ph-102)	63.5	41.5	30.43	30	29.8	29.57	29.36	29.14	28.92

6	Aspartame	10	10	10	10	10	10	10	10	10
7	Capsoroma Orange	8	8	8	8	8	8	8	8	8
8	Capsoroma Peppermint	4	4	4	4	4	4	4	4	4
9	Silicone Dioxide	3	3	3	3	3	3	3	3	3
10	Talcum	4	4	4	4	4	4	4	4	4
11	Mg. stearate	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
12	Sunset yellow	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	Total	175	175	175	175	175	175	175	175	175

***Amount of ingredients in Milligrams (mg.)**

F1- Levocetirizine Dihydrochloride : Veegum in 1:1.0, P: MCC in 1:1 and Cp – 2.0%
F2- Levocetirizine Dihydrochloride : Veegum in 1:1.5, P: MCC in 1:2 and Cp – 2.0%
F3- Levocetirizine Dihydrochloride : Veegum in 1:2.0, P: MCC in 1:3 and Cp – 2.0%
F4- Levocetirizine Dihydrochloride : Veegum in 1:2.0,P: MCC in 1:3 and Cp – 3.0%
F5- Levocetirizine Dihydrochloride : Veegum in 1:2.0,P: MCC in 1:3 and Cp – 3.5%
F6- Levocetirizine Dihydrochloride : Veegum in 1:2.0,P: MCC in 1:3 and Cp – 4.0%
F7- Levocetirizine Dihydrochloride : Veegum in 1:2.0,P: MCC in 1:3 and Cp – 4.5%
F8- Levocetirizine Dihydrochloride : Veegum in 1:2.0,P: MCC in 1:3 and Cp – 5.0%
F9- Levocetirizine Dihydrochloride : Veegum in 1:2.0,P: MCC in 1:3 and Cp – 5.5%
***P - Pearlitol, MCC - Micro crystalline cellulose and Cp – Crospovidone**

Evaluation of levocetirizine dihydrochloride mouth Dissolving tablet

Pre-compression evaluation of formulation blend

Bulk Density (D_b):
It is the ratio of total mass of powder to the bulk volume of powder. It was measured by pouring the weight powder (passed through standard sieve # 20) into a measuring cylinder and initial volume was noted. This initial volume is called the bulk volume. From this the bulk density is calculated according to the formula mentioned below. It is expressed in g/ml and is given by,

Tapped Density (D_t):
It is the ratio of total mass of the powder to the tapped volume of the powder. Volume was measured after tapping the powder for 100 times. From this the tapped density is calculated according to the formula mentioned below. It is expressed in g/ml and is given by,

Compressibility index
A simple test has been developed to evaluate to flow ability of a powder by comparing the bulk density and tapped density of granules and the rate at which it packed down. The compressibility of the powdered blend was determined by Carr"s compressibility index.

Angle of repose
The angle of repose of the powdered blend was determined by the funnel method. The accurately weighed granules were taken in a funnel. The height of the funnel was adjusted in such a way that the tip of the funnel just touched the apex of the heap of the granules. The granules were allowed to flow through the funnel freely onto the surface. The diameter of the powder cone was measured using the following equitation.

3. Result and Discussion

Preformulation Studies

Physical Characterization and organoleptic properties of Drug:
The drug Levocetrizine dihydrochloride was evaluated for its physical properties and it was observed that it is a free flowing white or almost white powder with unpleasant odour. The physical properties were found to be similar as given in literature I.P.

Table 3: Physical Characterization and organoleptic properties of Drug

Drug	State	Colour	Odour	Taste
Levocetrizine dihydrochloride	Free flowing crystalline powder	White	Unpleasant	Irritating

Solubility of drug
Solubility of Levocetirizine dihydrochloride was estimated in different solvents which were described as follow in table.

Table 4: Solubility of Levocetrizine dihydrochloride in different solvent

S. No.	Solvents	Quantity of Solvent (ml) used to solublize 1 gm Drug	Parameter Solubility
1.	Distilled water	8	Freely soluble
2.	Methanol	17	Soluble
3.	Ethanol	26	Soluble
4.	Hydrochloric acid	21	Soluble
5.	Accetone	>10000	Practically insoluble
6.	Methylene chloride	>10000	Practically insoluble

Levocetrizine Dihydrochloride was freely soluble in water, soluble in ethanol, methanol and Hydrochloric acid & insoluble in methylene chloride and acetone.

Melting point
The melting point of Levocetrizine dihydrochloride sample was found to be 218.5°C.

Preparation of calibration curve of Levocetrizine dihydrochloride.

Table 5: Concentration and Absorbance of Levocetrizine dihydrochloride in the Phosphate buffer (pH 6.8)

S. No	Concentration (µg/ml)	Absorbance
1	0	0
2	4	0.121
3	8	0.258
4	12	0.375
5	16	0.490
6	20	0.623
7	24	0.742

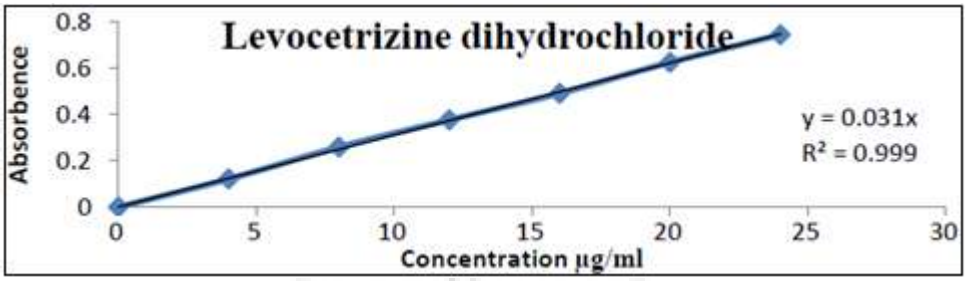

Figure 1: Calibration Curve of Levocetrizine dihydrochloride in Phosphate buffer (pH 6.8)

FTIR spectra of drug

FTIR spectra of Levocetirizine Dihydrochloride standard and drug sample were shown in Fig.

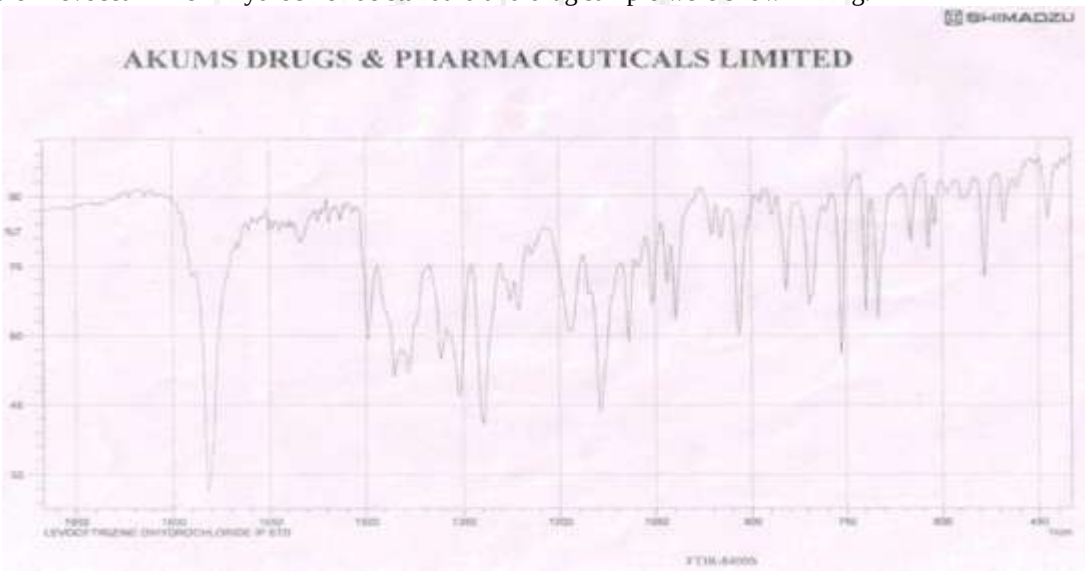

Figure 2: FTIR spectra of levocetirizine dihydrochloride(std)

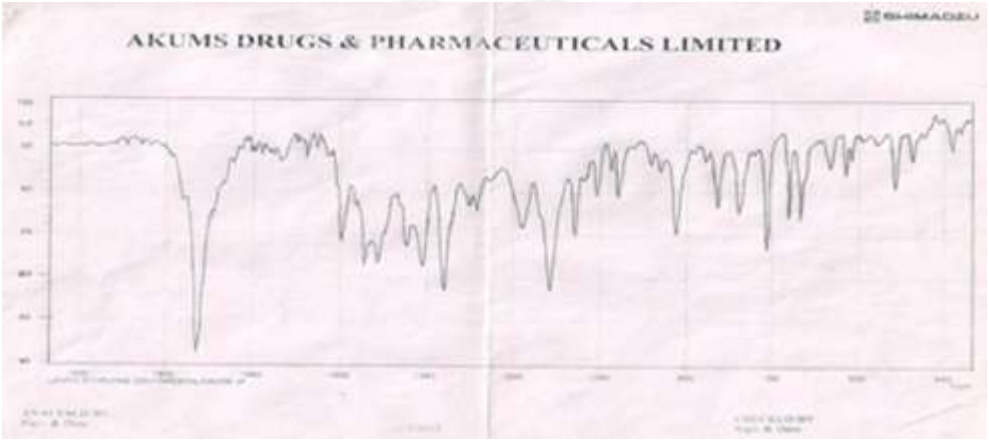

Figure 3: FTIR spectra of drug sample (levocetirizine dihydrochloride)

Table 6: Characteristic peak with their functional group

Peak	Theortical (cm^{-1})	Standard (cm^{-1})	Drug sample (cm^{-1})
-Cl	740-880	758, 804, 847	758.05, 808.20,
-C-N	1350-1390	1362	1356
-COOH	1730-1700	1742	1742.05
-C-O	1120-1170	1134	1136.11

The FTIR spectra of drug sample had shown the same characteristic peaks as shown by levocetirizine dihydrochloride standard which confirmed that our drug sample was levocetirizine dihydrochloride

Drug-excipients interaction studies

FTIR spectra of levocetrizine dihydrochloride and its mixture with Veegum, Crospovidone and all excipients used in the formulation are shown in figure.

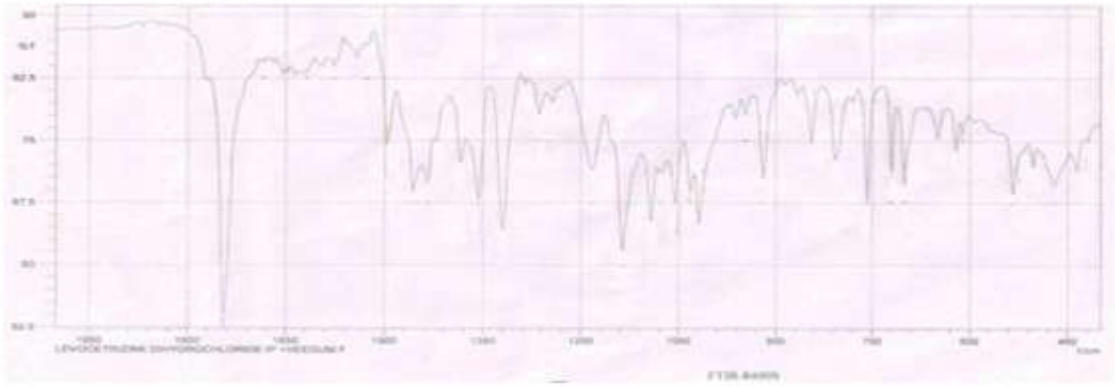

Figure 4: FTIR Spectra of Levocetrizine dihydrochloride and Veegum

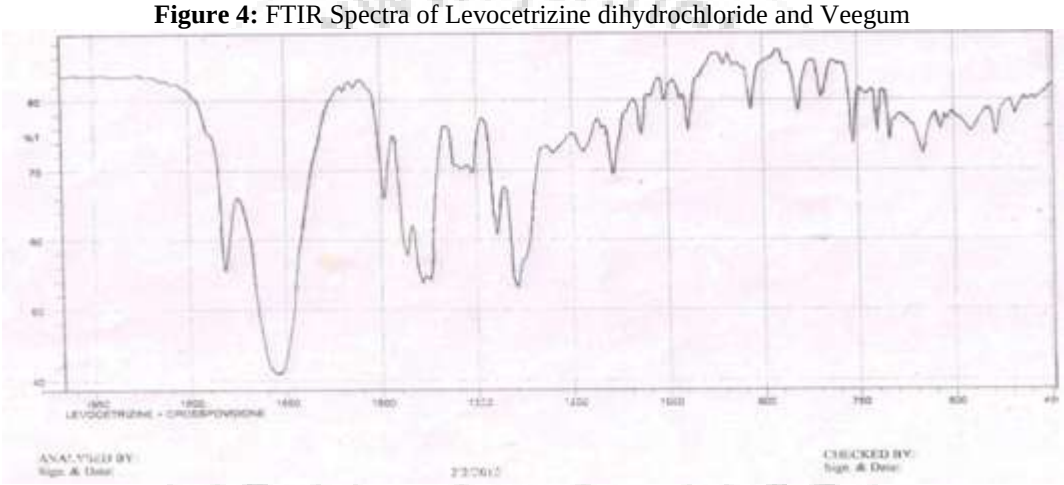

Figure 5: FTIR spectra of levocetrizine dihydrochloride and all excipetnts

No change found in the characteristic peaks of levocetrizine dihydrochloride when mixed with veegum, crospovidone and mixture of all excipients. So on the basis of observation obtained by form FTIR studies it may be stated that there is no interaction between drug and excipients.

Evaluation of the Levocetrizine Dihydrochloride Mouth Dissolving tablets

Pre-compression parameters

The results of angle repose, bulk density, tapped density, and compressibility index evaluation for different blends of formulations.

Table 7: Results of Pre-compression evaluation of formulation blend

Formulation	Bulk density (gm/cm^3)	Tapped density (gm/cm^3)	Compressibility index (%)	Angle of repose
F1	0.959 ± 0.010	1.143 ± 0.057	15.65 ± 0.53	20.33± 0.71
F2	0.951 ± 0.051	1.096 ± 0.045	13.30 ± 0.48	19.03± 0.31
F3	0.944 ± 0.053	1.076 ± 0.015	12.29 ± 0.44	17.5 ± 0.25
F4	0.936 ± 0.057	1.053 ± 0.057	11.16 ± 0.46	16.77± 0.15
F5	0.930 ± 0.056	1.033 ± 0.058	9.66 ± 0.85	16.63± 0.16
F6	0.932 ± 0.058	1.037 ± 0.055	10.25 ± 0.47	16.36± 0.59
F7	0.930 ± 0.043	1.033 ± 0.058	10.10 ± 0.48	16.40± 0.82
F8	0.929 ± 0.057	1.023 ± 0.056	9.18 ± 0.45	16.50± 0.10
F9	0.928 ± 0.048	1.016 ± 0.053	8.72 ± 0.53	16.57 ± 0.15

***Values are means ± SEM, n=3**

The results of evaluation of pre-compression parameters showed that varies from compressibility index 8.72 ± 0.53 % to 15.65 ± 0.53% and angle of repose varies from 16.36± 0.59° to 20.33±0.71°. Thus all formulation blends

comprised excellent flow as well as very good compressibility profile which are prime requisite for direct compression.

Post-Compression Evaluation of Compressed levocetrizine dihydrochloride Mouth Dissolving Tablets:

Physical Appearance: Uncoated Orange coloured tablets are round, flat and plain in appearance.

Table 8: Results of post-compression evaluation of MDTs

Formulation	Thickness (mm) ***	Diameter (mm)***	Average weight (mg)	Uniformity of weight (%)****	Hardness (kg/cm^2) ***	Friability (%)**	Drug content (%)****	DT (sec)**
F1	3.08 ± 0.031	8.02 ± 0.836	169.60	-4.4 to +2.6	2.5 ± 0.35	0.72 ± 0.025	98.23 to 99.62	278.33 ± 2.88
F2	3.09 ± 0.054	8.04 ± 0.418	171.50	-3.2 to +1.4	2.7 ± 0.23	0.60 ± 0.021	97.76 to 102.13	310 ± 5.00
F3	3.05 ± 0.010	8.06 ± 0.041	173.25	-3.6 to +2.2	3.1 ± 0.41	0.45 ± 0.015	99.33 to 99.13	331.66 ± 7.63
F4	3.03 ± 0.119	8.04 ± 0.014	174.02	-1.8 to +1.1	3.2 ±0.27	0.35 ± 0.025	95.56 to 98.16	231.67 ± 7.64
F5	3.12 ± 0.327	8.00 ± 0.010	176.45	-2.5 to +1.5	3.3 ± 0.28	0.33 ± 0.02	99.16 to 102.29	196.67 ± 20.81
F6	3.08 ± 0.277	8.04± 0.089	174.67	-2.1to +1.3	3.1 ± 0.22	0.35 ± 0.03	98.81 to 100.60	148.33 ± 17.56
F7	2.95 ± 0.360	8.04 ± 0.081	173.02	-2.5 to +2.2	3.1 ± 0.27	0.40 ± 0.05	97.20 to 191.18	90.00 ± 10.00
F8	3.04 ± 0.207	8.04 ± 0.089	173.02	-2.3 to +1.7	3.0 ± 0.35	0.37 ± 0.03	98.43 to 100.67	72.00 ± 12.58
F9	3.04 ± 0.259	8.00 ± 0.071	173.35	-2.5 to +1.5	3.1 ± 0.27	0.35 ± 0.04	98.12 to 99.90	70.00 ± 5.00

Values are means ± SEM, for **n=3, ***n=6 and **= values in range**

The prepared tablets from all nine formulations were subjected to post-compression

Parameter i.e. thickness, diameter, average weight, uniformity of weight, drug content. All

the post-compression parameter of all the formulations were compared with the compendial

Specification for mouth dissolving tablet. The results are shown in table no. 12

The results of post compression evaluation of various tablets formulations showed that thickness for all the formulation was varied between 2.95±0.360 to 3.12±0.32 mm and diameter from 8.00 ± 0.07 to 8.06 ± 0.041 mm.

The hardness for all the formulation was varied from 2.5±0.35 to 3.1±0.27 kg/cm^2. The hardness of the last two formulations (F8 and F9), was gradually increased that is because of the change in the M.C.C and pearlitol ratio. Overall there was no significant change in this parameter which clearly indicates that blending was uniform.

The disintegration time was significantly improved with increase in concentration in superdisintegrants, which ultimately affect the dissolution of drug. Formulation F8 and F9 showed comparatively better disintegration time from all other formulations.

Table No.9: Results of *In-Vitro* drug release study of mouth dissolving tablet formulations

Time (min.)	Cumulative percent drug released								
	F1	F2	F3	F4	F5	F6	F7	F8	F9
2	8.41 ± 1.27	7.63 ± 1.05	6.28 ± 0.93	11.39 ± 1.66	10.63 ± 2.24	12.72 ± 3.25	13.99 ± 1.95	13.84 ± 1.41	14.36 ± 2.32
5	25.53 ± 1.27	22.76 ± 1.12	20.26 ± 2.36	40.83 ± 2.52	43.39 ± 2.30	46.27 ± 4.27	50.51 ± 1.32	54.68 ± 0.74	59.84 ± 1.52
10	59.5 ± 2.02	55.56 ± 2.22	50.8 ± 1.66	73.35 ± 3.09	78.72 ± 2.16	79.57 ± 2.52	85.33 ± 1.01	91.57 ± 0.59	91.86 ± 1.20

***Values are means ± SEM, n=3**

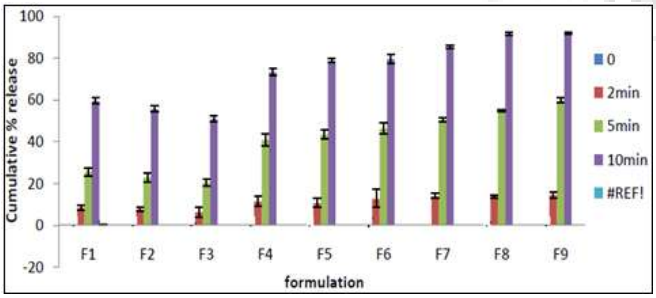

Figure 6: Results of *In-vitro* cumulative percent drug released of all formulations

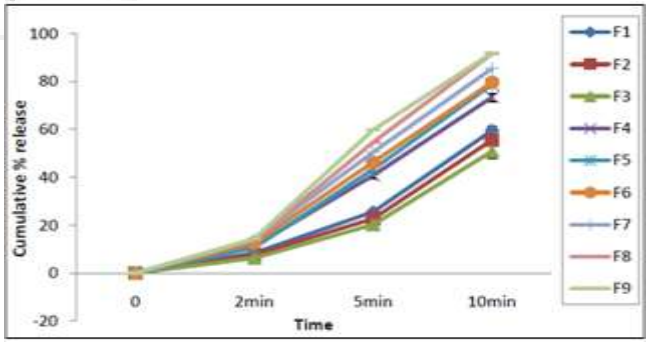

Figure 7: Results of *In-vitro* cumulative percent drug released of all formulation

The percent levocetirizine dihydrochloride released form mouth dissolving tablet in formulation F3 was found to be 50.8 ± 1.66 (minimum) and F9 was found to be 91.86 ± 1.52 (maximum) after 10 minutes. At the same time formulation F8 released 91.57 ± 0.74 which is very closed

to formulation F9 and be said almost equal. So it was concluded that F8 was the optimized formulation contained drug and veegum in 1:2 ratio, pearlitol and M.C.C in 1:3 ratio and 5.0 % crospovidone with all other excipients which are common for all formulation.

Stabity Studies for Optimized Formulation

Accelerated stability studies are carried out on optimized batch (F8). The batch was evaluated at the intervals of 1 month and 3 months respectively at 40±2ºC & 75±5%RH. The formulation F8 (tablets) at was subjected for the evaluation of physical parameter like description, thickness, diameter, average weight, weight uniformity, hardness, friability, taste, drug content, disintegration time and *In-vitro* drug release.

Table 10: Accelerated stability testing of optimized formulation (F8) at the storage condition i.e. 40ºC ± 2ºC /75 ±5%RH.

Parameters	Time in month		
	0 (initial)	1 month	3 month
Shape	Round	Round	Round
Color	orange	orange	Orange
Thickness (mm)**	3.04 ±0.207	3.01 ± 0.008	3.12 ± 0.16
Diameter (mm) **	8.04 ±0.089	8.08 ±0.047	8.06 ± 0.025
Hardness (kg/cm^2)**	3.0 ± 0.35	2.9 ± 0.50	2.7 ± 0.47
Average weight (mg)	173.02	174.33	173.51
Uniformity of weight	-2.32% to 1.72%	-1.25% to 3.82%	-1.9% to 2.4%
Friability (%)*	0.37 ± 0.03	0.46 ± 0.058	0.57 ± 0.083
Drug Content ##	98.43% to 100.67%	94.64% to 99.81%	92.05% to 96.32%
Disintegration time (sec)	72.00 ± 12.58	74.18 ± 4.84	75.13 ± 3.46

***Values are means ± SEM, for *n=3, **n=6 and ## = values in range**

There was no significant change appeared in physical parameters, in drug content and in the Cumulative drug release profile of levocetirizine dihydrochloride mouth dissolving formulation (F8) stored at 40±2ºC/75±5% RH, when compared from the same formulation before storage.

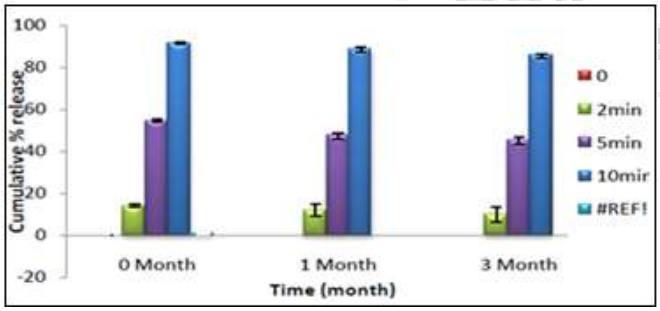

Figure 8: Cumulative percent drug released of optimizied formulations (F8)

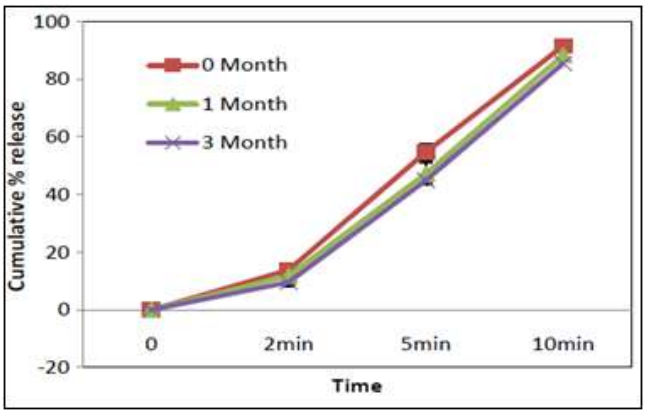

Figure 9: Cumulative percent drug released of optimized formulations (F8)

The results of accelerated stability studies of optimized formulation (F8) showed that it was a stable formulation, with very small variations in the physical parameters (like thickness, diameter, weight uniformity, hardness, friability and drug content), disintegration time and the drug % cumulative release. These changes were not too much significant because the formulation were still complied with the specific limits for the Mouth Dissolving Tablets after storing at condition 40±2ºC/75±5% RH for three months.

4. Conclusion

The formulation was developed of mouth dissolving tablet of levocetrizine dihydrochloride to improve patient compliance, reduce the treatment cost in Allergic Rhinitis and improves the health related quality of life. Identification of the drug was done by using FTIR spectrophotometer and comparing its absorption spectra with the levocetrizine dihydrochloride Std.

The tablet was prepared using crospovidone as superdisintegrant and the optimized its concentration. The veegum was used to mask the bitter taste of drug. Direct compression method was used for the preparation of mouth dissolving tablet.

Total nine formulations were prepared, to formulate a optimized mouth dissolving tablet. Three formulations **F1, F 2,** and **F9,** were prepared using drug and veegum **1:1, 1:5** and **1:2** in ratio respectively. The taste evaluation results showed that **F9** has the good promising taste masking properties for bitterness in drug. The remaining five formulations **F3, F4, F5, F6, F7 and F8**, were prepared for the optimization of concentration of superdisintegrant (crospovidone) by taking it in **2.0%, 3.0%, 3.5%, 4.0%, 4.5% and 5.0%** concentration respectively and the concentration of veegum was same in all five formulations.

The evaluation of pre-compression parameters showed that all formulation blends comprised excellent flow as well as very good compressibility profile which are prime requisite for direct compression. The post-compression evaluation of all formulation showed good results in case of physical parameters.

The results of post compression evaluation of various tablets formulations showed that thickness varied between 2.95 ± 0.360 to 3.12 ± 0.32 mm and diameter from 8.00 ± 0.07 to 8.06 ± 0.041 mm.

The % drug released (levocetirizine dihydrochloride) form mouth dissolving tablet in formulation F3 was found to be 50.82 ± 2.36 (minimal) and F9 was found to be 91.86 ± 1.52 (maximum) after 10 minutes. At the same time formulation F8 released 91.57 ± 0.74, which was much closed to formulation F9 and be said almost equal. So it was concluded that F8 was the optimized formulation. The data obtained from the accelerated stability studies of optimized formulation F8 after 1 and 3 months storage of tablets at 40±2ºC/75±5% the formulation was quite stable.

So overall conclusion of this research work was that levocetrizine dihydrochloride and veegum in 1:2 ratio and 5.0% crospovidone with other excipients mentioned in formulation F9 are optimal for the preparation of levocetirizine dihydrochloride Mouth Dissolving Tablets.

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