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Formulation, Optimization And Evaluation Of Mouth Dissolving Tablet Using Highly Bitter Taste Of Rosuvastatin

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Abstract: The primary objective of this study was to create user-friendly tablets of a model drug to enhance patient adherence to antilipidemic therapy. Many patients struggle to adhere to the prescribed dosage regimen, often skipping doses due to difficulties in swallowing tablets, bitter taste, and the unavailability of water when traveling. Mouth dissolving tablets (MDTs) offer a promising solution to improve patient compliance with the therapeutic regimen. These tablets disintegrate rapidly in the mouth, typically within a minute, eliminating the need to swallow the whole tablet or to use water. In this study, the bitter taste of the antilipidemic drug was effectively masked using the wet granulation method, employing both rapid mixture and a fluidized bed granulator. A total of 15 MDT formulations were prepared and subjected to comprehensive evaluation, including tests for hardness, friability, taste, in vitro disintegration time, wetting time, drug content, and in-vitro drug release. The optimized formulation achieved an in vitro disintegration time of 36 seconds, a hardness of 4-5 kg/cm2, a friability of 0.69%, and an impressive 99.5% drug release within 30 minutes, all while maintaining an acceptable taste. This successful development of patient-friendly MDTs for antilipidemic therapy holds significant promise for enhancing patient adherence to the prescribed therapeutic regimen.

Index Terms - Taste masking, Mouth dissolving tablet, Rosuvastatin, Wet granulation.

I. INTRODUCTION

Mouth dissolving tablets (MDTs), also known as orally disintegrating tablets (ODTs), are a type of solid dosage form that disintegrates and dissolves in the mouth without the need for additional water within a short period, typically ranging from 15 seconds to 3 minutes. These tablets are designed to be convenient, especially for individuals who have difficulty swallowing traditional tablets and capsules, such as pediatric and geriatric patients [1]. A Mouth Dissolving Tablet, also known as an Orally Disintegrating Tablet (ODT), is a unique form of drug dosage. Unlike traditional tablets, capsules, and liquids, this type of tablet disintegrates and dissolves directly in the mouth without the need for water [2].

The design of these tablets provides an alternative to conventional drug delivery methods, particularly for patients who have difficulty swallowing. This group includes children, the elderly, and people with neurological disorders. The active ingredient in the tablet is quickly released upon disintegration and is rapidly absorbed into the bloodstream. This process provides a swift onset of action, making ODTs an efficient and convenient form of medication administration [3]. Mouth Dissolving Tablets or Orally Disintegrating Tablets offer a beneficial alternative to traditional drug dosage forms, especially for those who struggle with swallowing. Their design allows for quick release and absorption of the active ingredient, providing rapid therapeutic effects [4].

Mouth-dissolving tablets, also known as orally disintegrating tablets (ODTs), are solid dosage forms that disintegrate rapidly in the mouth without the need for water. This dosage form is particularly helpful for patients who have difficulty swallowing conventional tablets or capsules [5].

Here is a general formulation for mouth-dissolving tablets:

- **Active Ingredient:** The active pharmaceutical ingredient (API) that provides the intended therapeutic effect.
- **Fillers:** Mannitol, Sorbitol, Lactose
- **Super disintegrants:** Crospovidone, Croscarmellose sodium, Sodium starch glycolate
- **Binding Agents:** Polyvinylpyrrolidone (PVP), HPMC (hydroxypropyl methylcellulose), Starch paste
- **Flavoring Agents:** Mint, Orange, Strawberry
- **Sweeteners:** Aspartame, Saccharin, Sucralose
- **Colorants:** FD&C dyes, Iron oxides, Titanium dioxide
- **Lubricants:** Magnesium stearate, Sodium stearyl fumarate, Talc [6]

The formulation and process parameters are crucial in developing mouth-dissolving tablets. The selection of excipients, their compatibility with the API, and the production method can significantly impact the disintegration time and overall quality of the tablet [7].

Antilipidemic drugs are a class of medications used to lower lipid levels in the blood, particularly cholesterol and triglycerides. High levels of these lipids are associated with an increased risk of cardiovascular diseases such as heart attacks and strokes. Antilipidemic drugs help reduce these risks by lowering lipid levels in the blood [8]. Common classes of antilipidemic drugs and examples of medications within each class:

- **Statins:** Examples: Atorvastatin (Lipitor), Simvastatin (Zocor), Rosuvastatin (Crestor)

Mechanism of Action: Inhibit HMG-CoA reductase, an enzyme involved in cholesterol synthesis, thereby reducing cholesterol production in the liver.

- **Fibrates:** Examples: Fenofibrate (Tricor), Gemfibrozil (Lopid)

Mechanism of Action: Activate peroxisome proliferator-activated receptor alpha (PPAR-alpha) to decrease triglyceride levels and increase HDL cholesterol.

- **Ezetimibe:** Examples: Ezetimibe (Zetia)

Mechanism of Action: Inhibits cholesterol absorption in the intestines, leading to reduced levels of LDL cholesterol.

- **Bile Acid Sequestrants:** Examples: Cholestyramine (Questran), Colesevelam (Welchol)

Mechanism of Action: Bind bile acids in the intestine, preventing their reabsorption and promoting the use of cholesterol to produce more bile acids.

- **PCSK9 Inhibitors:** Examples: Evolocumab (Repatha), Alirocumab (Praluent)

Mechanism of Action: Inhibit the PCSK9 protein, which leads to increased clearance of LDL cholesterol from the blood [9].

These medications are often prescribed along with lifestyle modifications such as adopting a healthy diet, regular exercise, and smoking cessation to manage dyslipidaemia effectively [10].

Formulating mouth-dissolving tablets (MDTs) for antilipidemic drugs involves a thoughtful approach to ensure the effectiveness and patient acceptability of the final product. The formulation typically includes the active antilipidemic ingredient, fillers such as mannitol or sorbitol to provide bulk, and super disintegrants like crospovidone to facilitate rapid disintegration in the mouth [11]. Binding agents like polyvinylpyrrolidone (PVP) are used to maintain tablet integrity, while flavouring agents and sweeteners are added to improve palatability. Colorants may also be included for an appealing appearance, and lubricants such as magnesium stearate aid in tablet manufacturing. It's critical to consider the compatibility of excipients with the active ingredient and adhere to regulatory guidelines to ensure a safe and effective formulation [12]. Collaboration with experienced formulation scientists or pharmacists can provide valuable insights, and conducting appropriate studies and tests is essential to assess the quality and performance of the mouth-dissolving tablet [13].

Table 1.1 Disintegrants used in MDT's [14-17]

Disintegrants	Mechanism	Conc. %w/w
Starch	It enables water to draw into the structure by capillary action, thus leading to disruption of tablet.	5-20
Pregelatinized starch	It increases dissolution rate by rapid disintegration due to superior swelling capacity.	5-15
Sodium Starch Glycolate (Explotab and Primogel)	It absorbs water readily leading to an increase in volume of granules result in rapid and uniform disintegration.	1-3
Cross-linked polyvinyl Pyrrolidone *(CrossPovidone, CrosspovidonM®,Kollidon®,Polyplasdone®)*	It acts by capillary action water is responsible for its tablet disintegration property.	0.5-5
Cellulose (Ac-Di-Sol, Nymce ZSX®, Primellose®, Solutab®)	They have ability to swell on contact with water results in rapid tablet disintegration.	1-3
Microcrystalline Cellulose (Avicel)	Allowing water to enter the tablet matrix by means of capillary pores, which break the hydrogen bonding between adjacent bundles of cellulose microcrystals	10-20
Alginates (Alginic Acid, Satialgine®)	It has High affinity for water absorption and high sorption.	1-5
Soy polysaccharides (Emcosoy®)	Rapid swelling in aqueous medium orwicking action, it does not contain any starch or sugar.	5-15
Gums (Guar Gums, Gum Karaya, Agar, Gellan Gum)	Swells in water	3-8
Chitin and Chitosan	Moisture sorption and water uptake	1-5
Smecta	It has a large specific area and high affinity for water makes it good disintegrant	5-15
Isapghula Husk	It has high swellability and gives uniform and rapid disintegration	5-15
Polacrillin Potassium	It swells up at very fast rate upon contact with water or gastro intestinal fluid and act as an effective tablet disintegrant.	10-20

Physiology of Taste:

Physiologically, taste is a sensory response resulting from a chemical stimulation of taste buds on the tongue. The sense of taste is conducted to the brain by a process called taste transduction. This process with the interaction of tastant (I.e., food or medicine) with cells, triggering the release of a G-protein called gustducin. [14]. Taste sensation phospholipase C-2. The effector enzymes then change the intracellular levels of second phosphate (IP3), and idacylglycerol (DAG). The second messengers activate ion channels, including calcium channels inside the cells, and sodium, potassium and calcium channels on the extracellular membrane. This ionization depolarizes the cell, causing the release of neurotransmitters that send a nerve impulse to the brain that carries the signal of taste.[15]

Taste constitutes four primary effects, viz., sweet, sour, bitter and salty. Correspondingly, there are four different kinds of taste buds. Sweet sensations are most easily detected at the tip, whereas bitterness at the back of the tongue, but salty sensations are usually detected at the tip and the sides of the tongue. During ingestion, taste buds react to soluble substances. [16]

The resulting sensations are transmitted to the brain by the ninth cranial nerve and tastes are detected. The sensitivity of the tongue to different sensations varies widely among individuals. [17]

Taste Buds:

Four fundamental sensations of taste have been generally described- Sweet, Sour, Bitter, Salty and fifth widely accepted basic taste is Umami. These tastes consistently stimulate taste bud in specific parts of the tongue as sweet and salty mainly at the tip, sour at sides, bitter at back [18]. Taste buds are small sense organ in most vertebrates, helps in the detection of taste. Hence a group of cells, found especially on the tongue Taste buds have been identified on the soft palate, pharynx, epiglottis, which allows different types of taste to be recognized. [19]

A. Salty Taste (Edge, upper portion):

The salty taste is one among the four taste receptors of tongue. They are located on the edge and upper front portion of the tongue. [20]

B. Sweet Taste (Tip):

The sweet taste is one among the four taste receptors in the tongue. They are found on the tip of the tongue. [21]

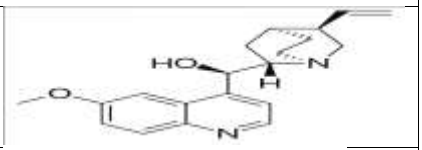
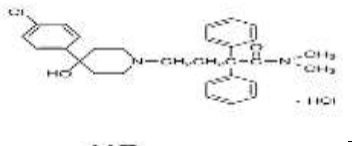
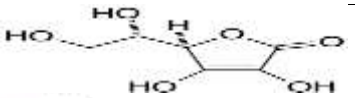
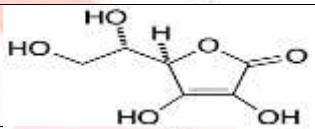
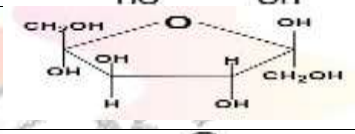
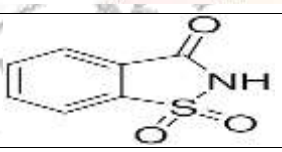
C. Sour Taste (Along sides in back):

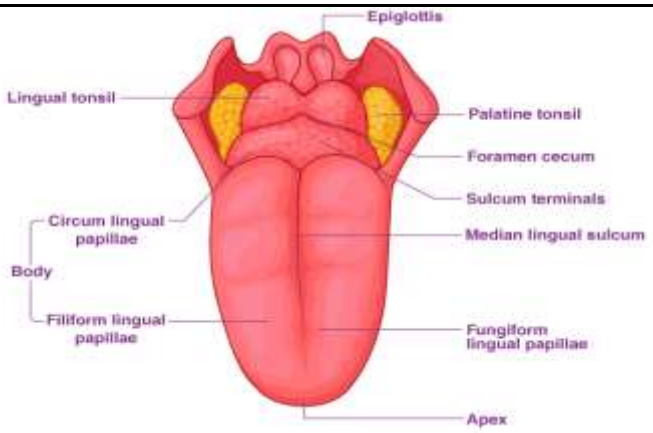
The sour taste is also one of the four taste receptors of the tongue. They occur at sides of the tongue and are stimulated mainly by acids. [22]

D. Bitter Taste (Back):

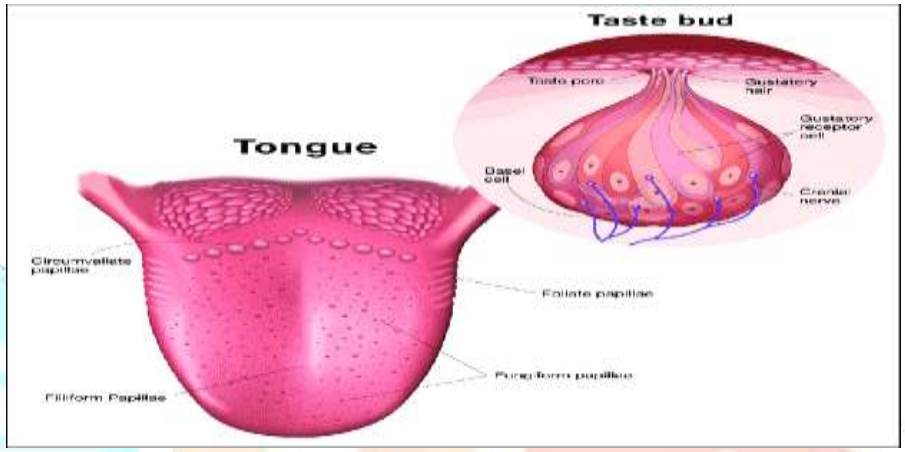
The bitter taste is the last and one of the four taste receptors in the tongue. That is located toward the back of the tongue. It is stimulated by a variety of chemical substances, most of which are organic compounds, although some inorganic compounds such as magnesium. [23]

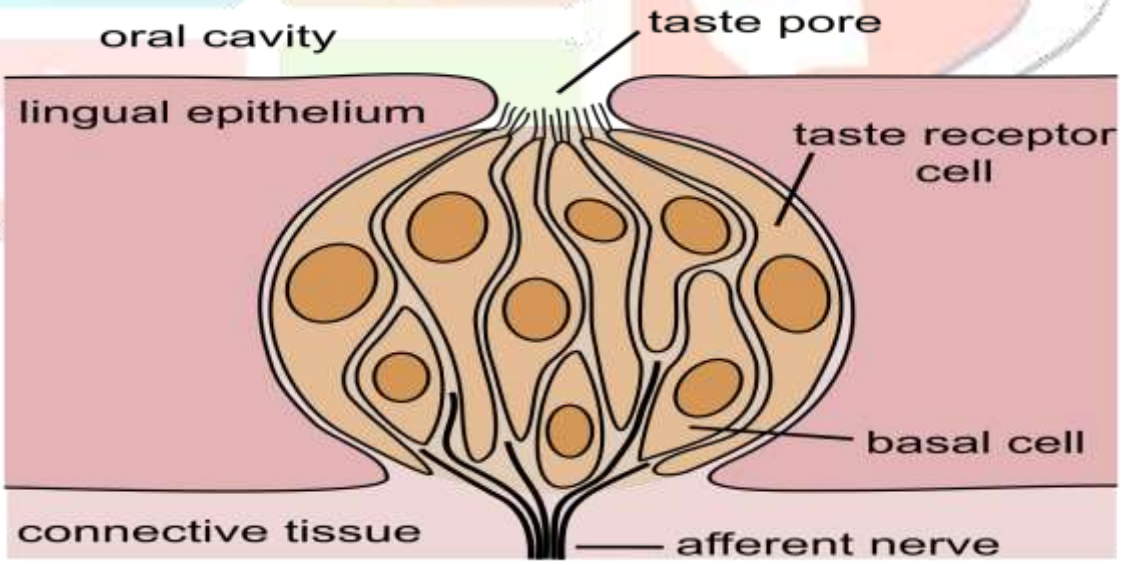
Examples with chemical structure of compounds of pharmaceutical interest, representing each of the four primary tastes [24]

Primary Taste	Functional group(s)	Natural Source	Pharmaceutical Example	Chemical Structure
Bitter	Organic Amines	Poisons, Alkaloids	Quinine	
			Lopiramide	
Sour	Organic or Inorganic acid	Natural products, Spoiled foods	Ascorbic acids	
			Malic acids	
Sweet	Sugars and sugar analogs	Nutritional, Synthetic sweetners	Fructose	
			Saccharin	
Salty	Inorganic salts	Sea water, Minerals deposits	Sodium chloride	NaCl
			Potassium iodide	KI



Taste Perception: [25]





Evaluation of Taste Masking: [26]

Taste is a sensation, which is realized when a substance such as food, beverages or drug is placed in the oral cavity. This sensation is the result of signal transudation from the receptor organ for taste, commonly known as Taste Buds. These taste buds contain very sensitive nerve endings, which produce and transmit electrical impulses via the seventh, ninth and tenth cranial nerves to those area of the brain, which are devoted to the perception of the taste buds. [27]

Pharmaceutical taste assessment typically requires:

- ✓ Trained Test Panel and Sophisticated Interpretation.
- ✓ Olfactory Gas Chromatography.
- ✓ Healthy human Volunteer Method.
- ✓ In vitro Cell Culture. [28]

Strategies for optimization of taste masking of bitter model drug

There are various methods for taste masking of bitter drugs but this project is based on two strategies for masking bitter taste of rosuvastatin and formulate fast disintegrating tablet. The methods used for this experiment are as follows: -

1) Direct Compression Method
2) By Wet Granulation Method

In wet granulation method there are 2 processes involves: -

a) Rapid Mixture Granulator (RMG)
b) Fluidized Bed Process (FBP)

Materials and Methods: -

The following materials of Pharma grade or the best possible Laboratory Reagent (LR) were used as supplied by the manufacturer.

Sl. No.	Material used	Source
1.	Drug	Ranbaxy Laboratory Ltd.
2.	Sodium citrate	Ranbaxy Laboratory Ltd
3.	Sodium chloride	Canton Laboratories
4.	Aerosil 200	Evonik Labs
5.	Crospovidone (PPXL)	Ashland Chemicals
6.	Xylitol	Signet chemical co. pvt. ltd
7.	Sucralose	Merck
8.	Menthol	Ranbaxy Laboratory Ltd
9.	Mango flavour	IFF
10.	Magnesium stearate	Macron Fine Chemicals
11.	Avicel12	Ranbaxy Laboratory Ltd

By the use of Fluidized Bed Granulator Method:

The main strategy for the choose this process was that the drug granules obtained by this method were much more spherical against Rapid Mixture Granulator (RMG) method and here was less chance for aggregate formation. In this method firstly weighed required amount of drug, mannitol and sodium citrate and passed these materials with BSS sieve no. 36. After that mixed it properly by V blender and kept the blend into the container of FBP. The second step was preparation of coating solution. The procedure for preparation of coating solution was same as in previous trials. Take exact quantity of water and kept it under continuous stirring after that slowly added accurately weighed sucralose and HPMC in water and the kept the solution for continuously stirring for 30 minutes for proper mixing. When the clear solution formed then it was started for coating on blend till the solution was totally completed but here preparation of coating solution was based on the different ratios of HPMC from trial 9 and trail 11 that is in trial 9 (10%w/w HPMC), trial 10 (15%w/w HPMC) and trial 11 (20%w/w HPMC) for improve good taste of the drug and finally take the LOD of granules after coating.

But in trial 12 to Trial 14, used Sepifilm polymer for the preparation of coating solution with sucralose and sodium chloride to enhance the good taste of drug and the procedure for preparation of blend and coating suspension were same as previous trials. In trial 12 used 10%w/w, trial 13 it was 15%w/w and trial 14, 20%w/w Sepifilm was used.

By the use of RMG and FBG (Trial 15):

In this method firstly the initial coating was done in RMG. The procedure of preparation of blend and coating were same as Trial 7. The obtained granules by RMG were further coated through FBG. The granules were putted into the container of FBG and coated by sepifilm. Here 35%w/w sepifilm was used for coating and the procedure for preparation of coating solution and coating were same as Trial 14.

Formula for preparation of Tablets by Direct Compression Method

Ingredients (mg/tablet)	Formulation Code					
	T1	T2	T3	T4	T5	T6
Drug	40	40	40	40	40	40
Tartaric acid	25	25	25	25	25	25
Sodium bicarbonate	25	25	25	25	25	25
Sodium chloride	10	10	10	10	10	10
Aerosil200	101	10	10	10	10	10
Crospovidone	30	30	30	30	30	30
Mannitol	274	244	214	274	244	214
Aspartame	30	60	90	-	-	-
Xylitol	-	-	-	30	60	90
Avicel 112	30	30	60	90	30	30
Sucralose	15	15	15	15	15	15
Menthol	1	1	1	1	1	1
Mango flavor	4	4	4	4	4	4
Magnesium stearate	6	6	6	6	6	6
Total	500	500	500	500	500	500

For the above investigation we had found that bitter taste was observed when the drug came contact with the mouth saliva. So, we can say that this strategy was failed to mask the bitter taste of drug. So we came on to next strategy which is wet granulation method.

A process of present work involves forming granules of drug with avicel112 and sodium citrate through the help of HPMC as well as HPC coating solution. For this purpose, three methods have been used:

a) By the use of Rapid Mixture Granulator (RMG)
b) By the use of Fluidized Bed Granulator (FBG)
c) By the use of RMG as well as FBG both.

By the use of Rapid Mixture Granulator (Trial 7 and Trial 8):

The main attraction of this process is that low loss of materials in it as well as it is Time consuming method. In this process required quantity of drug with avicel112 and mannitol are mixed properly and passed with BSS sieve no.36, after that sieved material was putted into the RMG chopper. When the first step was completed then further processing step was preparation of coating solution. 10% w/w HPMC was taken in required amount of water and kept this solution under continuous stirring at least 15-30 minutes. When the solution was found to be clear and no residue of solute occurs, then start the impeller and chopper then add coating solution drop by drop and mixing was done by impeller and chopper cuts the large particles, the was running till the desired amount as well as size of granules obtained. When the granules were obtained then its should be kept under fluidized bed dryer to dry for at least 20 minutes (till LOD of NMT 3.0%) and after that it was passed by BSS sieve no. 22 to obtained uniform size of granules and retained fines were discarded, but in Trial 8, the whole process was same but here used coating on drug by 10% w/w HPC polymer instead of HPMC.

Formula of coating solution by RMG

Ingredients	Trial 7 (mg/Tablet)	Trial 8 (mg/Tablet)
Drug	40	40
Avicel112	43	43
Sodium citrate	7	7
HPMC	10	-
HPC	-	10
Purified water	q.s.	q.s.
Total	100	100

Table for Process Parameters

Trials	Fluid Additional Time	Impeller	Chopper	Kneeding Time	% LOD
T7	2 minutes	Slow	Slow	30 seconds	4.0
T8	2 minutes	Slow	Slow	30 seconds	3.87

Formula for Preparation of Tablets

Ingredients	T7	T8
Granules	100	100
Sodium chloride	10	10
Aerosil	10	10
Crosspovidone	60	60
Mannitol	148	148
Xylitol	95	95
Avicel112	147	147
Sucralose	10	10
Flavour	3	3
Menthol	1	1
Magnesium stearate	6	6
Total	590	590

By the use of Fluidized Bed Granulator (Trial 9 to Trial 14): -

The main strategy for choose this process was that the drug granules obtained by this method were much more spherical against RMG method and here was less chance for aggregate formation. In this method firstly required amount of drug, mannitol and sodium citrate and passed these materials with BSS sieve no.36. After that mixed it properly by V blender and kept the blend into the container of FBP. The second step was preparation of coating solution. The procedure for preparation of coating solution was same as in previous trials. Take exact quantity of water and kept it under continuous stirring after that slowly added accurately weighed sucralose and HPMC in water and the kept the solution for continuously stirring for 30 minutes for proper mixing. When the clear solution formed then it was started for coating on blend till the solution was totally completed but here preparation of coating solution was based on the different ratios of HPMC from trial 9 to trial 11 that is in trial 9 (10%w/w HPMC), trial 10 (15%w/w HPMC) and trial 11 (20%w/w HPMC) for improve good taste for the drug and finally take the LOD of granules after coating.

But In Trial 12 to Trial 14, used Sepifilm polymer for the preparation of coating solution with sucralose and sodium chloride to enhance the good taste of drug and the procedure for preparation for preparation of blend and coating suspension were same as previous trials. In trial 12 used 10%w/w, trial 13 it was 15%w/w and trial 14, 20%w/w Sepifilm was used.

Formula of Coating Solution of Trials by FBG: -

Ingredients (mg/tab)	T9	T10	T11	T12	T13	T14
Drug	40	40	40	40	40	40
Mannitol	53	53	53	53	53	53
Sodium citrate	7	7	7	7	7	7
HPMC	13	19.2	27	13	13	13
Sepifilm	-	-	-	13	19.3	27
Sodium chloride	-	-	-	7	7	7
Sucralose	15	15	15	15	15	15
Purified Water	q.s.	q.s.	q.s.	q.s.	q.s.	q.s.
Total	128	135	142	128	135	142

Table for

Process Parameter: -

Parameters	T9	T10	T11	T12	T13	T14
Inlet Temperature (ºC)	58-69	45-68	52-67	58-64	57-66	58-67
Product Temperature (ºC)	29-34	25-34	24-33	35-40	35-40	34-40
Exhaust Temperature(ºC)	31-33	27-31	29-34	25-50	25-50	25-49
Drive Speed	15-30	12-35	12-32	13-34	13-34	13-35
Atomized Air (bar)	1.7-2.2	2-2.5	1.9-2.4	1.2-1.5	1.3-1.5	1.3-1.7
Pump Speed (rpm)	3-8	2-7	3-7	3-9	3-8	3-9
% LOD	3.12	2.8	2.6	1.94	2.5	1.98

Formula for Preparation of Tablets

Ingredients	T9 HPMC 10%W/W	T10 HPMC 15%W/W	T11 HPMC 20%W/W	T12 HPMC 10%W/W	T13 HPMC 15%W/W	T14 HPMC 20%W/W
Granules	128	135	142	128	135	142
Sodium Chloride	10	10	10	10	10	10
Aerosol	10	10	10	10	10	10
Crosspovidone	60	60	60	60	60	60
Mannitol	120	113	106	120	113	106
Xylitol	95	95	95	95	95	95
Avicel 112	147	147	147	147	147	147
Sucralose	10	101	10	10	10	10
Flavor	3	3	3	3	3	3
Menthol	1	1	1	1	1	1
Magnesium stearate	6	6	6	6	6	6
Total	590	590	590	590	590	590

By the use of RMG and FBG (Trial 15):

In this method firstly the initial coating was done in RMG. The procedure of preparation of blend and coating were same as Trial 7. The obtained granules by RMG were further coated through FBG. The granules were putted into the container of FBG and coated by sepifilm. Here 35% w/w sepifilm was used for coating and the procedure for preparation of coating solution and coating were same as Trial 14.

Formula of coating solution by RMG then FBG

Ingredients (mg/tab)	Trial 15	
	At RMG	At FBG S.F. (35%w/w)
Drug	40	Granules (100)
Avicel 112	43	-
Sodium citrate	7	-
HPMC	10	-
Sepifilm	-	52.12
Sucralose	-	9
Sodium chloride	-	6
Purified water	Q.S.	Q.S.
Total	100	167.12

Process parameters

RMG	**Process**	**FBG**	**Process**
Fluid Addition Time (min.)	2 Minutes	Inlet Temperature (ºC)	59-69
Impeller	Slow	Product Temperature (ºC)	35-40
Chopper	Slow	Exhaust Temperature (ºC)	25-51
Kneeding Time (sec.)	30 seconds	Drive speed (%)	13-34
% LOD	3.51	Atomized Air (bar)	1.2-1.9
_	_	Pump speed (rpm)	2-9
_	_	%LOD	2.85

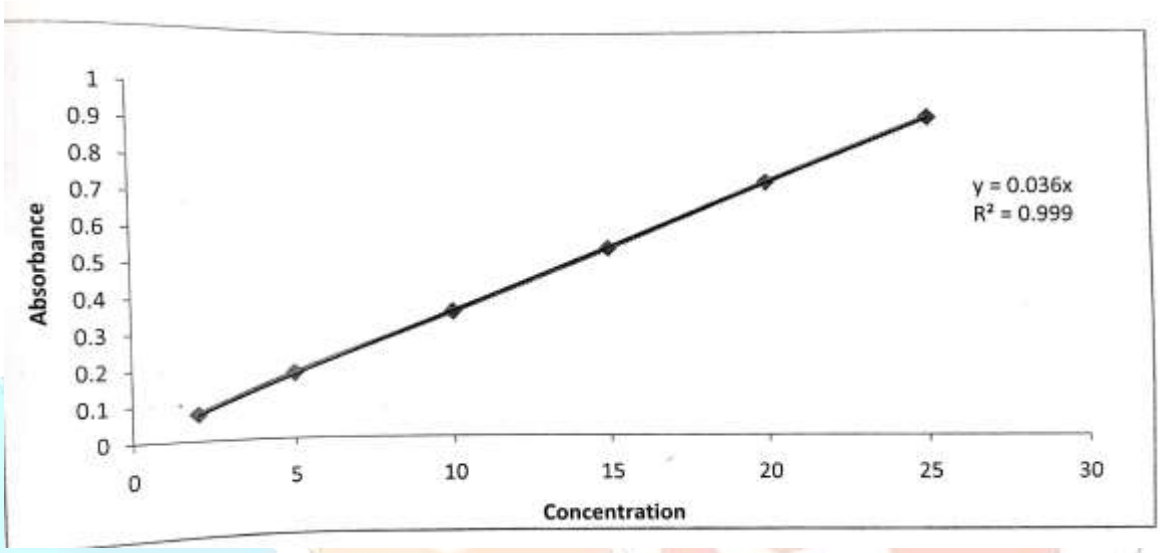
Formula for Preparation of Tablets

Ingredients (mg/tab)	T15
Granules	167
Sodium chloride	10
Aerosol	10
Crosspovidone	60
Mannitol	81
Xylitol	95
Avicel 112	147
Sucralose	10
Flavour	3
Menthol	1
Magnesium chloride	6
Total	590

Results and Discussions

Standard calibration curve of Rosuvastatin

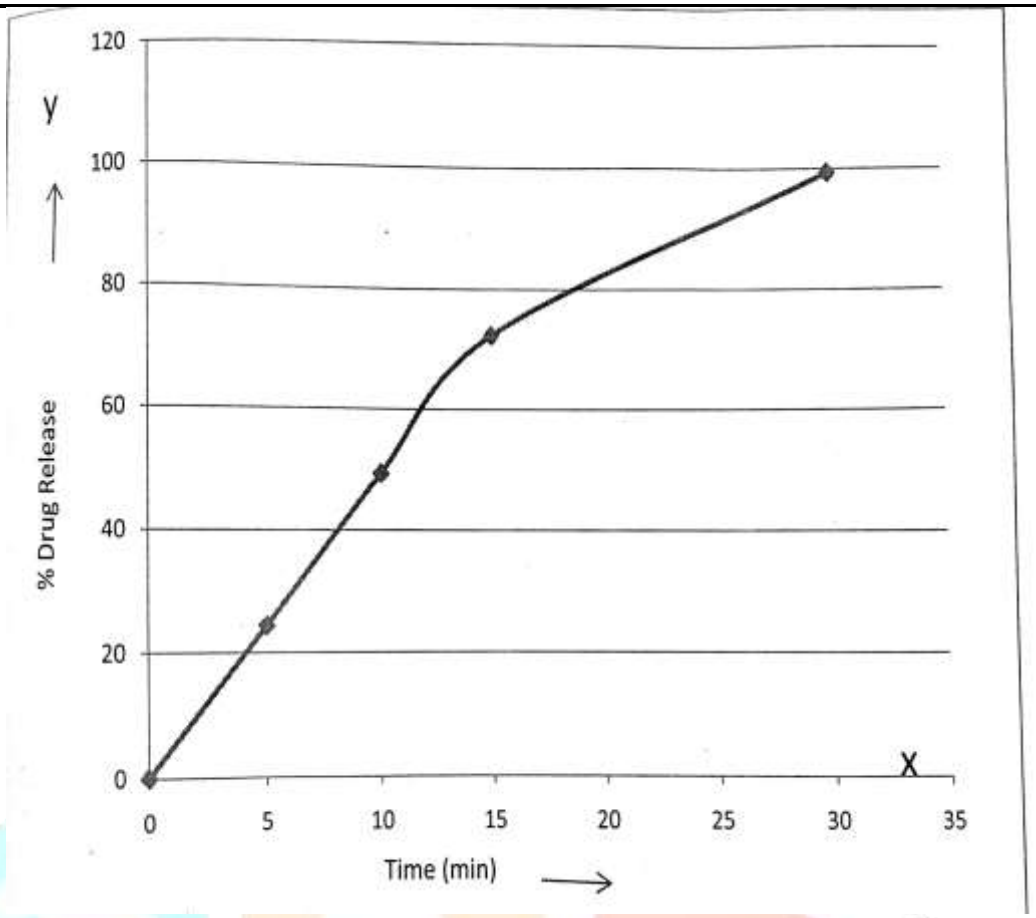
Sl. No.	Concentration (µg/ml)	Absorbance
1.	**2**	**0.0753**
2.	**5**	**0.187**
3.	**10**	**0.359**
4.	**15**	**0.538**
5.	**20**	**0.725**
6.	**25**	**0.907**



Calibration Curve of the Drug

Dissolution Profile of Trial 15 in 6.6 pH of Citrate Buffer

Sl. No.	Time (min) at (x-axis)	% Drug Release at (y-axis)
1.	0	0
2.	5	24.4
3.	10	49.3
4.	15	72.3
5.	20	99.5



Dissolution Profile of the given Drug

Preformulation studies:-

Sl. No.	Angle of Repose (θ)	Bulk density (g/cm^3)	Tapped density (g/cm^3)	Compressibility index (%)	Hausner's ratio
T7	26.56	0.58	0.68	14.71	1.18
T8	25.45	0.57	0.67	14.93	1.18
T9	27.13	0.48	0.64	25	1.33
T10	26.5	0.56	0.65	13.85	1.16
T11	26.45	0.52	0.66	21.21	1.27
T12	25.25	0.54	0.65	16.92	1.20
T13	27.61	0.56	0.66	15.15	1.18
T14	26.77	0.53	0.62	14.51	1.16
T15	25.42	0.55	0.63	12.68	1.14

Formulation:-

Sl. No.	RMG	RMG	FBP HPMC 10% w/w	FBP HPMC 15%w/w	FBP HPMC 20%w/w	FBP S.F. 10%w/w	FBP S.F. 15%w/w	FBP S.F. 20%w/w	RMG	FBP S.F. 35% w/w
Ingredients	**T7**	**T8**	**T9**	**T10**	**T11**	**T12**	**T13**	**T14**	**T15**	
Drug	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**40**	**Granules 100**
Mannitol	**-**	**-**	**53**	**53**	**53**	**46**	**46**	**46**	**-**	**-**
Avicel101	**43**	**43**	**-**	**-**	**-**	**-**	**-**	**-**	**43**	**-**
Sodium citrate	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**-**
HPMC	**10**	**-**	**13**	**19.2**	**27**	**-**	**-**	**-**	**10**	**-**
HPC	**-**	**10**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Sepifilm	**-**	**-**	**-**	**-**	**-**	**13**	**19.3**	**27**	**-**	**52.12**
Sucralose	**-**	**-**	**15**	**15**	**15**	**15**	**15**	**15**	**-**	**9**
Sodium chloride	**-**	**-**	**-**	**-**	**-**	**7**	**7**	**7**	**-**	**6**
Purified water	**Q.S**	**Q.S**	**Q.S**	**Q.S**	**Q.S**	**Q.S**	**Q.S**	**Q.S**	**Q.S**	**Q.S**
Total	**100**	**100**	**128**	**135**	**142**	**128**	**135**	**142**	**100**	**167.12**

Postformulaiton Studies:-

Parameters	T7	T8	T9	T10	T11	T12	T13	T14	T15
Thickness (mm)	3.99	4.1	3.91	3.89	3.86	3.92	3.88	3.87	3.98
Hardness (Kp)	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5	4-5
Friability (%)	0.64	0.68	0.73	0.61	0.68	0.71	0.63	0.59	0.69
Disintegration time (sec.)	32	35	12	15	18	14	17	21	24
Taste	Very Bitter	Very Bitter	Bitter	Bitter	Slightly Bitter	Slightly Bitter	Slightly Bitter	Slightly Bitter	Acceptable
Dissolution (at 15 mins.)									98%
Wetting time (sec)	23	24	14	14	15	16	17	19	23
Water absorption ratio (%)	89	88	81	87	92	93	97.3	98	83
Dispersion test	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
% Assay									99.5

Evaluation of Taste

Formulations	Human Taste Sensation				
	I.	II.	III.	IV.	V.
T7	Very Bitter	Very Bitter	Very Bitter	Very Bitter	Very Bitter
T8	Very Bitter	Very Bitter	Very Bitter	Very Bitter	Bitter
T9	Very Bitter	Very Bitter	Bitter	Bitter	Bitter
T10	Bitter	Bitter	Very Bitter	Bitter	Bitter
T11	Slightly Bitter	Slightly Bitter	Bitter	Slightly Bitter	Slightly Bitter
T12	Slightly Bitter	Slightly Bitter	Bitter	Slightly Bitter	Slightly Bitter
T13	Slightly Bitter	Slightly Bitter	Slightly Bitter	Slightly Bitter	Slightly Bitter
T14	Slightly Bitter	Slightly Bitter	Slightly Bitter	Slightly Bitter	Slightly Bitter
T15	Acceptable	Acceptable	Acceptable	Acceptable	Acceptable

CONCLUSION

In conclusion, the primary objective of this study was effectively achieved through the successful creation of user-friendly mouth dissolving tablets (MDTs) for an antilipidemic drug, aiming to enhance patient adherence to the therapeutic regimen. The bitter taste of the drug was efficiently masked using the wet granulation method, which involved the application of both rapid mixture and a fluidized bed granulator. A total of 15 MDT formulations underwent comprehensive evaluation, including tests for hardness, friability, taste, in vitro disintegration time, wetting time, drug content, and in-vitro drug release. The optimized formulation demonstrated remarkable results, achieving an in vitro disintegration time of 36 seconds, a hardness of 4-5 kg/cm2, a friability of 0.69%, and an exceptional 99.5% drug release within 30 minutes, all while maintaining an acceptable taste. This successful development of patient-friendly MDTs holds significant promise for enhancing patient adherence to the prescribed therapeutic regimen. By effectively addressing key concerns such as swallowing difficulties and unpleasant taste, these tablets provide a convenient and effective alternative for individuals facing challenges in complying with traditional tablet formulations. Overall, the promising solution offered by these MDTs holds significant potential for enhancing patient adherence to antilipidemic therapy, providing a much-needed improvement in patient experience and treatment outcomes.

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