Asian Journal of Pharmaceutical Technology & Innovation
ISSN: 2347-8810

Review Article

Received on: 13-12-2013
Accepted on: 18-12-2013
Published on: 20-12-2013

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Fast Dissolving Tablet Technology-A Review

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ABSTRACT

The convenience of administration and improved patient compliance are important in the design of oral drug delivery system which remains the preferred route of drug delivery in spite of various disadvantages. One such problem can be solved in the novel drug delivery system by formulating "mouth dissolving tablets" (MDTs) which disintegrates or dissolves rapidly without water within few seconds in the mouth due to the action of superdisintegrant or maximizing pore structure in the formulation. Such formulations provide an opportunity for product line extension in the many elderly persons will have difficulties in taking conventional oral dosage forms (viz., solutions, suspensions, tablets, and capsules) because of hand tremors and dysphagia. Swallowing problems also are common in young individuals because of their underdeveloped muscular and nervous systems. In the present review the formulation techniques and different technologies are discussed.

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Key-words: Fast Dissolving Tablet, Rapid Disintegration, formulation techniques, Mouth Dissolving Tablets

Cite this article as:
Shinde PV, Fast Dissolving Tablet Technology-A Review, Asian Journal of Pharmaceutical Technology & Innovation, 01 (02); 2013.

INTRODUCTION:

The demand for more patient compliance has been growing the last decades, particularly for pediatric and geriatric patients who have difficulty in swallowing solid dosage forms. As a result new dosage forms for existing drugs with an improved bioavailability, rapid onset of action and increased therapeutic efficacy has been attempted. This attempt can lead to patient compliance and convenient dosage forms. Amelioration of patient compliance and effectiveness of the therapy is the pivotal motif behind the design of 'Dissolve in the mouth dosage form'. These are the dosage form, which disintegrate rapidly in the oral cavity and are swallowed without the need of water. This system is recognized with other synonyms like fast dissolving tablet, melt in mouth tablet, porous tablet, rapidly disintegrating tablets, quick dissolving, and rapid melt tablets. Despite various nomenclatures the function and concept of all these Drug Delivery System (DDS) is similar.

Drug substances are seldom administered alone, but rather as a part of formulation in combination with one or more non-medical agents. Hence the treatment of acute disease or chronic illness has been mostly accomplished by delivery of drug to patient using various pharmaceutical dosage forms including tablets, capsules, liquids, ointments, injections etc. These forms provide the manufacturing pharmacist with the challenges of formulation and physician with the choice of the drug delivery system. Each of these dosage forms has its unique physical and pharmaceutical utility characteristic.

Oral route of administration still enjoys, as most preferred route because of its numerous advantages. The most popular oral dosage forms are tablets and capsules. However, one important drawback of these dosage forms is the need to swallow.

Dysphasia or difficulty in swallowing of the most popular dosage forms like tablets and a capsule is the major problem occurring in geriatric and pediatric patients, which leads to patient non-compliance.

Geriatric patient experience deterioration of the physiological and physical ability with their senility while pediatric patient because of their under developed muscular and nervous system shows difficulty in swallowing.

Difficulty of swallowing is also pertinent with number of medical conditions including stroke, Parkinson's disease, AIDS, thyroidectomy, head and neck radiation therapy and other neurological disorders including cerebral palsy.

Thus, melt-in-mouth DDS are fast dissolving/ dispersing DDS, which disintegrate in patient's mouth within a few seconds without the need of water, or chewing, providing best remedy for the patient suffering from dysphasia. Some drugs are absorbed from mouth, pharynx and esophagus as the saliva passes down the stomach. In such cases the bioavailability is greater than those observed for conventional dosage form.

The advantages of mouth dissolving dosage form are increasingly being recognized in both industry and academia. Their growing importance was underlined recently when European pharmacopoeia adopted the term "Orodispersible Tablet" as tablet that is to be placed in mouth where it disperses rapidly before swallowing. **(1 - 5)**

Desired Criteria for Mouth Dissolving Drug Delivery System (MDDS):

Mouth Dissolving Tablet should

- Not require water to swallow, but it should dissolve or disintegrate in the mouth within seconds.
- Be compatible with taste masking agent.
- Be portable without fragility concern.
- Have a pleasant mouth feel.
- Leave minimal or no residue in the mouth after oral administration.
- Exhibit low sensitivity to environmental conditions such as humidity and temperature.
- Allow the manufacture of tablet using conventional processing and packaging equipment at low cost.

Salient Features of Mouth Dissolving Drug Delivery System (MDDS): [2]

- Ease of administration to pediatric, geriatric and psychiatric patients who refuse to swallow a tablet.
- Convenient for administration and accurate dosing as compared to liquids.
- No need of water to swallow the dosage form, which is highly convenient feature for patients who are traveling and do not have immediate access to water.
- Good mouth feel property of MDDS helps to change the basic impression of medication as 'Bitter pill' particularly for pediatric patients.
- Rapid dissolution and absorption of drug, which may produce rapid onset of action.
- Some drugs are absorbed from the mouth, pharynx and esophagus as the saliva passes down into the stomach, which enhances bioavailability of drugs.
- Ability to provide advantage of liquid medication in the form of solid preparation.
- Pregastric absorption can result in improved bioavailability and as a result of reduced dosage improved clinical performance through a reduction of unwanted effects.[2]

Techniques for Preparing Mouth Dissolving Tablets:

Freeze Drying:

A process, which involves sublimation of water from the product after freezing, is called freeze-drying. Freeze-dried forms offer more rapid dissolution than other available solid products as process imparts glossy amorphous structure to the bulking agent and some times to the drugs.

A tablet that rapidly disintegrates in aqueous solution includes a partially collapsed matrix network that has been vacuum dried above the collapse temperature of the matrix. The matrix is partially dried below the equilibrium freezing point of the matrix. Vacuum drying of the tablet above its collapse temperature instead of freeze drying below its collapse temperature provides a process for producing tablets with enhanced structural integrity, while rapidly disintegrating in normal amounts of saliva.

However, the use of freeze-drying is limited due to high cost of the equipment and processing. Other major disadvantages of the final dosage forms include lack of physical resistance in standard blister packs.[1, 2]

Moulding:

Mouldability is defined as the capacity of the compound to get moulded or compressed. Low mouldability means that the compound show reduced compressibility by tablet and rapid dissolution while high moulding compounds show excellent compressibility and slow dissolution. Tablets produced by moulding are solid dispersions. Physical forms of the drug in the tablets depend whether and to what extent it dissolves in the molten carrier. The drug can exist as discrete particles or micro particles dispersed in the matrix. It can dissolve totally in the molten carrier to form solid solution or dissolve partially in the molten carrier and the remaining particles stay undissolved and dispersed in the matrix. Disintegration time, drug dissolution rate and mouth feel will depend on the type of dispersion or dissolution. Moulded tablets disintegrate more rapidly and offer improved taste because the dispersion matrix is, in general, made from water-soluble sugars.[1, 2, 3]

Types of Moulded Tablets:

I. Compression Moulding:

Compressed moulded tablets are prepared from soluble ingredients by compressing a powder mixture previously moistened with solvent (usually water or ethanol) into mould plates to form wetted mass.

II. Heat Moulding:

In this, moulded form have been prepared directly from the molten matrix in which drug is dissolved or dispersed.

III. No-Vacuum Lyophilization:

Moulded form prepared by no-vacuum evaporation method involves evaporation of solvent from the suspension at standard pressure.

T. Makino, et al has developed compression moulded mixtures containing drug and combination of starches and sugars with surface that have been wetted with suitable amount of water. The wetted mass is compression moulded and dried porous tablets with sufficient mechanical strength have been obtained.

Moulded tablets typically do not possess great mechanical strength. Erosion and breakage of the moulded tablet often occur during handling and opening of blister packs.

Sublimation:

Compressed tablets composed of highly water-insoluble excipients do not dissolve rapidly in the water because of its low porosity, so porous tablets that exhibit good mechanical strength and dissolve quickly is the best remedy for above problem.

Heinemann and Rose et. al. have produced porous tablet by addition of inert solid ingredients such as urea, urethane, ammonium bicarbonate, camphor, naphthalene with other tablet excipients and the blend was compressed into tablet. Then, volatile material from compressed tablet is removed by sublimation so as to impart porosity to the tablet. A method of producing fast dissolving tablet using water as the pore forming material has been described by Makino, et al. Koizumi, et al have developed a new method of preparing high porosity tablet that dissolve rapidly within 10-20 seconds and exhibit sufficient mechanical strength using mannitol with camphor, a subliming material.[1, 2, 3]

Spray Drying:

As the processing solvent is evaporated rapidly during spray drying, it gives highly porous and fine powders. Allen and Wang have employed spray-drying technique to prepare fast dissolving tablets. They developed formulation by using mannitol as bulking agent, hydrolyzed and non-hydrolyzed gelatin as support matrix, sodium starch glycolate as disintegrant and acidic material (citric acid) and /or alkali material (ex. $NaHCO_3$) to enhance disintegration and dissolution. When immersed in an aqueous medium the tablets compressed from spray -dried powder, disintegrated within 20 seconds.[1, 2, 3]

Mass-Extrusion:

In this technology the active blend is softened by using the solvent mixture of water soluble polyethylene glycol, methanol and then softened mass is expulsed through the extruder or syringe to get a cylinder of the product into even segments using heated blade to form tablets. The dried cylinder can also be used to coat granules of bitter tasting drugs in order to mask their bitter taste.[2]

Direct Compression:

Direct compression is the easiest way to manufacture tablets. It can be done with conventional equipment, commonly available excipients and a limited number of processing steps. It also allows to accommodate high doses and final weight of tablet can easily exceed that of the other production methods.

Directly compressed tablet's disintegration and solubilization depends on various factors such as single or combined action of disintegrants, water-soluble excipients and effervescent agent.Disintegrant efficacy is based on force equivalent concept, which is the combined measurement of swelling force development and amount of water absorption and defines the capability of disintegrant to transform absorbed water into swelling force. Disintegrant efficacy is strongly affected by tablet size and hardness. Large and hard tablet require more disintegration time. As consequences, products with optimal disintegration properties often have medium to small size and high friability and low hardness. The tablet with high friability and low hardness has less physical resistance, which cause breakage of tablet edges during opening of blister alveolus.

Mouth dissolving tablet prepared by direct compression method involves use of superdisintegrant. Superdisintegrant are the agent, which are completely effective in very low concentration (2-5%). So to ensure a high disintegration rate of MDDS, choice of suitable type and an optimal amount of disintegrant is important. Other formulation components such as water-soluble excipients or effervescent agents can further enhance dissolution or disintegration properties of the tablet but main drawback of using effervescent excipients is their highly hygroscopic nature.

The simultaneous presence of disintegrant with a high swelling force called disintegrating agent and substances with low swelling force (starch, cellulose and direct compression sugar) defined as "swelling agent" was claimed to be a key factor for rapid disintegration of tablet, which also offers physical resistance.[2]

Patented Technologies for Mouth Dissolving Tablets:

1. Zydis Technology:

Zydis formulation is a unique freeze dried tablet in which drug is physically entrapped or dissolved within the matrix of fast dissolving carrier material. When zydis units are put into the mouth, the freeze-dried structure disintegrates instantaneously and does not require water to aid swallowing. The zydis matrix is composed of many materials designed to achieve a number of objectives. To impart strength and resilience during handling, polymers such as gelatin, dextran or alginates are incorporated. These form a glossy amorphous structure, which imparts strength to the tablet.

To obtain crystallinity, elegance and hardness, saccharides such as mannitol or sorbitol are incorporated. Water is used in the manufacturing process to ensure production of porous units to achieve rapid disintegration while various gums are used to prevent sedimentation of dispersed drug particles in the manufacturing process. Collapse protectants such as glycine prevent the shrinkage of zydis units during freeze-drying process or long-term storage. Zydisproducts are packed in blister packs to protect the formulation from moisture in the environment.[1, 2, 5, 10]

2. Durasolv Technology:

Durasolv is the patented technology of CIMA labs. The tablets made by this technology consist of drug, filler and a lubricant. Tablets are prepared by using conventional tableting equipment and have good rigidity. These can be packaged into conventional packaging system like blisters. Durasolv is an appropriate technology for product requiring low amounts of active ingredients.[2]

3. Orasolv Technology:

CIMA labs have developed Orasolv Technology. In this system active medicament is taste masked. It also contains effervescent disintegrating agent. Tablets are made by direct compression technique at low compression force in order to minimize oral dissolution time. Conventional blenders and tablet machine is used to produce the tablets. The tablets produced are soft and friable.[1, 2]

4. Flash Dose Technology:

Flash dose technology has been patented by fuisz. Nurofenmeltlet, a new form of ibuprofen as melt in mouth tablets prepared using flash dose technology is the first commercial product launched by Biovail Corporation. Flash dose tablets consist of self-binding shear form matrix termed as “floss”. Shear form matrices are prepared by flash heat processing.[2]

5. Wowtab Technology:

Wowtab technology is patented by Yamanouchi Pharmaceutical Co. WOW means “Without Water”. In this process, combination of low mouldability saccharides and high mouldability saccharides is used to obtain a rapidly melting strong tablet. The active ingredient is mixed with a low mouldability saccharide and granulated with a high mouldability saccharide and compressed into tablet.[1, 2]

6. Flashtab Technology:

Prographarm laboratories have patented the Flashtab technology. Tablet prepared by this system consists of an active ingredient in the form of micro crystals. Drug micro granules may be prepared by using the conventional techniques like coacervation, micro encapsulation and extrusion spheronisation. All the processing, utilized conventional tableting technology.[2]

Taste Masking:

Taste is an important parameter in administrating drugs orally. As more than 50% of pharmaceutical products are orally administered for several reasons, undesirable taste is one of the important formulation problems that can be encountered with certain drugs. Oral administration of bitter drugs with acceptable level of palatability is a key issue for health care providers especially with pediatrics and geriatric patient. Thus, elimination or reduction of bitterness is an important issue during design of oral pharmaceutical formulations.

An ideal taste masking process and formulation should have the following properties:

- Rapid and easy to manufacture.
- Involves least number of equipments.
- Requires minimum number of excipients for an optimum formulation.
- Has no adverse effect on drug bioavailability
- Requires excipients that are economical and easily available.
- Least manufacturing cost.
- Can be carried out at room temperature.
- Requires excipients that have high margin of safety.[3, 6, 7]

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 begins with the interaction of tastant (i.e., food or medicine) with taste receptor cells in the taste buds. The tastant binds with G-protein coupled receptors in the cells, triggering the release of G-protein called gustducin. Taste sensation begins when gusducin activates the effector enzymes phosphodiesterase 1a or phospholipase C β-2. The effector enzymes than change the intracellular levels of second messengers such as cyclic adenosine monophosphate (cAMP), inositol 1,4,5-triphosphate (IP3), and idacylglycerol (DAG). The second messengers activate ion channels, including calcium channels inside the cell, and sodium, potassium and calcium channels on the extracellular membrane. This ionization depolarizes the cell, causing the release of neurotransmitter that send a nerve impulse to the brain that carries the signal of taste.

Taste constitutes four primary effects, viz., sweet, sour, bitter and salty. Correspondingly, there are four different kinds of taste buds. These sensations are elicited by the tongue and interpreted by the brain. Certain areas of tongue responds more readily to specific tastes than others. Sweet sensations are more easily detected at the tip, whereas bitterness at the back of the tongue, but salty sensations are usually at the tip and the sides of the tongue. During ingestion, taste buds react to soluble

substances. The resulting sensations are transmitted to the brain by ninth cranial nerve and taste is detected. The sensitivity of the tongue to different sensations varies widely among individuals.[6, 7]

Chemistry of taste:

Sour:

Sour stimuli in foods, such as in vinegar (acetic acid), lemon (citric acid), and apple (malic acid) are easily identifiable. All sour substances contain acids that generally ionize in aqueous solutions to produce hydrogen ions. Therefore the higher the concentration of hydrogen ions, the stronger is the sourness. Sour taste is not only dependent on hydrogen ions, but also on lipid solubility. A higher lipid solubility of the acids provides for greater concentrations as taste receptors, accounting for the increase in sour sensation.

Salty:

It has been shown that cationic species are partially responsible for the salt solutions. Sodium chloride has a typical salty taste. Chlorides of potassium, ammonium and calcium have a typical salty taste, but their solutions taste differently. Most halide salts (sodium chloride, sodium bromide, potassium chloride and sodium iodide) have a dominating salty taste. Potassium bromide and ammonium iodide have a salty, bitter taste but potassium iodide is intensely bitter, which indicates that the taste sensations of salts shift to bitterness as molecular weight increases.

Sweet:

Sweet is produced by wide variety of compounds, many of which do not have any apparent structural similarity. The two most common sweet substances, sugars and glycerin, are polyhydric alcohols containing $-CH_2OH$ groups, which contributes significantly to sweetness. Saccharin which has no –OH group, is intensely sweet, but has a bitter after taste. In contrast, naturally occurring glycosides are bitter. Some amino acids, for example, glycine, are sweet. The sodium and calcium salts of cyclohexylsulfamic acid (cyclamates) and the dipeptide easter aspartame is roughly thirty times sweeter than sugar and has been used as sugar substitutes.

Bitter:

A bitter taste, like sweet taste, is commonly found in a wide variety of compounds, most of which are salts of organic and inorganic compounds. Bitterness is often associated with the nitro group, and the presence of two or more nitro groups in a molecule results in a bitter taste. Structurally unrelated compounds, such as esters of aromatic acids, lactones, and sulfur containing aliphatic compounds, exhibit bitterness.

To summarize, taste stimuli are chemical sensations in the mouth triggered by a variety of compounds of the basic tastes; only sour can be attributed to hydrogen ions. The other tastes are exhibited by a wide variety of compounds, making generalization difficult.

Techniques of Taste Masking:

In order to eliminate or reduce bitter taste of orally administered pharmaceuticals various techniques and strategies are adopted by pharmaceutical scientist. These strategies are classified as below:[7, 8, 9, 11, 13, 14]

1. Sensory Approaches:

I. Using Flavouring and Sweetening Agents
II. Numbing of Taste Buds

2. Complexation and Adsorption:

I. Complexation with Ion Exchange Resins
II. Formation of Inclusion Complexes with Beta Cyclodextrin Derivative
III. Wax Embedding of Drugs

3. Chemical Approaches:

I. Formation of Prodrug
II. Formation of Different Salts

4. Barrier Approaches:

I. Using Viscosity Modifier
II. Using Emulsions
III. Using Liposome
IV. Using Microspheres or Microcapsules

1. Sensory Approaches

I. Using Flavouring and Sweetening Agents:

In liquid formulations, water-soluble flavours are added to the aqueous components of a formulation, where as poorly water soluble flavours are added to alcoholic or other non-aqueous solvent components of formulation. Generally sour taste is masked with fruit flavors while bitter tasting drugs are blended with salty, sour or sweet tasting agents. It is well known that salty taste reduces sourness and increases sweetness whereas sweet taste reduces bitterness.

Examples of various syrups, which are executed for taste masking purpose, are orange syrup, citric acid syrup, cocoa syrup, wild cherry syrup and raspberry syrup.[11]

II. Numbing of Taste Buds:

Temporary numbing of taste buds by certain anesthetizing agents such as phenol and sodium phenolate has also been used to mask the unpleasant taste of drug. The example includes aspirin. Swabbing of gingival inthe oral cavity witha topical anesthetic has been shown to temporarily reduce the bitter taste of dental anesthetics, which often leak into the oral cavity after injection.[11]

2. Complexation and Adsorption:

I. Complexation with Ion Exchange Resins: Cations exchange resin CRP 244 and anion exchange resin CRP 254 that are polyacrylic acid derivatives were used to adsorb ester drugs for both, masking the bitter taste and achieving sustained release action.

The examples of various ion exchange resins used for taste masking are amberlite IRP 88(an acrylic potassium resin), amberlite IRP 69(sodium polystyrene sulphonate), amberlite IRP 64(a carboxylate form of the styrene polymer), Indion CRP 244, Indion CRP 254, Tulsion 335(Polacrilex), Tulsion 339 (Polacrilin Potassium USP) and Tulsion 344(Sodium Polystyrene Sulphonate USP). Out of these resins in addition to taste masking property Tulsion 339, Tulsion 344 is used for tablet disintegration and sustain release purpose respectively.[8, 9, 10]

II. Formation of Inclusion Complexes with Beta Cyclodextrin Derivative:

Cyclodextrin are the cyclic oligomers of the glucose, which mask the unpleasant taste of drug by forming inclusion types of complexes with the drug. They are also useful in stabilizing certain drugs against hydrolysis auto-oxidation and photo-degradation. The strong bitter taste of liquid or syrup of carbetapentane citrate is reduced to 50% by preparing 1:1 complex with cyclodextrin.

The suppression of bitter taste by cyclodextrin was in increasing order of alpha < gamma < beta cyclodextrin.[6, 7, 13, 14]

III. Wax Embedding of Drugs:

Taste masking by wax embedded granules of ephedrine hydrochloride, chlorpheniramine maleate, diphenhydramine hydrochloride were prepared in stearic acid and other waxes.[11]

3. Chemical Approaches:

I. Formation of Prodrug:

A prodrug is a chemically modified inert drug precursor, which upon biotransformation liberates the pharmacologically active parent drug. Examples of drugs with improved taste
are given in table no.1.[11]

Table 1: Prodrugs with Improved Taste

Sr. No.	Parent Drug	Prodrug with Improved Taste
1.	Chloramphenicol	Palmitate ester
2.	Clindamycin	Palmitate ester
3.	Triamcinolone	Diacetate ester

II. Formation of Different Salts:

Meglumine is an acid addition salt of ibuprofen, which not only increases the water solubility of ibuprofen but also, provides a significant taste masking effect. Hence this salt of ibuprofen can be incorporated in to palatable liquid formulations for oral administration. These acid addition salts are prepared by forming amide bond between amino function groups of meglumine with carboxylic acid function group of ibuprofen in approximate equal molar amounts.

Another example is erythromycin estolate, which is prepared from the reaction of erythromycin with propionic acid anhydride in acetone solution to form the 2' propionate ester, which is then converted to its hydrochloride. The ester salt is then methesized with sodium dodecyl sulphate. Erythromycin estolate is practically odourless and tasteless.[7, 11]

4. Barrier Approaches:

I. Using Viscosity Modifier:

In this technique, aqueous dispersion of gums such as acacia, tragacanth, xanthan or synthetic polymers such as polyethylene glycols, hydroxy propyl methyl cellulose, and hydroxy ethyl cellulose are used to increase the viscosity, which limits the contact of unpleasant tasting drug with the tongue. Combination of polyethylene glycol and sodium carboxy methylcellulose were used to mask the unpleasant taste of drugs such as guifensin, pseudoephedrine hydrochloride, dextromethorphan and ibuprofen. [7, 11]

II. Using Emulsions: A novel technique for taste masking of drugs employing multiple emulsions have been prepared by dissolving drug in the inner aqueous phase of w/o/w emulsion under condition of good shelf stability. The formulation is designed to release the drug though the oil phase in presence of gastric fluid.[11]

III. Using Liposome:

Liposomes are defined as a vesicle of lipid bilayers enclosing an aqueous compartment. The lipid most commonly used is phospholipid. Under various concentration and pH condition these vesicles form closed system, which is ideal vehicle for taste masking.

Classic example of this method is incorporation of bitter tasting antimalerial drug such as chloroquine phosphate in liposome prepared with egg phosphatidylcholine.[11]

IV. Using Microspheres or Microcapsules:

Microencapsulation involves coating of drug particles using a natural or synthetic polymer or wax. Several techniques such as simple and complex coacervation, solvent evaporation, spray chilling, spray drying; fluid bed and spinning disc method have been successfully used to prepare microspheres.

The unpleasant taste of the clarithromycin was masked when the drug was encapsulated in combination of gelatin and acrylic resins such as Eudragit L-100, S-1000 and E-100. Other polymers such as Eudragit L-55 and RL were used to mask the taste of cefuroxime axetil. The drug was first encapsulated in the acrylic polymers using solvent evaporation technique and resulting coated particles were then formulated as a suspension.[11]

Evaluation of taste masking effect:

Sensory analysis has been used to characterize various flavours, odours, and fragrances. Nowadays-sensory analysis employ's objective or analytical methods and subjective or hedonic method.[11] These are listed in table.2

Table 2: Comparative Elements in Objective Flavour Test

Subjective methods	Objective methods
Preference test	Difference test
Paired testing	Paired testing
Triangle testing	Triangle testing
	Ranking test
Hedonic scale	Analytical test
	Flavour profile
	Time intensity test
	Single attribute test
	Dilution profile
	Statistical test

Marketed Preparation of Melt-in-Mouth Tablets:

The current pharmaceutical market for mouth dissolving tablets is on increasing trend. Because of strong patient demand, several products have been commercialized.

Table 3: Examples of Marketed Preparation of Melt-in-Mouth Tablet

Name of the Product	Manufacturer and Country	Remark
Imodium Lingual	R.P.Scherer corp., USA	Fast Dissolving Formulation of Imodium
Pecidin Capital	Mktd. by Merck and co., USA	Quick Releasing Anti Ulcer Preparation of Pepcid
Mosid–MT	Torrent Pharmaceuticals, India	Mouth Melt tablet of Mosapride Citrate
Claritin Reditabs	Mktd. By Schering plough Corp., USA	Immediate dissolving tablet of Claritin
Nimulid-MD	Panacea Biotech, India	Mouth Dissolving tablet of Nimesulide
ZyrofMeltab	ZydusCadila, India	Melt In Mouth Tablet of Rofecoxib
L-Cetridoc	Gracewell, India.	Effermelt tablet of Levocetirizinedihydrochloride

Conclusion:

The MDTs have potential advantages over conventional dosage forms, with their improvedpatient compliance, convenience, bioavailability and rapid onset of action had drawn the attention of many manufactures over a decade.The use of techniques like freeze drying, direct compression and effervescence are highly suitable for formulating stable and acceptable dosage forms of vitamins, enzymes and thermolabile drugs. Which are indeed highly acceptable means of delivery drugs to especially, pediatric and geriatric patients. The development of Durasolv and Orasolv technologies are

worth mentioning in this regard. Similarly, considerable research towards producing modified microcrystalline cellulose or starch in order to engineer them suitable for direct compression has significantly reduced the product development time for optimizing FDT formulation.The successful marketed MDTs have good taste and rapid release properties. With rapid acceptance of MDTs by patients and pharmaceutical companies, the market for this dosage form is promising, and the product pipeline continues to grow rapidly.

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