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# MOUTH DISSOLVING TABLETS: A CONVENIENT NOVAL DOSAGE FORM - A REVIEW

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***ABSTRACT***

*Mouth dissolving tablets are novel type of solid oral dosage form, which dissolves/disintegrates rapidly in saliva without the need of water. Mouth dissolving tablets provide an advantage particularly for pediatric and geriatric populations who have difficulty in swallowing conventional tablets; bedridden patients and traveling patient having no accesses to water, this approach thus increase the patient compliance by providing convenience in administration. Various technology such as direct compression, molding, spray drying, sublimation, freeze drying, mass extrusion, high plastic granule technology, effervescent disintegration technology etc. have been used for the preparation of mouth dissolving tablets. Taste masking is also essential step in the formulation of MDTs in case of drug having bitter taste because the drug is released in mouth,various approaches are used for taste masking of bitter drug.*

***Keywords:-*** *Mouth dissolving tablets, patented technologies, superdisintegrants, taste masking, ion exchange resins.*

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## INTRODUCTION

Dosage forms are sophisticated vehicles which are designed and developed to deliver the drug. Designing of dosage form is equally challenging process as like drug discovery in drug development process.[(1)] Dosage form for systemic efficacy can be administered through various routes such as oral, nasal, buccal, parentral, transdermal etc. Since beginning, oral dosage forms enjoyed the first position because of its convenient, comfort and economy[(2,3)]; almost 85% of drugs administered for systemic effects belong to oral route. Oral drug delivery system is mainly classified into two types, such as oral solid dosage forms and oral liquid dosage forms. Liquid dosage forms have limitations, when compared to solid dosage forms; liquid dosage forms are more expensive to ship, difficult in handling, improper dosage accuracy (while self medication), breakage or leakage and lack of stability. Most commonly employed oral solid dosage forms are tablets and capsules. Compressed tablets are the most widely used

dosage forms for a number of reason; they are convenient, easy to use, accuracy in dose, less expensive and more stable than oral liquid dosage forms .[3]

The conventional oral solid dosage forms (tablet and capsule) have wide acceptance, but one drawback is difficulty in swallowing (dysphagia), which is more prominent in children, elderly patients and individuals having severe tonsillitis and many more like:-

1. Parkinsonism
2. Motion sickness
3. Unconsciousness
4. Mentally disabled persons

This condition becomes more sever in case when there is unavailability of water. These problems led to the development of a novel type of solid oral dosage form called "Mouth Dissolving Tablet" which disintegrates/dissolves rapidly in saliva without the need of drinking water. MDTs are also called as orally disintegrating tablets, orodispersible tablets, quick disintegrating tablets, and fast disintegrating tablets, fast dissolving tablets, rapid dissolving tablets, porous tablets, and rapimelt. [4]

In recent decades, a variety of pharmaceutical research has been conducted to develop new dosage forms and considering quality of life, most of these efforts have been focused on ease of medication. Among the various dosage forms developed to improve the ease of administration and patient compliance, the Mouth Dissolving Tablet (MDT) is the most widely preferred commercial products. [5] In 1986, Scherer has patented the zydis technology and introduced the fast dissolving dosage form and after this a number of other formulation were developed. Fast or mouth dissolving tablets have been formulated for pediatric, geriatric, and bedridden patients and for active patients who are traveling and may not have access to water[6]. Fast Dissolving Drug Delivery System (FDDS) is gaining popularity among various pharmaceutical products as these are new drug delivery techniques in order to provide the patient with medicine without obstacles in swallowing and faster onset of action.[7]

The US Food and Drug Administration Center for Drug Evaluation and Research (CDER) defines, in the 'Orange Book', MDT as "a solid dosage form containing medicinal substances, which disintegrates rapidly ,usually within a matter of seconds, when placed upon the tongue".[8]

Recently, European Pharmacopoeia has used the term "orodispersible tablet" for tablets that disperse readily within a limit of three minutes [9]

**1.2 Advantages of Mouth Dissolving Tablets:-**

1. Suitable for geriatric and pediatric Patients who experience difficulties in swallowing (dysphasia) and also for bedridden and mentally ill patients .
2. Accurate dosing as compared to liquids.[10]
3. Free of risk of suffocation due to physical obstruction when swallowed, thus Offering improved safety.
4. Administration without water , anywhere, anytime.[11]
5. Bioavailability of drugs is increased as some drugs are absorbed from mouth, pharynx and esophagus through saliva passing down into the stomach.[12]
6. Rapid onset of therapeutic action as tablet is disintegrated rapidly along with quick dissolution and absorption in oral cavity.[13]
7. Conventional processing and packaging equipments allow the manufacturing of tablets at low cost.[14]
8. Stability for longer duration of time, since the drug remains in solid dosage form till it is consumed.

So, it combines advantage of solid dosage form in terms of stability and liquid dosage form in terms of bioavailability.[15]

**1.3 The Need of Development of MDTs:-**

The need for novel delivery systems persists due to patient's poor acceptance, and compliance with, existing delivery regimes. Also the need of improvement for developing better and efficacious drug delivery system.

**1.3.1 Patient compliance: -**

Mouth dissolving tablets is a boon for the patient having the problem of dyspahagia (common in pediatric and geriatric patient). Especially in case of elderly patients who may not be able to swallow a daily dose of their medicine. Thus play a major role in improving patient compliance.(15)

**1.3.2 Efficacious drug delivery system :-**

**1.3.2.1 Increased bioavailability:-**

MDTs release drugs in the mouth for absorption through local oromucosal tissues and through pregastric (e.g., oral cavity, pharynx, andoesophagus), gastric (i.e., stomach), and postgastric (e.g., small and large intestines) segments of the gastrointestinal tract (GIT). The pregastric absorption of drugs, which avoids first pass hepatic metabolism to reduce the dose than those observed in conventional dosage forms and finally, increase the bioavailability of drugs .(16)

**1.3.2.2 Quick on set of action:-**

In some disease conditions like sudden allergic attack, hypertension, nausea, vomiting, heart burn which requires quick onset of action. MDTs help in quick dissolution of the drug and thereby result in rapid absorption without any lag time and providing faster onset of action to relieve the disease condition immediately.(17)

**1.3.3 Manufacturing and marketing factors:-**

Developing new drug delivery technologies and utilizing them in product development is critical for pharmaceutical industries to survive. As a drug or drug product nears the end of its patent life, it is open for pharmaceutical manufacturers for its betterment to develop a given drug entity in a new and improved dosage form. A new dosage form allows a manufacturer to extend market exclusivity, unique product differentiation, value-added product line extension, and extend patent protection, while offering its patient population a more convenient dosage form.(18)

**1.4 Challenges in Formulating Mouth Dissolving Tablets:-**

There are number of challenges in designing an efficient MDTs; the major one are discussed here under

**1.4.1 Disintegration time:-**

Rapid disintegration is one of the major challenges while forming MDTs. Mouth dissolving tablets are formulated to disintegrate rapidly in the oral cavity after coming in contact with the limited volume of saliva. According to FDA mouth dissolving tablets should have in-vitro disintegration time of approximately 30 seconds or less ,commonly various type of super disintegrant are used to overrule this challenge in such type of tablets. Some commonly used super disintegrants are sodium starch glycolate, crosscarmellose sodium, crosspovidone etc. (18)

**1.4.2 Mechanical strength:-**

MDTs are formulated to obtain disintegration time of less than a minute; while doing so, maintaining a good mechanical strength is a prime challenge. It is obvious that increasing the mechanical strength will delay the disintegration time, but if the mechanical strength is not enough then it will lead to high friability of the tablet. So optimization of these two parameters is always essential. (19)

**1.4.3 Taste masking**:-

Taste is another most important parameter governing patient compliance. Undesirable taste is one of several important formulation problems that are encountered with many drugs and thus with their dosage form. Oral administration of bitter drugs with an acceptable degree of palatability is a key issue for health care providers, especially in the preparation of MDTs; as they have to dissolve in mouth, so it should have sweet and pleasant taste. There are number of taste masking technologies which are used to mask the taste of bitter drug. But the selection of technique is very important and it is mainly depending upon the degree of bitterness of drug, needs of the formulation as well as the efficiency and limitations of the technique used for the taste masking for example:

- Addition of sweetener and flavoring agents technique: This is a common and economical method, but the main drawback of this method is that it is applicable only for drugs having slight bitter taste.
- Molecular complexation method: This is very effective technique for taste masking, but the long processing time is the main limitation for this method. This method also cannot used for the drug which are hydrolysable.

**1.4.4 Dose:-**

Drug having high dose, faces mainly two challenges in the development of MDTs

- Effective taste masking of the active ingredients
- Tablet size.

These challenges are not unrelated because most drugs do require taste masking, the amount of taste masking material used will depend on the drugs degree of bitterness relative to its dose; which will in turn affect the final tablet size. [20]

**1.5 Techniques Used in Preparation of Mouth Dissolving Tablets:-**

Many techniques have been reported for the formulation of MDTs, which differ in their methodologies and vary in various properties of final product design. The commonly used technologies for the preparation of MDTs are:

1. Direct compression method.
2. Effervescent disintegration technology.
3. Sublimation.
4. Melt granulation.
5. Molding.
6. Freeze drying or lyophilization.
7. Mass extrusion.
8. Spray drying.
9. Highly plastic granule technology.
10. Cotton candy process.

**1.5.1 Direct compression method**:-

In this method, tablets are compressed directly from the mixture of the drug and excipients without any preliminary treatment. The mixture to be compressed must have adequate flow properties and cohere under pressure, thus making pretreatment as unnecessary unlike conventional wet granulation. This technique involves usage of superdisintegrants that is why this technique is also known as disintegrant addition technique. The type of disintegrant used and its proportion (in case of blend of superdisintegrants) are of prime importance for acceptable quality of MDT. It is a cost effective technique and easy to implement at industrial level because it requires simple equipments and involve limited number of processing steps.[21]

**Table 1: Commonly Used Superdisintegrant in Formulation of MDTs**[22]

| Sr | Common name | Classification | Brand name | Mechanism of action |
|---|---|---|---|---|
| 1 | Crosscarmellose Sodium | Cellulose, carboxymethyl ether, sodium salt crosslinked | Ac-DiSol, Nymce 25X | Wicking and Swelling |
| 2 | Crosspovidone | Polyvinyl-pyrrolidone | CL-Kollidon polyplasdone | Swelling |
| 3 | Sodium starch Glycolate | Sodium carboxymethyl Starch | Explotab Primojel | Swelling |
| 4 | Hydroxypropyl cellulose(low substituted) | Cellulose,2-hydroxypropyl Ether | L-HPC | Wicking and Swelling |
| 5 | Starch, Pregelatinized | Pregelatinized Starch | Starch 1500 | Swelling |
| 6 | Alginic acid/NF | Alginic acid | Satialgine | Rapid swelling and wicking |
| 7 | Polacrillin Potassium | Cation exchange resin | Amberlite IRP 88 | Swelling |

**Mechanism of action of Superdisintegrants :-**

There are six major mechanisms for tablets disintegration which are as follows:

**1.5.1.1 Swelling:-**

Perhaps the most widely accepted general mechanism of action for tablet disintegration is swelling. This type of disintegrant show disintegration by swelling when come in contact with aqueous medium. Tablets with high porosity show poor disintegration due to lack of adequate effect of swelling force as the void spaces available make the swelling inefficient. On the other hand, sufficient swelling force is exerted in the tablet with low porosity. It is worthwhile to note that if the packing fraction is very high, fluid is unable to penetrate in the tablet and disintegration is again slows down. Thus the optimization between two is the sole parameter to be taken care of while using the superdisintegrant acting by this mechanism e.g. Sodium starch glycolate, Platago ovata.[23]

**1.5.1.2 Porosity and capillary action (Wicking):-**

The ability of disintegrant to draw water into the porous network of the tablet is essential for effective disintegration. When we put the tablet into suitable aqueous medium, the medium penetrates into the tablet and replaces the air adsorbed on the particles, which weakens the intermolecular bond and breaks the tablet into fine particles. Water uptake by tablet depends upon hydrophilicity of the drug /excipient and on tableting conditions. For these types of disintegrants maintenance of porous structure and low interfacial tension towards aqueous fluid is necessary which helps in disintegration by creating a hydrophilic network around the drug particles. E.g. L-Hydroxy Propyl Cellulose, Croscarmellose Sodium.[23]

**1.5.1.3 Deformation:-**

During tablet compression, disintegrant particles get deformed and these deformed particles get into their normal structure when they come in contact with aqueous media or water. Occasionally, the swelling capacity of starch was improved when granules are extensively deformed during compression; this increase in size of the deformed particles produces a breakup of the tablet. This may be a mechanism of starch and has only recently begun to be studied.e.g. Potato starch.[24]

**1.5.1.4 Particle-particle repulsive forces:-**

Another mechanism of disintegration attempts to explain the disintegration of tablet made with 'nonswellable' disintegrants. Guyot-Hermann has proposed a particle repulsion theory based on the observation that nonswelling particle also cause disintegration of tablets. The electric repulsive forces between particles are the mechanism of disintegration and water is required for it; researchers found that repulsion is secondary to wicking. e.g. carboxymethyl starches [24]

**1.5.1.5 Due to release of gases:-**

The effervescent disintegrants release carbon dioxide on wetting due to interaction beween effervescent agents. The tablet disintegrates due to generation of pressure within the tablet due carbon dioxide. This effervescent mixture is used when their is need to formulate very rapidly dissolving tablets or fast disintegrating tablet. As these disintegrants are highly sensitive to small changes in humidity level and temperature, strict control of environment is required during manufacturing of these types of tablets. The effervescent blend is either added immediately prior to compression or can be added in to two separate fraction of formulation. e.g. sodium bicarbonate. [24]

**1.5.2 Effervescent Disintegration Technique:-**

In this process, an effervescent disintegrating agent is employed; it is mixed with the active ingredient or its micro particles along with other standard tableting excipients and finally compressed into tablets. Saliva activates the effervescent agent, causing the tablet to disintegrate due evolution of gas [25]

The key excipients of effervescent formula included carbondioxide donor (eg. Alkali metal and

alkaline earth metal carbonates and bicarbonates like sodium bicarbonate) and an acidic component for liberating carbondioxide from donor. The other ingredients used in the formulation are monosaccharides (glucose, maltodextrin etc.), binders (glycine, polyvinylalcohol) and wetting agents (dioctylsodiumsulphosuccinate). Disintegration with this technology is fast and spontaneous with evolution of carbondioxide.[26]

**1.5.3 Sublimation**:-

Sublimation technique is used to produce MDTs with high porosity and good mechanical strength. In this technique volatile ingredients (e.g. camphor, ammonium bicarbonate etc.) are used along with other tablet excipients. Subliming material like camphor is removed by sublimation from compressed tablets and high porosity is achieved due to the formation of many pores where particles of subliming material previously existed in the compressed tablets prior to the processes of sublimation. These compressed tablets which have high porosity (approximately 30%) rapidly dissolve within in saliva. Commonly the mixture of mannitol and camphor is used as subliming material which is removed from compressed tablets to provide porous tablets with acceptable mouth dissolving properties.[27,28]

**1.5.4 Melt granulation**:-

The melt granulation technique is a process by which pharmaceutical powders are efficiently agglomerated by the use of a low melting point binder, which is added to the other components of the powder. In this technique, binder in molten state acts as a granulating liquid. In this method, the temperature of the mixture is raised to above the melting point of the binder, either by a heating jacket or by the heat of friction generated by the impeller blades if the impeller speed is high enough.[29] The powder mixtures containing the drug is agglomerated using a blend of polyethylene glycol 400 and 6000 as meltable hydrophilic binders. Granular mannitol or granular mannitol/sucrose mixture were used as fillers.[30] This method does not involve any water or organic solvent, which is used in conventional granulation, and hence no drying step is included, which reduces the processing time . Binder having low melting point is not only acting as a binder and increase the physical resistance of the tablet, but also helps in disintegration of the tablet as it melts in the mouth and help in solubilization of tablet in buccal cavity rapidly leaving no residue.[31]

**1.5.5 Moulding**:-

Moulded tablets possess porous structure, which facilitates rapid disintegration and easy dissolutions. Moulded tablets offer improved taste due to water soluble sugar present in dispersion matrix. Molding can be classified depending on the technique used for preparation:-

**1.5.5.1 Compression method**:-

This method involves the preparation of wet mass by moistening the powder blend with a hydroalcohlic solvent followed by compression at low pressure in mould plates to form a better mass. The solvent is then removed by air drying. The tablets manufactured in this manner are less compact then compressed tablet and possesses a porous structure that fastens disintegration and dissolution.

**1.5.5.2 Heat Moulding**:-

The tablet prepared using heat moulding process involves settling of molten mass that contain dissolved or dispersed drug. In this process, the suspension or solution of drug, binding agent and sugar is prepared, which is then finally poured into moulds. Then this mixture is solidified at room temperature to form a jelly which is eventually dried at 30°c under vacuum for solidifiction.[32]

**1.5.6 Freeze drying or lyophilization**:-

Freeze drying is the process in which water is removed from the product after it is frozen. This technique creates an amorphous porous structure that can dissolve rapidly. In manufacturing procedure the active drug is dissolved or dispersed in aqueous solution of a carrier and the mixture is frozen to bring it below its eutectic point in

lyophilizer. Then primary drying is carried out to reduce the moisture around 4% w/w of dry product and finally, secondary drying is carried out to reduce the bound moisture to required volume. Due to lyophilization, bulking agent and drug acquire glossy amorphous structure and thus disintegration and dissolution is enhanced.[33]

**1.5.7 Mass extrusion**:-

In this method, paste of drug and the other ingredients is prepared by using solvent, most commonly ethanol . Then this softened mass is extruded through the extruder to get a cylinder shaped product, after which solvent is removed by evaporation which is then cut in to even segments and finally compressed into tablets which posses the acceptable quality for MDT.[34,35]

**1.5.8 Spray drying**:-

The spray drying technique produces highly pourous and fine powders as the processing solvent is evaporated during the process. In this method to prepare MDTs, hydrolysed gelatin is used as supporting matrix , mannitol as bulking agent, which are prepared by spray drying from a aqueous composition containing gelatin and bulking agent to form highly porous and fine powder at inlet temperature of 140° C and outlet temperature of 60° C . Then this powder is mixed with active ingredients and other excipients and compressed into tablets. [36]

**1.5.9 Highly plastic granule technique**:-

In this technique highly plastic granules are compressed into tablets at low pressure to develop mouth dissolving tablets. The highly plastic granules are composed of three components: a plastic material, a material enhancing water penetration and wet binder; one of the unique property of the highly plastic granule is that the maintain a porous structure even after being compressed into tablet. The porous and the plastic nature of the granules allows fast absorption of water into compressed tablet for fast disintegration and dissolution of the tablet. The tablet possesses enough strength that is suitable for multi tablet packages which is beneficial from industrial point of view. [37]

**1.5.10 Cotton candy process**:-

cotton candy process is so named as it utilizes a unique spinning mechanism to produce floss like crystalline structure, which mimic cotton candy process. This involves formation of matrix saccharides (sucrose, dextrose, lactose and fructose.) at temperature ranging between 80°-85°Cby simultaneous action of flash melting and spinning. The matrix form is particularly recrystalized to have improved flow properties and compressibility. This candy floss matrix is then milled and blended with other ingredients and subsequently compressed to MDTs. [38]

**1.6 Patented technology used for MDTs**

1. Zydis technology.
2. Durasolve technology.
3. Orasolv technology.
4. Flash dose technology.
5. Wowtab technology.
6. Flash tab technology.
7. Frost technology.
8. Oraquick Technology

**1.6.1 Zydis technology**:-

It was the first marketed technology developed by R.P.Scherer,inc.as the zydis technology . It was first mouth dissolving dosage form in the market. It is freeze-dried tablet in which the active drug is incorporated in a water soluble matrix which is made up of a number of ingredients in order to obtain different objectives. Polymers such as gelatin, dextran or alginate are added to impart strength. Manitol and sorbitol is added to impart crystallanity, elegance and hardness. Water is used as a medium to ensure the formation of porous dosage form by lyphilization. The zydis units quickly disintegrate and dissolve in saliva, when put in to mouth.

**Advantages:**

1. Buccal pharyngeal and gastric regions are the areas of absorption from this formulation. Any

pre-gastric absorption avoids first-pass metabolism and can be an advantage in drugs that undergo a great deal of hepatic metabolism.

2. The zydis formulation self-preserving because the final water concentration in the freeze-dried product is too low to allow for microbial growth.[7]

**1.6.2 Durasolv technology**:-

Cima Labs developed this technology. Durasolv has much higher mechanical strength than Orasolv due to the use of higher compaction pressures during tableting . Durasolv product is thus produced in a faster and more cost-effective manner. It is so durable that it can be packaged in either traditional blister packaging or bottles. The drug powder coating in Durasolv may become fractured during compaction, exposing the bitter-tasting drug to a patient's taste buds. Therefore, Durasolv technology is best suited for formulations including relatively small doses of active compound. The tablets made by this technology consist of a drug, fillers, and lubricants, prepared by using conventional tableting equipment, and have good rigidity. Due to higher force of compaction used, tablets prepared are rigid. It is one of the appropriate technologies for product requiring low amounts of active ingredients.

**Advantages:**

1. Durasolv has much higher mechanical strength than its predecessor due to the use of higher compaction pressures during tableting.
2. Durasolv product is thus produced in a faster and in more effective manner.[7]

**1.6.3 Oraslov technology**:-

This technology is used by Cima in the formulation of MDTs. This includes use of effervescent disintegrating agents compressed with low pressure to produce the MDTs. The evolutions of carbon dioxide from the tablet produce fizzing sensation, which is a positive organoleptic property and reduces the affect of bad taste. The concentration of effervescent mixture usually employed is 20-25% of tablet weight.

**Advantages:**

1. The Orosolv formulations are not very hygroscopic.
2. The formulation can accommodate high doses.
3. It also provides a distinct, pleasant sensation of effervescence in the mouth.[11]

**1.6.4 Flash dose technology**:-

This technology is patented by Fuisz. This system used the combination of both shear form and ceform technologies in order to mask the bitter taste of the drug. A sugar based matrix, called floss is used which is made up of a combination of excipients ( crystalline sugar) in combination with drug this processes mimic the cotton candy processes.

Advantages:

1. Flash dose technique is very economical method.
2. It is very effective technique mask the bitter taste of drugs.[11]

**1.6.5 Wowtab technology**:-

Yamanauchi Pharmaceutical company patent this technology .the meaning of wow is without water. The active ingredients may constitute up to 50% w/w of the tablet. In this process, combination of low mould ability saccharides and high mould ability saccharides is used to obtain a rapidly melting tablet. The active ingredient is mixed with a low mould ability salaccharides (lactose, glucose and mannitol) and granulated with a high mould ability saccharide(maltose, oligosaccharides) and compressed into tablet.

Advantages:

1. Offers Superior mouth feel due to the smooth melt action
2. It is suitable for both conventional bottle and blister Packaging
3. Bit more stable to the environment than the zydis and orasolv.[14]

**1.6.6 Flash tab technology**:-

Prographarm lab. have patented this technology. In this technology microgranules of taste masked active drug are used. These may be prepared by using conventional technique like coacervation, microencapsulation and extrusion spheronistaion. All these processes utilize conventional tableting technology. These taste masked microcrystals of active drug disintegrating agent, a swelling agent and other exicipient like soluble diluents are compressed to form a multiparticuate tablet that disintegrate rapidly.[18]

**1.6.7 Frosta technology**:-

Akina patents this technology. It utilizes the concept of formulating plastic granules and compressing at low pressure to produce strong tablets with high porosity. Plastic granules composed of:

i. Porous and plastic material,
ii. Water penetration enhancer, and
iii. Wet Binder.

The process involves usually mixing the porous plastic material with water penetration enhancer and followed by granulating with binder. The tablets obtained have excellent hardness and rapid disintegration time ranging from 15 to 30s depending on size of tablet.

Advantages:

1. Highly plastic granules can be compressed at low pressure to produce fast-melting tablets.
2. MDTs produce by Frosta technology have less disintegration time with low processing cost.[18]

**1.6.8 Oraquick Technology**:-

The Oraquick fast dissolving/disintegrating tablet formulation utilizes a patented taste masking technology. KV Pharmaceutical claims its microsphere technology known as Micro Mask, has superior mouth feel over taste-masking alternatives. The taste masking process does not utilize solvents of any kind, and therefore leads to faster and more efficient production. Also, lower heat of production than alternative fast-dissolving/disintegrating technologies makes Oraquick appropriate for heat-sensitive drugs. KV Pharmaceutical also claims that the matrix that surrounds and protects the drug powder in microencapsulated particles is more pliable, meaning tablets can be compressed to achieve significant mechanical strength without disrupting taste-masking Oraquick claims quick dissolution in amatter of seconds, with good taste-masking.

**Advantage:**

1. Tablets can be compressed to achieve significant mechanical strength
2. Oraquick claims quick dissolution in a matter of seconds, with good taste-masking.[18]

**Table 2: List of Commercially Available Fast Dissolving Tablets [14, 18]:**

| Trade Name | Active Drug | Manufacturer |
|---|---|---|
| Benadryl Fastmelt | Diphenhydramine and pseudoephedrine | Warner Lambert, NY, USA |
| Claritin redi Tab | Loratidine | Schering plough Corp., USA |
| Olanex instab | Olanzapine | Ranbaxy lab. Ltd. New-delhi, India |
| Felden fast melt | Piroxicam | Pfiser Inc., NY, USA |
| Zeplar TM | Selegilline | Amarin Corp., London, UK |
| Romilast | Montelukast | Ranbaxy lab. Ltd. New-delhi, India |
| Torrox MT | Rofecoxib | Torrent pharmaceuticals , India |
| Maxalt MLT | Rizatriptan | Merck and Co., NJ, USA |
| Zyprexia | Olanzapine | Eli lilly, Indianapolis, USA |

| | | |
|---|---|---|
| Zofran ODT | Ondansetron | Glaxo Wellcome, Middlesex, UK |
| Zoming-ZMT | Zolmitriptan | AstraZeneca, Wilmington, USA |
| Nimulid MDT | Nimesulide | Panacea Biotech, New delhi , India |
| Pepcid RPD | Famotidine | Merck and Co., NJ, USA |
| Mosid-MT | Mosapride citrate | Torrent Pharmaceuticals, Ahmedabad, India |

**Future Trends in Mouth Dissolving Tablets:** Although the Rapidly disintegrating tablet area has passed its infancy, as shown by a large number of commercial products on the market there are still many aspects to improve in the MDT formulations. Despite advances in the MDT technologies, formulation of hydrophobic drugs is still a challenge, especially when the amount of drug is high. A new technology is being developed to incorporate higher doses of hydrophobic drugs without affecting the fast disintegrating property too severely.The disintegration times of most MDTs on the market are acceptable—i.e., less than 60 seconds—but certainly there is a room for improvement. Because the disintegration time is related to other formulation variables, a balance has to be maintained between shortening the disintegration time and other tablet properties. The tablet hardness, friability, and stability can be further improved to such a level that multitablet packaging in conventional bottles becomes a norm. The future of MDTs lies in the development of MDTs with controlled release properties. If one MDT can deliver drugs with short half-lives for 12–24 hours, it would be a quantum improvement in the MDT technology. The added convenience and compliance of such formulations would be enormous.The future of RDTs also lies in the development of effective taste-masking properties. Development of effective taste masking technologies, which mask the bad taste of drug without large increase in the weight of final formulation. Further to increase the utilization of natural excipients to reduce the chances of side effects such as natural superdisintegrant and natural sweeteners [39] .

**CONCLUSION**

FDTs is a growing technology, offering considerable benefits for lifecycle management, development timelines, patient convenience and market share. By paying close attention to advances in technologies, pharmaceutical companies can take advantage of MDTs for product line extensions or for first-to-market products. With continued development of new pharmaceutical excipients, one can expect the emergence of more novel technologies for MDTs in the days to come. 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. The clinical studies show MDTs can improve patient compliance, provide a rapid onset time of action, and increase bioavailability. Considering the many benefits of MDTs, it is only a matter of time until a majority of oral formulations are prepared in MDT forms.

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