MOUTH DISSOLVING TABLETS (MDTs)-A REVIEW ARTICLE

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Abstract:
Without water, MDTs immediately dissolve in the mouth or disintegrate. These are genuine mouth-dissolving tablets since they are made to dissolve in saliva amazingly quickly—in less than 60 seconds. To speed up the pace at which a tablet dissolves in the buccal cavity, MDT formulations incorporate super disintegrants. MDTs are a great alternative for elderly and pediatric patients and have benefits including simple production and portability, precise dosing, strong chemical and physical stability. Since MDTs break down and absorb more quickly than other dosage forms, in vitro drug release times are improved, which increases bioavailability. MDT compositions benefit from both the traditional tablet and liquid dosing forms. For the production of MDTs, a number of standard or patented procedures, such as mass extrusion, spray drying, the cotton candy process, sublimation, melt granulation, direct compression, freeze drying/lyophilization, and the phase transition process, have been developed. Brief information regarding MDTs, such as their definition, ideal properties, benefits, needs or requirements, key characteristics, difficulties in designing them, various manufacturing techniques, and evolution parameters for mouth-dissolving tablets, is provided in this article.

Keywords: Mouth dissolving tablets (MDTs), Superdisintegrants, taste masking, patented technology.

Introduction:
The oral route is still the best way to provide therapeutic agents despite significant breakthroughs in drug delivery since it is inexpensive, simple to administer, and encourages patient self-medication, which results in high patient compliance. The most widely used dose forms are tablets and capsules [1]. But "Dysphagia," or trouble swallowing, is a significant disadvantage of such dose formulations. A third of the population nearly 35% is thought to be affected by this.
Additional conditions linked to this illness include:

1. Parkinson's disease
2. Motion sickness
3. Being unconscious
4. Senior citizens
5. Youngsters
6. People with mental disabilities
7. The absence of water.

There is a great deal of need for improved patient compliance. As a result, the demand for such technology is growing tremendously. It takes a lot of money, effort, and time to build a chemical entity. Therefore, efforts are being concentrated on creating new drug delivery methods for already available medications that have improved efficacy and bioavailability, thereby lowering the dose and frequency of dosing to reduce adverse effects [2]. The goal of a scientist or dosage form designer is always to increase a drug's safety while preserving its therapeutic efficacy.

Recent developments in Novel Drug Delivery Systems (NDDS) work toward this goal by creating an easy-to-use dose form to increase patient compliance.

The creation of a Mouth Dissolving Drug Delivery System, or Mouth Dissolving Tablet, has been the focus of pharmaceutical technologists [3]. Some medications' bioavailability may be boosted by oral cavity absorption as well as by pregastric absorption of saliva containing scattered medications that enter into the stomach. Additionally, less medication undergoes first pass metabolism than with conventional pills [4].

**Mouth dissolving tablet (MDT)**

It is a tablet that dissolves quickly in the saliva within a few seconds without the need for chewing or drinking water. Typically, a mouthdissolving tablet dissolves in the mouth between 15 seconds to 3 minutes. Many MDTs contain taste-masking chemicals and certain super disintegrants.

**Ideal properties of MDTs** [5]:

They should:
- Dissolve or disintegrate in the mouth in a matter of seconds;
- Not require water to be swallowed;
- Work well with flavour masking;
- Be transportable without posing a fragility risk;
- Have a satisfying mouthfeel;
- Leave little to no aftertaste in the mouth following oral use;
- Display a low sensitivity to environmental factors like humidity and temperature;
- Permit inexpensive production of the tablet using standard processing and packaging machinery.
Advantages of MDTs [6,5]:

The advantages of both solid and liquid dose forms are offered by MDTs, in addition to specific features like:

1. **Accurate dosing**: Since unit solid dosage forms are easy to manufacture, transport, and store, they offer the benefits of accurate dosing as well as strong physical and chemical stability and make an excellent substitute for young and elderly patients.

2. **Increased bioavailability**: Drugs have increased bioavailability as a result of absorption through the mouth, pharynx, and oesophagus.

3. **Quick action**: The therapeutic effect kicks in quickly as the tablet quickly dissolves and is quickly absorbed in the oral cavity.

4. **Patient compliance**: The dosage form can be swallowed dry. As a result, it is practical for patients who are on the go and do not have quick access to water.

5. **Convenience of administration**: Particularly suitable for elderly, young, mentally challenged, and bedridden patients who have trouble swallowing.

6. **Obstruction free**: This improves safety and compliance because there is no chance of suffocating in the airways from physical obstruction when swallowed.

7. **Improved palatability**: Pleasant mouth sensations, particularly for young patients who are protected from the drug's bitter taste by taste masking techniques.

8. **Simple packaging**: There is no need for special packaging. It may come in push-through blister packaging.


10. **Economical**: The production of tablets is made possible by conventional processing and packaging tools.

Challenges to develop MDTs [7,8]:

1. **Mouth feel**: MDTs shouldn't break up into bigger pieces in the mouth. The MDTs should be broken up into the smallest feasible particles after that. Additionally, the oral sensation is improved by the inclusion of flavours and cooling substances like menthol [4].

2. **Tolerance**: Since most medications are unpleasant to consume, MDTs typically include the medication in a form that masks its taste. After being administered, MDTs break down or dissolve in the patient's mouth, releasing the active components that come into touch with the taste buds. Thus, concealing the taste of the medications is essential for ensuring patient compliance [7,9].

3. **Sensitivity to environmental conditions**: Since the majority of the components used in MDTs are designed to dissolve in a small amount of water, MDTs should show little sensitivity to environmental factors like humidity and temperature [4].
4. Mechanical strength and disintegration time: MDTs are made of either a very porous and soft molded matrix or are compressed into tablets with very little force, which makes the tablets brittle and/or friable, difficult to handle, and frequently necessitates specialised peeloff blister packing that could increase the cost. [7,9] The only tablet manufacturing technologies that can create tablets that are robust and hard enough to be put in multidose bottles are wow tab and durasolv [7].

5. Tablet size: A tablet's size affects how simple it is to administer. 7-8 mm tablets are reportedly the simplest to swallow, while tablets larger than 8 mm were said to be the easiest to handle. As a result, it is challenging to create tablets that are both simple to hold and simple to swallow [7,4].

8. Hygroscopicity: Under normal circumstances of temperature and humidity, a number of orally disintegrating dosage forms are hygroscopic and unable to preserve physical integrity [7,9]. As a result, they require humidity protection, which necessitates particular product packaging [7].

9. Aqueous solubility: Watersoluble medications present a number of formulation difficulties because they create eutectic mixtures that lower the freezing point and lead to the formation of a glassy solid that could collapse upon drying due to the loss of supporting structure during the sublimation process [4,7,9]. Utilizing different matrixforming excipients, such as mannitol, which can induce crystallinity and hence contribute stiffness to the amorphous composite, can occasionally prevent such collapse [7].

10. Drug content: The amount of drug that can be included in each unit dose restricts the use of technologies used for MDTs. The medication dose must be less than 400 mg for insoluble pharmaceuticals and 60 mg for soluble drugs in lyophilized dosage forms [7,9]. This criterion is particularly difficult to formulate when creating mouth-dissolving oral films or wafers [7].

FORMULATION OF MDTs [6,10,11,12]:

The ideal properties of a medicine for oral absorption and pregastrointestinal absorption from MDTs are: Free from bitter taste Dose lower than 20 mg Small to Moderate molecular weight Good solubility in saliva Ability to permeate through oral mucosal tissue.

Bulking materials:

Bulking ingredients play a big role in the creation of fast-melting tablets. The substance provides diluent, filler, and cost-cutting properties. Additionally, increasing bulk also lowers the concentration of the active ingredient in the composition. Bulking agents enhance the textural qualities, which in turn promote the disintegration in the mouth. For increased aqueous solubility and good sensory perception, more sugarbased bulking agents are advised for this delivery system, such as mannitol, polydextrose, lactitol, DCL (direct compressible lactose), and starch hydrolystate. Bulking agents are incorporated into the final composition in amounts ranging from 10% to 90% by weight.

Emulsifying agents:

Emulsifying agents are crucial excipients for creating tablets that dissolve quickly because they speed up medication release without the need for chewing, swallowing, or water. Emulsifying chemicals are also helpful in stabilising immiscible blends and improving bioavailability. For the creation of fastacting tablets, a variety of emulsifiers are advised, including alkyl sulphates, propylene glycol esters, lecithin, sucrose esters, and others. These substances can be included in the final composition in amounts varying from 0.05 to 15 percent by weight.
Lubricants:
Even though they are not necessary excipients, lubricants can help make these tablets more appealing once they dissolve in the mouth. Lubricants take away stickiness and help transfer drugs from the lips down into the stomach.

Flavors and sweeteners:
The products are made more edible and attractive for patients by adding flavours and taste-masking chemicals. These substances help to mask the bitterness and unpleasant tastes of some active compounds.

Table 1: Enlists various existing superdisintegrants and also their mechanism of action.

<table>
<thead>
<tr>
<th>Name of superdisintegrants</th>
<th>Brand name</th>
<th>Concentration (%)</th>
<th>Mechanism of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Starch Glycolate</td>
<td>Explotab, Primogel</td>
<td>2-8%</td>
<td>Swelling</td>
</tr>
<tr>
<td>Micro crystalline cellulose</td>
<td>Avicel, Celex</td>
<td>2-15%</td>
<td>Water wicking</td>
</tr>
<tr>
<td>Cross linked povidone</td>
<td>Cross povidone</td>
<td>2-5%</td>
<td>Swelling, Water wicking</td>
</tr>
<tr>
<td>Low substuted hydroxy propyl cellulose</td>
<td>LH-11, LH-12 (Grades)</td>
<td>1-5%</td>
<td>Swelling</td>
</tr>
<tr>
<td>Crosscarmellose sodium</td>
<td>Ac-Di-Sol</td>
<td>1-3%Direct compression 2-4% wet granulation</td>
<td>Wicking and swelling</td>
</tr>
<tr>
<td>Pregelatinized starch</td>
<td>Starch 1500</td>
<td>1-20%</td>
<td>Swelling</td>
</tr>
</tbody>
</table>

Superdisintegrants:
An excipient called a disintegrant is added to a tablet or capsule mixture to help the compacted mass break apart when it is placed in a fluid environment.

Advantages:
1. Effective in lower concentrations.
2. Less effect on compressibility and flowability.

SELECTION OF SUPERDISINTEGRANTS:
Superdisintegrants typically alter disintegration rate, but when administered at large doses, they can also affect tablet hardness, friability, and tongue feel. Therefore, a number of desirable criteria that should be taken into account when choosing a suitable superdisintegrant for a given formulation include:

- When a tablet comes into contact with saliva in the mouth or oral cavity, they quickly disintegrate.
- Be able to make tablets that are less brittle by being compact.
- Give patients a positive mouthfeeling experience.
- Small particle sizes are therefore selected to ensure patient compliance.
- Flow well, as this enhances the whole blend's flow properties.
Mechanism of Superdisintegrants [13,14]:

The following list identifies the four main mechanisms of tablet breakdown.

1. Swelling:

Swelling is arguably the most generally recognised general mode of action for tablet disintegration. High porosity tablets have poor breakdown because there is insufficient swelling force. On the other hand, the tablet with poor porosity experiences enough swelling force. It is important to remember that when the packing percentage is extremely high, liquid cannot enter the tablet and the rate of disintegration is again slowed down.

2. Porosity and capillary action (Wicking):

The initial stage of disintegration is always capillary action. The intermolecular link of the tablet is weakened and the tablet is broken into small particles when it is submerged in an appropriate aqueous solution, which penetrates the tablet and replaces the air adsorbed on the particles. The hydrophilicity of the medicine or excipient and the tableting circumstances affect how much water is absorbed by the tablet. In order to disintegrate by forming a hydrophilic network surrounding the drug particles, these forms of disintegrants require maintenance of porous structure and low interfacial tension toward aqueous fluid.

![Figure 1: Disintegration of Tablet by Wicking and Swelling.](image)

3. Due to disintegrating particle/particle repulsive forces:

Another disintegration process makes an attempt to explain why a tablet manufactured with 'nonswellable' disintegrants swells. Based on the finding that nonswelling particles also contribute to tablet disintegration, Guyot-Hermann proposed the particle repulsion theory. The mechanism of disintegration is the electric repulsive interactions between particles, and water is necessary for it. Researchers discovered that wicking comes second to repulsion.

4. Due to deformation

Particles that have disintegrated during tablet compression become deformed, and when these deformed particles come into touch with aqueous medium like water, they return to their original structure. Occasionally, when granules underwent significant deformation during compression, the starch’s ability to swell was enhanced. The tablet breaks up as a result of the distorted particles' growth in size. It has only lately been realised that this could be a mechanism of starch.
Various manufacturing techniques for MDDDS include:

1. **Lyophilization**
2. **Moulding**
3. **Direct Compression**
4. **Cotton Candy Process**
5. **Spray Drying**
6. **Sublimation**
7. **Mass Extrusion**
8. **Nanonization**
9. **Fast Dissolving Film**

### 1. Freeze drying/Lyophilization:

One of the earliest methods for making MDT involves the product being frozen first and then the water being sublimated from it. Due to the bulking agents’ and occasionally the drug’s appearance of glossy amorphous structure, the formulations exhibit improved dissolving properties. Relative water insolubility, small particle size, and strong aqueous stability in suspensions are the optimum pharmacological properties for this method. The two main issues with watersoluble pharmaceuticals are the production of eutectic mixture due to a lowered freezing point and the formation of a glassy solid during freezing that may melt upon sublimation. Amorphous material gains stiffness and induces crystallinity when mannitol or other crystal-forming agents are added. The use of the freeze-drying technique has the benefit of allowing medicinal ingredients to be treated at normal room temperature, preventing harmful thermal effects. The usage of this technique is constrained by its high cost of equipment and processing. Lack of the required resistance for the final dosage forms' conventional blister packs is one of the drawbacks [15,16].

### 2. Molding[17]:

In order to achieve maximal drug disintegration, hydrophilic substances are used in the construction of tablets. A hydroalcoholic solvent is used to moisten the powder material before compression into a dosage form. After then, the solvent system is left to evaporate. Spray congealing the molten combination of hydrogenated cottonseed oil, sodium carbonate, lecithin, and polyethylene glycol with an active component into lactose-based tablet triturate creates the flavour of the medication particles. The porous nature of the mass created by the moulding process, which is characterised by the removal of solvents by drying, facilitates quick disintegration.
3. Sublimation:
In this procedure, inert volatile chemicals like urea, urethane, naphthalene, camphor, etc. are added to other excipients before the blend is compressed into tablets. Tablets disintegrate when they come into contact with saliva because pores in the tablet's structure caused by the removal of volatile substance via sublimation. Additionally, a number of solvents, including benzene and cyclohexane, can be used as pore-forming agents. By using this technique, mouthdissolving tablets with a highly porous structure and good mechanical strength have been created[18,11].

Figure 3: Schematic Diagram of Sublimation Technique for Preparation of MDT

4. Spray-Drying[19,20]:
Spray-drying has been employed by Allen et al. to create MDTs. The formulations included sodium starch glycolate/croscarmellose as a disintegrant, mannitol as a bulking agent, and hydrolyzed and unhydrolyzed gelatin as a supportive ingredient for the matrix. By incorporating an acid (like citric acid) or an alkali, dissolution and disintegration were increased even further (e.g., sodium bicarbonate). Spraydrying the excipient suspension produced a porous powder that was then crushed into tablets. This approach produced tablets that decomposed in an aqueous solution in under 20 seconds.

5. Direct compression[21,22]:
The simplest and most economical method of producing tablets is direct compression. Because of the availability of better excipients, particularly super-disintegrants and sugar-based excipients, MDT can be manufactured using this technique.
   (a) Super-disintegrants:
The inclusion of superdisintegrants affects the dissolution by affecting the rate of disintegration. The disintegration is also accelerated by additional substances like effervescent agents and water-soluble excipients.
   (b) Sugar based excipients:
Particularly bulking agents (like dextrose, fructose, lactitol, maltitol, maltose, mannitol, sorbitol, starch hydrolysate, polydextrose, and xylitol) with high aqueous solubility and sweetness are commonly used sugar based excipients because they have a pleasant mouthfeel and taste-masking properties.
   On the basis of moulding and dissolution rate, Mizumito et al. divided sugar-based excipients into two types:
   Type 1 saccharides (lactose and mannitol) exhibit low mouldability but high dissolution rate.
   Type 2 saccharides (maltose and maltitol) exhibit high mouldability but low dissolution rate.
   Process of direct compression [23]
   MILLING-SIEVING -MIXING -COMPRESSION
6. **Mass – Extrusion** [24, 23]:

Using methanol as a solvent and polyethylene glycol, which is water soluble, to soften the mixture of components, it is then extruded into thin cylinders. Which are then further cut into small tablets using a hot blade. With this technique, bittertasting medications can be covered up by creating tiny granules that increase oral bioavailability.

7. **Nanonization** [25, 23,26]:

In a recently created nanomelt technology, the medicine is milled using a patented wet-milling method to reduce the drug's particle size to nano size. Surface adsorption on particular stabilisers, which are then included into MDTs, prevents the drug's nanocrystals from clumping together. This method is especially useful for medications that are weakly water soluble. The quick disintegration/dissolution of nanoparticles, which increases absorption and raises bioavailability while lowering dose, as well as the technology's costeffective manufacturing method, conventional packaging due to its remarkable resilience and wide dose range, are additional benefits (up to 200 mg drug per unit).

8. **Cotton Candy Process** [27,19,20]:

The FLASHDOSE® is an MDDS made utilising ShearformTM and Ceform TITM technologies in order to get rid of the medication’s unpleasant taste. A matrix known as “floss” is created from a combination of excipients, either by themselves or in conjunction with medications, and is prepared using the Shearform technology. The floss is a fibrous substance that resembles cotton candy fibres and is often made of saccharides such as sucrose, dextrose, lactose, and fructose at temperatures between 180 and 266 degrees Fahrenheit. Other polysaccharides, such as polymaltodextrose and polydextrose, can, however, be converted into fibres at temperatures 30–40% lower than sucrose. With this change, thermostable medications may be safely added to the formulation. Due to the quick solubilization of sugars in the presence of saliva, the tablets produced using this procedure have a very porous character and have a very pleasant mouthfeel.

9. **Oral disintegrating or fast dissolving thin films** [23,26]:

It is a cutting-edge instant release tablet that offers a very practical way to take nutrients and prescription drugs. In this method, a non-aqueous solution containing a drug, other taste-mimicking ingredients, and a water-soluble film-forming polymer (such as pullulan, carboxymethylcellulose, hydroxypropyl methylcellulose, hydroxyethyl cellulose, hydroxyl propyl cellulose, polyvinyl pyrrolidone, polyvinyl alcohol, or sodium alginate, etc.) is prepared. The solvent is then allowed. It is possible to include resin adsorbate or coated microparticles of a bitter medication into the film. When this film is put in the mouth, it quickly melts or dissolves, releasing the medication as a solution or suspension. This system’s properties include rapid drug delivery, dissolution in 5 seconds, paper-thin films with a size of less than 2 inches by 2 inches, and flavoured aftertaste.

**PATENTED TECHNOLOGIES:**

1. Zydis technology [28]
2. Orasolv technology [4,8]
3. Durasolv technology [4,29]
4. Wow tab technology [4,28,29,30]
5. Flash dose technology [28,29,31]
6. Flashtab technology [32,33]
7. Oraquick technology [28,34]
9. Advatab technology [33]
10. Nanocrystal technology [4,28,35]
11. Pharmabust technology [4,35]
EVALUATION PARAMETERS [37,38,39,40,41]:

Preformulation studies for mouth dissolving tablet [42, 43]:
The term "preformulation study" refers to pharmaceutical and analytical research done prior to and in support of formulation development activities of the drug substance's dosage form. Preformulation provides the fundamental knowledge needed to create a formulation that is appropriate for toxicological use. In addition to providing the framework for the drug combination with pharmaceutical excipients in the dosage form, it provides information necessary to define the nature of the drug substance. So, using the drug sample that had been collected, the following preformulation investigations were carried out.

1. Bulk Density (Db):
It is the proportion of the powder's total mass to its bulk volume. The weight powder, which had been put through a standard sieve #20, was poured into a measuring cylinder, and the starting weight was recorded. The bulk volume is the original volume. Using this information, the bulk density is computed using the following formula. It is provided by and stated in g/ml.

\[ Db = \frac{M}{V_b} \]

Where M is the powder's mass and \( V_b \) is the volume of the powder in bulk.

2. Tapped Density (Dt):
It is the proportion of the powder's overall mass to its tapped volume. The powder was tapped 750 times to determine its volume, and if there was a difference of less than 2% between the two volumes, the tapped volume was documented. If it is higher than 2%, tapping is repeated 1250 times, and the volume of taps is recorded. Tapping was kept up until the volume difference between each successive reading was under 2%. (in a bulk density apparatus).

It is calculated using \( Dt = \frac{M}{V_t} \) and is expressed in g/ml.

Where M is the powder's mass and \( V_t \) is the powder's tapped volume.

3. Angle of Repose (θ):
The angle of repose can be used to calculate the friction forces in loose powder (θ) It is a sign of the powder's flow characteristics. It is described as the greatest angle that can be formed between the powder pile's surface and the horizontal.

\[ \tan (\theta) = \frac{h}{r} \]

\[ \theta = \tan^{-1} \left( \frac{h}{r} \right) \]

The angle of repose is \( \theta \). The height in cms is h. The radius in cms is r. The funnel was set up on a stand at a specific height, and the powder mixture was allowed to flow through it (h). The height and radius of the powder pile that resulted were then measured in order to determine the angle of repose. The powder particles were carefully watched to ensure that they would roll and slide through the funnel's sides. Angle of repose and powder flow characteristics are related.
Table 1: Angle of Repose as an Indication of Powder Flow Properties.

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Angle of Repose</th>
<th>Type of Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;20</td>
<td>Excellent</td>
</tr>
<tr>
<td>2</td>
<td>20-30</td>
<td>Good</td>
</tr>
<tr>
<td>3</td>
<td>30-34</td>
<td>Passable</td>
</tr>
<tr>
<td>4</td>
<td>&gt;34</td>
<td>Very poor</td>
</tr>
</tbody>
</table>

4. Carr’s index (or) % compressibility: It indicates powder flow properties. It is expressed in percentage and is given by the formula:

\[ I = \frac{D_t - D_b}{D_t} \times 100 \]

Where, Dt is the tapped density of the powder and Db is the bulk density of the powder.

Table 2: Relationship between % compressibility and flow ability

<table>
<thead>
<tr>
<th>% Compressibility</th>
<th>Flow ability</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-12</td>
<td>Excellent</td>
</tr>
<tr>
<td>12-16</td>
<td>Good</td>
</tr>
<tr>
<td>18-21</td>
<td>Fair Passable</td>
</tr>
<tr>
<td>23-35</td>
<td>Poor</td>
</tr>
<tr>
<td>33-38</td>
<td>Very Poor</td>
</tr>
<tr>
<td>&lt;40</td>
<td>Very Very Poor</td>
</tr>
</tbody>
</table>

Evaluation of mouth dissolving tablets:

1. Weight variation Test [44]:

20 tablets were chosen at random from the batch, and each one was weighed to look for weight variance.

Table 3 displays the weight variation specification according to I.P.

Specifications for Weight Variation Per IP

<table>
<thead>
<tr>
<th>Average wt of Tablet</th>
<th>% Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>80mg or less</td>
<td>±10</td>
</tr>
<tr>
<td>More than 80mg but less than 250mg</td>
<td>±7.5</td>
</tr>
<tr>
<td>250mg or more</td>
<td>±5</td>
</tr>
</tbody>
</table>

The % weight variation of each individual tablet from the average weight is calculated by the given formula,

\[ \% \text{Weight Variation} = \frac{\text{Individual weight of each tablet} - \text{Average weight of 20 tablets}}{\text{Average weight of 20 tablets}} \times 100 \]

2. Hardness [45]:

Utilizing hardness testers such as those made by Pfizer and Monsanto, among others, the tablet’s hardness was tested. The amount of force needed to break the tablets is proportional to how hard they are (kg/cm²).

The measured values must match the reference value.

3. Friability (F) [46]:

Using the Roche or Electro lab friabilators, the tablet’s friability was determined. In a plastic chamber that rotates at 25 revolutions per minute and drops a tablet from a height of 6 inches with each revolution, this gadget treats the tablet to the combined effects of abrasion and shock. The friabulator was loaded with a preweighted sample of tablets, and it was rotated 100 times. A delicate muslin cloth was used to dust the tablets, and they were reweighed.

The formula yields the friability (F).
4. **Wetting time:**
The key factors for mouth-dissolving tablets are wetting time and water absorption ratio. With the next technique, you may determine how long the pill needs to wet. In a tiny Petri dish filled with a watersoluble dye solution, a piece of filter paper that had been cut in a circle was put. The time needed for the tablet to completely wet was measured after the tablet was placed on the paper (Figure 7). Tissue paper that had been folded twice was utilised by Bi Y. et al. and placed in a little culture dish (i.d. = 6.5 cm) with 6 ml of water.

![Wetting time](image)

*Figure 7: Wetting time of Mouth dissolving tablet. The time taken for appearance of dye colour on tablet is wetting time.*

5. **Water absorption ratio:**
Comparable to the method used to determine wetting time (Figures 8). However, in this case, the tablet's initial weight and final weight (after thorough soaking) were assessed, and the water absorption ratio was determined using the following formula:

\[ R = \frac{(W_a - W_b)}{100} \]

Where \( W_a \) and \( W_b \) are the weights of the tablet before and after wetting, respectively, and \( R \) is the water absorption ratio.

6. **Uniformity of dispersion:**

Two tablets were maintained in 100 ml of water and swirled for two minutes at random. 22 meshes were used to filter out the dispersion. If there is no trace of residue on the tablet's screen, it is said to have passed the test.

7. **Stability studies:**

During preformulation, several stability investigations, including rapid stability studies, intermedia
te stability studies, and long term stability studies, were conducted. To determine their effects on the stability of the mouthdissolving tablet, the sample was exposed to higher temperatures, more humidity, or both.

8. **Taste or mouth feel:**

The mouth feel of the tablets was evaluated on healthy human participants. For one tablet, the mouthfeel was assessed. A five-person panel uses the time-intensity method to assess how the mouth feels. A 40 mg sample was held in the mouth for 10 seconds, and the opinion was scored using a range of values.

(0: excellent, 1: flavourless, 2: hardly bitter, 3: bitter, and 4: terrible).

9. **In-vitro disintegration time**[^47]:

Disintegration is the term for the breaking down of a tablet into smaller pieces. Using disintegration test equipment that met I.P. requirements, the invitro disintegration time of a tablet was calculated. Six tubes in the basket, each holding one tablet, were filled. Each tube should have a disc added before the device is operated with pH 6.8 (simulated saliva fluid) kept at 37°C as the immersion liquid. The assembly should be raised and lowered 30 times.
per minute in a pH 6.8 solution that is kept at a temperature of 37°C. The amount of time, measured in seconds, needed for the tablet to completely dissolve, leaving no discernible mass inside the device, was noted.

10. In-vitro dissolution studies[45]:
Six tablets were chosen at random and submitted to drug release tests using a USP dissolution apparatus. A volume of 900 ml of dissolution liquid was utilised, and a temperature of 37 0.5 oC was maintained. Up to 30 minutes, 5 ml of the sample was taken at 5 minute intervals and replaced with 5 ml of new buffer solution. The samples were filtered and appropriately diluted, then an HPLC system or UV spectrophotometer was used to conduct the drug assay. The outcomes were contrasted with reference values.

CONCLUSION:
Tablets that dissolve in the mouth have a number of pharmacological benefits, such as increased efficacy compared to traditional dose forms. For instance, they offer better drug bioavailability than standard tablets and capsules, require lower doses of active ingredient to be effective, and improve absorption profiles. Additionally, they might be appropriate for oral drug delivery of medicines like protein and peptide based therapies, which have a low bioavailability when taken orally. These products often break down quickly in the stomach. Due to the potential for pregastric absorption of medications administered by MDTs, which may be appropriate for delivering relatively low molecular weight and highly permeable pharmaceuticals to buccal and mucosal tissues of the oral cavity. MDTs and drug delivery have a lot of room for development in the future, but the technology is still in its infancy.

REFERENCES:


