International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Fast Dissolving Tablet

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Abstract:
Fast dissolving tablets (FDTs) are a sort of oral strong measurement structure that crumbles or disintegrates rapidly in the oral cavity, bringing about fast medication retention and beginning of activity. These tablets have acquired fame because of their benefits over ordinary tablets, including simplicity of organization, expanded patient consistence, and further developed bioavailability. FDTs can be ready by different strategies, including direct pressure, freeze-drying, sublimation, splash drying, and hot-soften expulsion. They can be intended to deliver the medication quickly upon contact with spit or after a particular time delay, contingent upon the medication's physicochemical properties and restorative prerequisites. The definition of FDTs includes the utilization of different excipients, for example, super disintegrants, sugars, flavors, and oils, to work on the tablet's taste, mouthfeel, and crumbling time. The decision of excipients relies upon the medication's properties and the ideal disintegration profile. FDTs have tracked down applications in different remedial regions, including analgesics, antiemetics, allergy meds, and cardiovascular medications. They are especially valuable for drugs with a limited restorative window, where quick beginning of activity is basic, and for patients who experience issues gulping ordinary tablets. All in all, FDTs are a promising medication conveyance framework that gives a helpful, patient-accommodating, and compelling approach to managing drugs. With the rising interest for effective and simple to-regulate drug items, the FDT market is supposed to fill fundamentally before very long.

Keywords: Fast dissolving tablets, (FDTs), Orodispersible tablets, Superdisintigrants, Mouth dissolving tablets (MDTs).

Introduction :

Fast Dissolving Tablets (FDTs) are a sort of oral strong measurements structure intended to break down or deteriorate rapidly in the oral hole without the requirement for water or biting. These tablets are otherwise called Orodispersible tablets, Quickly breaking down tablets, or Dissolve in-mouth tablets. FDTs are especially helpful for patients who experience issues gulping customary tablets or cases, like the old, youngsters, and people with dysphagia or a feeling of dread toward stifling. They can likewise give a more helpful and watchful dosing choice for patients who are in a hurry. FDTs regularly contain a superdisintegrant or potentially a mix of other excipients to help with the fast disintegration or crumbling of the tablet.

Fast dissolving tablets are designed to dissolve in saliva remarkably faster, within a few seconds (less than 60 seconds), and those are real fast-dissolving tablets. FDTs formulations contain super disintegrants to enhance the disintegration rate of a tablet in the buccal cavity.

Fast-dissolving tablets The tablet is the most widely used dosage form now in use due to its ease of self-administration, compactness, and simple manufacture.

However, patients with conditions like hand tremors, dysphasia (in the case of senior patients), and underdeveloped muscular and nervous systems have difficulty swallowing the tablets. Patient compliance may suffer as a result of this. Fast Dissolving Tablets (FDT) have become a popular alternative oral dose form to address these shortcomings. These are unique tablet types that dissolve, disperse, or disintegrate in saliva in a matter of seconds. The most common method of administering medication for disease is through the oral route.

Tablets are a frequently prescribed dose form due to their self-administration accessibility, firmness, and ease of manufacturing Patients, especially young children and the elderly, frequently have difficulty swallowing conventional tablets, an issue that may get worse when travelling because of the lack of or limited access to water.

The creation of mouth-dissolving tablets can address these issues with traditional dose forms.

In just 20 to 30 seconds, these tablets dissolve in the mouth and come into contact with saliva, causing the active ingredient to begin acting therapeutically. Compared to traditional tablets, mouth-dispersing tablets exhibit higher patient compliance and acceptance as well as increased bioavailability, efficacy, and biological characteristics.

Fast-dissolving tablets instantly dissolve when placed on the tongue, releasing the medication, which then dissolves or disperses in the saliva. faster the drug into solution, quicker the absorption and onset of clinical effect. Some drugs are In these circumstances, the drug's bioavailability is considerably higher than what is often seen with dosage forms of regular tablets.

such cases, bioavailability of drug is significantly greater than those observed from conventional tablets dosage form. The difficulty swallowing is a common occurrence in elderly patients due to anxiety about choking, hand tremors, dysphasia, in young people due to underdeveloped neurological and muscular systems, and in patients with schizophrenia due to poor patient compliance. A third of the population, mostly children and the elderly, has trouble swallowing. This results in low adherence to oral tablet drug therapy, which lowers the overall effectiveness of therapy. Because of this, tablets that can dissolve or disintegrate quickly in the mouth have drawn a lot of interest. These tablets are made to dissolve or disintegrate quickly in the saliva, usually in less than 60 seconds. Pharmaceutical technologists have created novel oral dosage forms known as orally disintegrating (dispersible) tablets (ODTs), Fast Disintegrating (dissolving) tablets (FDTs), mouth Melting Tablets (MMTs), or mouth Dissolving Tablets (MDTs), which dissolve quickly in saliva without the need for water, to meet these medical needs. More than half of the patient population prefers FDTs to dosage forms, according to recent market studies.

Criteria for Fast dissolving Drug Delivery system:

- The tablets should:
- Not require water to swallow, but it should dissolve or disintegrate in the
- mouth in matter of seconds.
- Be compatible with taste masking.
- Be portable without fragility concern.
- Have a pleasant mouth feel.
- Leave minimum or no residue in the mouth after oral administration.

- Exhibit low sensitive to environmental condition as temperature and humidity.
- Be harder and less friable

Concept of fast Dissolving tablet:

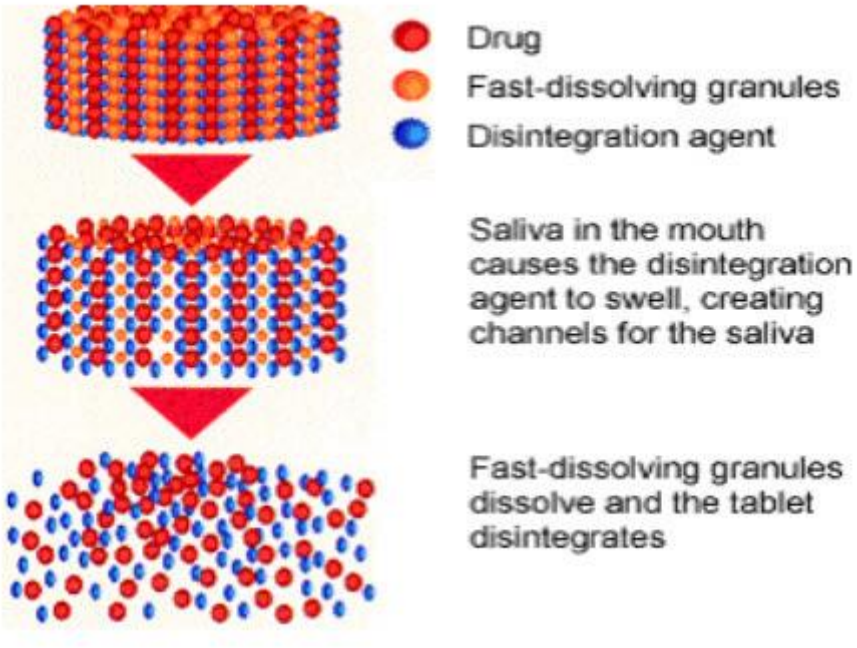

Figure no :1 Concept of FDT.

Advantages:

- Ease of administration to the patient who cannot
- swallow, inclusive of elderly, stroke victims, bedridden
- patients, affected person suffering from renal failure and
- patient who refuse to swallow such as paediatrics, geriatric
- & psychiatric patients.
- Quick onset of action and improved bioavailability.
- improved patient compliance.
- Helpful in more convenient dosing.
- There is no risk of choking, as in case of tablets and capsules.
- Enhanced stability as compared to other dosage forms.
- Taste masking of bitter drugs can be done.
- These films have both site specific and local action.
- Rapid disintegration and dissolution of films leads to rapid drug release..

Disadvantage:

- The major disadvantages of FDTs is related to the mechanical Strength of tablets.
- FDT are very porous and soft molded metrics or compressed in a Tablet with low compression, which makes tablet friable and brittle Which difficult to handle.
- Costly technique, and stability problem at high temperature.

- Bad tastes drugs are difficult to formulate as FDT; special Precaution should have to be taken before formulate such kind of Drug. .
- These tablets may leave unpleasant taste and/or grittiness in mouth if not formulated.
- Drugs with larger doses are difficult to formulate Into FDT .

❖ **Drug eligible for Fast Dissolving tablet:**

Fast Dissolving Tablets (FDTs) are an innovative dosage form that dissolve quickly in the mouth or dissolve rapidly in water, making them a convenient and easy-to-use option for patients who have difficulty swallowing conventional tablets or capsules.

Several types of drugs are eligible for FDT formulations, including:

Class Of Drug	Drugs	Uses
Analgesic	Ibuprofen,Aspirin	Pain relief
Antihistamine	Cetrizine , Promethazine	Allergy
Antiemetic	Ondansetron	Nausia and Vomiting
Cardiovascular	Furosemide, warfarine	Angina &Heart failure
Antidepressants	Citalopram,Fluoxetine	Depression
Antianxiety	Lorazepam	Anxiety disorder
Antiepileptics	Lamotrigine,Clobazam	Seizure and epilepsy
Bronchodilators	Albutamol,Salbutamol	Respirator disorder
Antifungal	Flucanazole, Clotrimazole	Fungal infection
Anticoagulant	Warfarine	Prevent blood clots
Antimalarial	Chloroquine ,Primaquine	Malaria infection

❖ **Preparation Techniques For Fast Dissolving Tablets**

1. Lyophilization

Typically, this technique is used to dry medications that are sensitive to heat. Low temperatures are used while drying, and water is eliminated through sublimation. The creation of a glossy, amorphous structure after freeze-drying produces a product that is extremely porous and light in weight.

When placed on the tongue, the resulting pill quickly disintegrates and dissolves, releasing the medication. This technology's main benefit is that it delivers a faster rate of disintegration, but the process is highly pricey and requires particular packaging techniques. Since these tablets are less stable in a changing environment, correct storage conditions must be maintained; hence, unique packaging techniques are needed.

2. Tablet moulding

The very porous nature of tablets created during the moulding process leads to a rapid rate of dissolution. In this procedure, the medications are moistened, dissolved, or dispersed with a solvent before being shaped into tablets. Prior to preparation, the powder combination may be sieved to improve solubility. The powder mixture is wet with a hydro-alcoholic solvent before being compressed into tablets at a lower pressure than usual. Air drying is then used to remove the solvent.Compressed tablets are much more compact than moulded tablets. These are permeable, which facilitates dissolution.

Because these are produced from water soluble excipients, they dissolve quite quickly. The manufacturing of tablets using a moulding technique is simpler to scale up for industrial use than the lyophilization procedure. Cheaper and less mechanically strong are tablets that have been moulded.

3. Direct compression

The simplest and most economical method of producing tablets is direct compression. Due to the availability of improved tabletting excipients with improved flow, compressibility, and disintegration qualities, particularly tablet disintegrants, effervescent agents, and sugar-based excipients, this technology can now be used for the formulation of FDT. The kind of disintegrant and its quantity are crucial factors. Disintegration is influenced by a number of variables, including disintegrant type and concentration, contact angle, pore size distribution, tablet hardness, and particle size distribution.

4. Cotton – candy process

In this procedure, FLOSS, a matrix created from the combination of the receivers alone or with the medications, is created using Shearform technology. The floss's fibrous structure is comparable to cotton candy fibres. At temperatures ranging from 180 to 266 °F, saccharides including sucrose, dextrose, lactose, and fructose are frequently used to make floss. At temperatures between 30 and 40% lower, other polysaccharides including polymaltodextrins and polydextrose can be converted into fibres.

5. Spray drying

By spraying the feed into a hot drying medium, feed can be converted from a fluid condition to a dried particle form. The particle support matrix used in this method is created by spray drying the solvent. The active chemicals are then transported by this matrix. The formulations include sodium starch glycolate or crosscarmellose sodium as a disintegrating agent, hydrolyzed and non-hydrolyzed gelatins as binding agents, mannitol as a bulking agent, and an acidic and/or an alkaline substance (such as sodium bicarbonate) to promote dissolution and disintegration. In a spray dryer, the mixture is finally spray-dried. Because the processing solvent may be dried with ease, spray drying is frequently used to produce goods with high porosity in fine powder. This approach results in fast-dissolving tablets that dissolve in less than 20 seconds.

6. Sublimation

Using this method, a tablet is created by compressing the active medication, a chemical that causes volatilization, and other ingredients. The volatile components are removed from the tablets after compression, leaving behind a highly porous tablet that dissolves quickly in saliva and may be readily broken down. Camphor, hexamethylene tetramine, ammonium bicarbonate, urea, ammonium carbonate, and other volatile compounds may be employed. As a tablet matrix material and for sublimating the substance, mannitol and camphor were utilised, respectively. Camphor was sublimated in a vacuum for 30 minutes at 80 C to create pores in the tablets, resulting in highly porous tablets with acceptable mechanical strength and a high dissolving rate.

7. Taste masking

Fast dissolving tablets must include taste masking in order to be successful commercially. There are many ways to disguise the taste of the active substances. The pH-sensitive acrylic polymers can microencapsulate medications with unpleasant bitter tastes. By using solvent evaporation and solvent extraction procedures, cefuroxime axetil is microencapsulated in a variety of acrylic polymers (such as Eudragit E, Eudragit L-55, and Eudragit RL). These polymer micro spheres demonstrated quick and complete disintegration as well as effective taste masking. The bitter taste of sparfloxacin was covered up by the fine granules of medication and disintegrant (such as low substituted hydroxypropyl cellulose) when they were coated with a water insoluble polymer (such as ethyl cellulose). When compared to the drug's traditional tablets, the addition of low substituted hydroxypropyl cellulose as a disintegrant to the drug's cores enhanced the drug's dissolving rate and bioavailability.

8. Mass extrusion

With this technology, the active blend is softened using a solvent solution of water-soluble polyethylene glycol and methanol, and the softened mass is then ejected through an extruder or syringe to produce an extrude with a cylindrical shape that is then cut into even segments using a heated blade to create tablets. Drug granules that are bitter can also be coated in this manner to hide their flavour.

9. Melt granulation

A meltable binder is used in the procedure to effectively agglomerate pharmaceutical powders. The benefit of this method over traditional granulation is the absence of water and organic solvents. The procedure takes less time and uses less energy than wet granulation because there is no drying step. Enhancing the dissolution rate of medications that are weakly water-soluble, like griseofulvin, is a beneficial method. This method involves using a hydrophilic waxy binder (Superpolystate, PEG-6) to create FDT with adequate mechanical integrity.

10. Nanonization

Through the use of a patented wet-milling procedure, a recently developed Nano melt technology reduces drug particle size to nano size. Surface adsorption on certain stabilisers stabilises the drug's nanocrystals against agglomeration before they are integrated into tablets that dissolve quickly. This method is particularly helpful for poorly water soluble medicines.

❖ **Excipients use in fast Dissolving tablet:**

Fast Dissolving Tablets (FDTs) are pills that dissolve quickly in the mouth without chewing or the use of water. Excipients are essential in the formulation of FDTs because they help the tablet dissolve fast in the oral cavity.

Some commonly used excipients FDT Include:

1) Superdisintigrants:

The main excipients used in FDTs are superdisintegrants. Tablets dissolve quickly in the mouth likes to superdisintegrants such crospovidone, sodium starch glycolate, and crosscarmellose sodium.

2) Sweeteners:
FDTs frequently contain sugars like aspartame, sucralose, or mannitol to further develop taste and attractiveness.
3) Flavouring agent :
Seasoning specialists like peppermint, orange, or cherry are utilized to upgrade the taste and mouthfeel of the FDT.
4)Binder:
Folios like microcrystalline cellulose (MCC) and lactose are utilized to further develop tablet hardness and stability.
5) Lubricant:
Oils like magnesium stearate or stearic corrosive are utilized to lessen grating between the tablet and the bite the dust during tablet compression.
6) Disintegrate:
Disintegrants like croscarmellose sodium and sodium starch glycolate are utilized to work with tablet breaking down.
7) Fillers:
Fillers like mannitol, sorbitol, and lactose are utilized to further develop tablet volume and solidness.
8) Surfactant:
Surfactants like sodium lauryl sulfate are utilized to further develop wettability and disintegration of the tablet.
The choice and amount of excipients used in FDTs depend on the drug's physicochemical properties and the desired tablet characteristic

❖ **Mechanism of Superdisintigration:**
1) Swelling:
Superdisintegrants which act by this system work on the basic of “swell” and “burst”
At the point when the Super-Disintegrant interacts with the water/spit, the fluid stage additional items more cement force Upon the superdisintegrant when contrasted with other excipients and drug bringing about enlarging and trust or falling to pieces Of the tablet

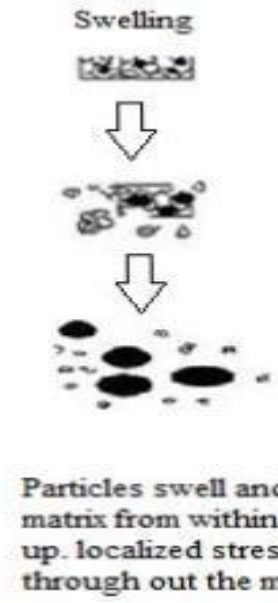

Figure no 2 : mechanism of swelling

Most of the Superdisintegrants follow this mechanism. Of them, the widely used are starch and its modifications.

Given below is the list of the natural as well as the synthetic Superdisintegrants having swelling mechanism.

2) Wicking or Capillary action :

This component recommends that basically every one of the particles of the tablet are surface wetted in the given watery media.Water then, at that point, enters into the center of the tablet, decreasing the between molecule bond accordingly supporting breaking of the tablet.Accordingly it is named as fine activity or wicking as leisurely, the wetting ascends in the tablet with extreme aftereffect of breakage of tablet. Here the porosity of the tablet is absolutely critical as it is the key prerequisite for simple and fast wetting/water take-up. The more permeable the material the more noteworthy the pace of wetting and disintegration time is less.

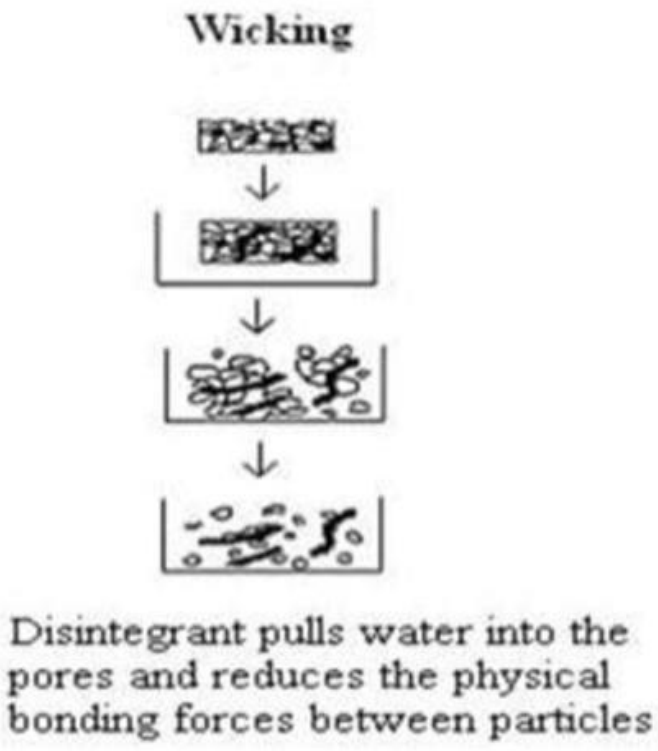

Figure no. 3 :Mechanism of Wicking

3) Repulsion:

Guyot-Hermann has proposed a molecule repugnance hypothesis. This hypothesis expresses the enlarging by means of tablet made of "nonswellable" disintegrants. This deals with the rule of electric horrendous power of particles. It is obligatory for the tablet to interact with water consequently creating appalling power, causing particles to repulse one another and accordingly the tablet breaks down.

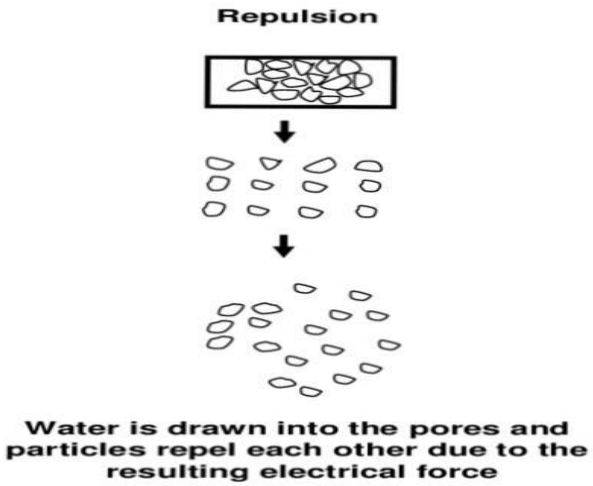

Figure no. 4 Mechanism of Repulsion

4) Deformation:

Disintegrant particles' shapes are altered during pressure, but they recover to their original shapes after being moistened. The mechanism of action of disintegrants may contain a large portion of such a wonder. For instance, povidone and starch that almost never swell. The breaking apart of the tablet by repulsion and deformation forces was shown

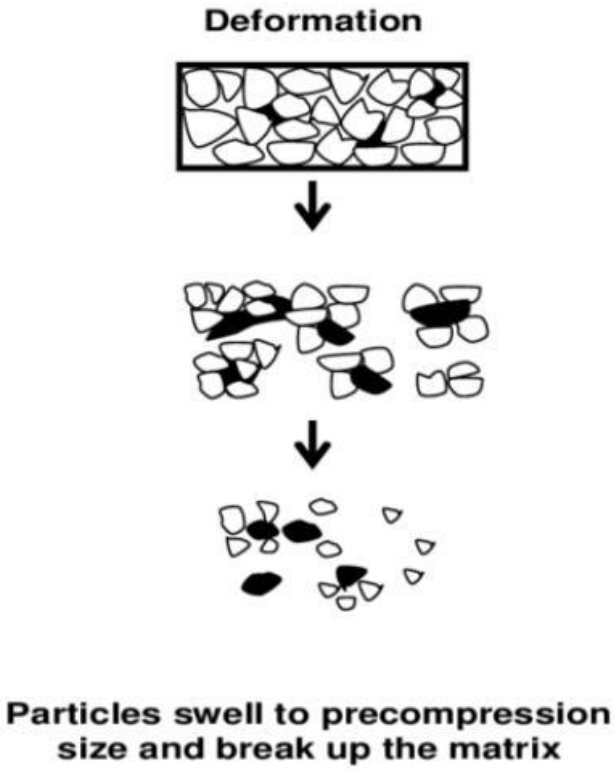

Figure no. 5:Mechanism Deformation

- **Patent Technology :**

Fast dissolving tablets (FDTs) are a sort of oral dose structure that quickly break down and disintegrate in the mouth without the requirement for water. They are intended to work on quiet accommodation, consistence, and adherence to prescription regimens. A few patent innovations connected with quick dissolving tablets are:

1) Zydis Technology:

This innovation utilizes a freeze-drying interaction to make a permeable grid of the dynamic fixing and other excipients. The tablet breaks down in the mouth in no time, delivering the medication for retention.

***2) Wowtab Technology* :**

This innovation includes a cycle called “pressure forming,” which makes a tablet with a profoundly permeable design that breaks down quickly in the mouth. The tablet likewise contains a super-disintegrant to work with fast crumbling.

***3)Orasolv Technology*:**

This innovation includes a cycle called “sublimation,” which makes a tablet with an exceptionally permeable construction that breaks down rapidly in the mouth. The tablet likewise contains a super-disintegrant to work with fast breaking down.

***4) Flash Dose Technology*:**

This innovation utilizes a cycle called "direct pressure" to make a tablet that breaks up rapidly in the mouth. The tablet contains super-disintegrants, which work with the fast breaking down of the tablet.

5) Adva Tab Technology :

AdvaTab innovation is a licensed innovation that utilizes a blend of pressure and deterioration advances to make a quick dissolving tablet.

6) Lyoc Technology:

This innovation utilizes a freeze-drying cycle to make a permeable framework of the dynamic fixing and other excipients. The tablet deteriorates in the mouth in practically no time, delivering the medication for retention. It likewise contains a super-disintegrant to work with quick deterioration.

7) Oraquick Technology:

This licensed innovation utilizes a blend of superdisintegrants and taste-concealing specialists to make a tablet that breaks up quickly in the mouth while veiling the unpleasant taste of the medication. This makes it ideal for drugs that are undesirable to swallow.

Conclusions:

Fast dissolving tablets are inventive measurements structures created and Uniquely intended to conquer a portion of the issues that seen in Regular strong measurement structure for example trouble in gulping of theTablet in geriatric and pediatric patients. Quick dissolving tablets are Intended to for the most part break down or deteriorate rapidly in the spit Inside under 60 seconds (scope of 5-60 seconds). Quick dissolving Tablets have better quiet consistence and acknowledgment might move along Biopharmaceutical properties, bioavailability further developed adequacy,Comfort, and better wellbeing contrasted and traditional oral Dose structures. The prominence of FDTs has expanded breathtakingly over The last ten years. FDTs should be planned for crazy patients,Disabled, geriatric, pediatric patients, for those patients who may Not approach water, patients who are occupied in voyaging. FDTs Plans planned by a portion of these convetional and patent Innovations and FDTs have adequate mechanical strength, speedy Deterioration/disintegration in the buccal pit without water. The More up to date advancements used for the plan of the FDTs thatFurnish more viable measurements structures with additional benefits and Insignificant weaknesses.The advances portrayed in this article Show how late advances in detailing Advancement and handling innovations meet the Endeavors to accomplish more complex medication conveyance Framework. As a result of expanded patient interest,Fame of these measurements structures will most likely extend In future.

Reference:

1. Ashish Masih, Amar Kumar, Shivam Singh, Ajay Kumar Tiwari. Quick
a. Dissolving tablets: a survey. Int J Curr Pharm Res 2017;9(2):8-18.
2. D Bhowmik et al , Quick Dissolving Tablet: An Outline, J.Chemical and Pharma.Research, 2009; 1(1), 163-17.
3. Kumari, S., Visht, S., Sharma, P.K., Yadav, R.K., Quick dissolving Medication conveyance framework : Audit Article; J.Drug store Exploration, 2010, 3(6),1444-1449.
4. Bandari, S., Mittapalli, R.K., Gannu, R., Rao, Y.M., Orodispersible tablets: An outline. Asian J Pharm, 2008,2, 2-11.

5. Gajare, G.G., Bakliwal, S.R., Rane, B.R., Gujrathi, N.A., Pawar, S.P., Mouth dissolving tablets: A survey, Int JPharma Res &Deve, 2011, 3(6), 280 – 296.
6. Debjit, B., Chiranjib, B., Krishnakanth, Pankaj, R.Margret Chandira, Quick Dissolving Tablet: An Overview,JSynthetic and Pharma Res,2009, 1(1), 163-177.
7. Kuccherkar, B.S., Badhan, A.C., Mahajan, H.S., Mouth dissolving tablets: An original medication Conveyance framework, Phrma. Times, 2003, 35, 3-10.
8. Amin, A.F., Shah, T.J., Bhadani, M.N., Patel, M.M., Arising patterns in orallyDeteriorating tablets, , 2005.
9. Patel TS, Sengupta M. Quick dissolving tablet innovation.World J Pharm Sci. 2013 Blemish 23;2(2):485-508.
10. Khan Stomach muscle, Tripuraneni A. Quick dissolving tablets-a book
a. Move toward in drug conveyance. Rguhs J Pharm Sci. 2014;1:7-16.
11. Bandari, S., Mittapalli, R.K., Gannu, R., Rao, Y.M.,Orodispersible tablets: An outline. Asian J Pharm, 2008;2:2-11
12. Khanna K, Xavier G, Joshi SK, Patel A, Khanna S, Goel B,Quick Dissolving Tablets-An Original Methodology, Global Diary of Drug Exploration and Unified Sciences, 2016; 5(2):311-322.
13. Hannan Dad, Khan JA, Khan A, Safiullah S, 2016.Oral dispersible framework: another methodology in drugConveyance framework. Indian diary of drug Sciences, 78(1), 2.
14. Habib W, Khankari R, Hontz J, Quick dissolving drug Conveyance frameworks, basic survey in therapeutics,Drug Transporter Frameworks, 17(1), 2000, 61-72.
15. Nand P, Vashist N, Anand A, Drabu S. Mouth dissolving tablets-an original medication conveyance Framework. IJABPT, 2010; 1(3): 890-896.
16. Patel TS, Sengupta M, 2013. Quick dissolving tablet innovation. World J Pharm Sci, 2, 485-508