A Review on: Fast Dissolving Tablet

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Abstract: Novel drug delivery system (NDDS) advancements recently have increased medication safety and effectiveness. Because of its many benefits, the oral route of administration is the traditional dose method. Recently, a fast-dissolving pill was created to increase patient compliance and treat dysphagia, or trouble swallowing. One dose type that is frequently utilized for both pediatric and elderly patients is FDT'S. Fast-dissolving tablets, when taken without water, disintegrate quickly in saliva in a matter of seconds. Oral dissolving tablets are one method. The rate of disintegration is increased by utilizing super disintegrant. Such Parkinson's disease, ODT, and FDT IS appropriate for mentally sick patients. AIDS patients, both pediatric and geriatric.

Keywords:- Fast Dissolving tablet, dosage form, geriatric, paediatric, ODT, MDT.

The first drug administration methods were conventional dose forms. Oral medication administration is the most popular and widely recognized method. Because they are affordable in comparison to other dosage forms, simple to manufacture, allow for self-administration, and may be supplied in oral dosage forms with precise dosages.[1, 2] Disadvantages of these dosage form is difficulty in swallowing[2]. elderly and paediatrics people are difficulty of swallow (Dysphagia) and patients of all age groups have this issue in common.[3] People frequently have difficulty swallowing traditional dose forms, such tablets, when water is scarce, when they have motion sickness (kinetosis), or when they suddenly start coughing up a cold, an allergy, or bronchitis. In the mouth or saliva, fast-dissolving pills can dissolve or break down quickly 4. Within 20 to 30 seconds, the active substance in these tablets starts to dissolve in the mouth, producing the intended therapeutic effect. When compared to normal tablets, fast-disintegrating tablets exhibit increased bioavailability, effectiveness, and biopharmaceutical qualities, as well as patient compliance and acceptability.[5] These types of formulations are widely used in emergency like Cardiac agents, Brain stroke, Asthma, Anti-hyper-lipidemic neurological disorder, AIDS ,diarrhoea etc[1,6]United States Food and Drug Administration (FDA) defined the ODTs or FDTs as "A solid dosage form that containing medicinal substances or active ingredients which disintegrates very rapidly within a few seconds when placed up on tongue."[7,2] According to European Pharmacopoeia, "the FDT should disperse disintegrates in less than three minutes".[7].Mouth dissolving tablets are also named as orodispersible tablets or orally disintegrating tablets or fast disintegrating tablets or quick disintegrating tablets or fast dissolving tablets or porous tablets or rapid dissolving tablets or quick melt tablets and rapid melt tablets.[8]Bioavailability of drug is increased due to absorption in oral cavity and pregastric absorption of saliva .[9] Among Superdisintegrants are composition to promote the tablet's breakdown into tiny particles and provide a quick start to action The substances that were excipients films contain ingredients to cover up the taste of the active main ingredient as well as soluble and insoluble excipients. then that is saliva-swallowed [10].

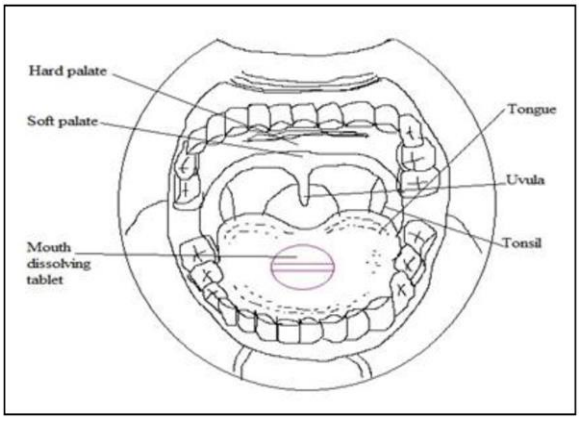

Fig No 1:Administration of Mouth Dissolving Tablet

DRUGS TO BE INCORPORATED IN FAST DISSOLVING TABLETS:[8]

1. Antihypertensive: Felodipine, Amlodipine, Nifedipine, Nimodipine, Diltiazem,
Carvedilol, Prazosin hydrochloride, Terazosin hydrochloride, Benidipine, Darodipine,
Minoxidil, Nicardipine
2. Antiarrhythmics: Quinidine sulphate, Amiodarone hydrochloride, Disopyramide,
Flecainide acetate
3. Analgesics/Anti-inflammatory agents: Ibuprofen, Ketoprofen, Naproxen,
Oxyphenbutazone, Phenylbutazone, Indomethacin, Piroxicam, Mefenamic acid, Diclofenac
sodium, Flurbiprofen, Sulindac
3. Antidepressants: Nortryptaline hydrochloride, Trazodone hydrochloride, Amoxapine,
Mianserin hydrochloride, Paroxetine hydrochloride, Imipramine, Amitryptaline
hydrochloride, Sertraline hydrochloride
4. Antidiabetics: Tolbutamide, Tolazamide, Chlorpropamide, Glibenclamide, Glipizide
f. Antibacterial agents: Ciprofloxacin, antibiotic medication, erythromycin, rifampicin,
penicillin, doxycyclin, nalidixic acid, trimethoprim, sulphacetamide, sulphadiazine
5. Anthelmintics: Albendazole, mebendazole, thiabendazole, livermectin, praziquantel,
pyrantel etc.
6. Diuretics: Amiloride, Furosemide, Acetazolamide, Clorthiazide, Spironolactone,
7. Gastrointestinal agents: Famotidine, Ranitidine hydrochloride, Cimetidine,
Ondansetron, Omeprazole hydrochloride, Granisetron hydrochloride etc.
8. Anxiolytics, sedatives hypnotics & Neuroleptics: Alprazolam, Diazepam, Clozapine,
Lorazepam, Nitrazepam, Midazolam, Phenobarbitone, Thioridazine, Oxazepam etc.
9. Corticosteroids: Betamethasone, Beclometasone, Hydrocortisone, Prednisone,
Prednisolone etc.
10. Antiprotozoal agents: Metronidazole, Tinidazol, Omidazole, Benznidazole, Clioquinol,
Decoquinate etc.

Marketed Products

Table 1:Commercially available fast dissolving tablet.[10]

Trade name	Active drug	Manufacturer
Zofran ODT	Ondansetron	Glaxo Smithkline
Feldene Fast Melt	piroxicam Pfizer	Inc.,NY,U.S.A
Romilast	Montelukast	Sun Pharmaceutical Pvt.Ltd.,New Delhi
Febrectol	Paracetamol	Prographarm, Chateanueuf,France
Nimulid MDT	Nimesulide	Pancea Biotech , New Delhi, India
Pepcid RPD	Fomatidine	Merck
Zelapar TM	Selegiline	Amarin Corp.,Londen,UK
Mosid MT	Mosapride Citrate	Torrent Pharmaceuticals Ltd., Ahmedabad,India
Torrox MT and Zyrof Meltab	Rofecoxib	Torrent Pharmaceuticals Ltd.,Ahmedabad, India
Benadryl Fast melt	Diphenhydramine& Pseudoephedrine	Warner Lambert,NY,USA
Claritin redi Tab	Loratidine	Schering Plough Corp.,USA
Olanex instab	Olanzapine	Ranbaxy lab. Ltd. NewDelhi,India
Maxalt MLT	Rizatriptan	Merck and Co., NJ ,USA
Zyprexia	Olanzapine	Eli lillly, Indianapolis,USA

ADVANTAGES:[8,12]

1. Water is not needed.
2. Patients with mental disabilities, the elderly, and children can all easily get it.
3. Chewing is not necessary.
4. Improved taste.
5. First pass metabolism is reduced and increased bioavailability
6. Enhanced Stability of formulation.
7. Fit for actives with controlled or prolonged relea se.
8. Permits heavy drug load.
9. The capacity to provide liquid medication's benef its as a solid preparation.
10. Economical.
11. Rapid onset of action.
12. There's a chance of high drug loading.
Taste well enough and feel well on the tongue.
13. There is need of particular packaging.

DISADVANTAGES: [7]

1. Hygroscopic in nature drug not suitable for Fast dissolving tablet i.e. drug having moisture absorbing property, keep in dry place.
2. The physical stability of the tablets is typically unsuitable.
3. Tablets that are improperly created may leave the mouth feeling gritty and tasting bad.
4. It is hard to produce drugs at greater doses into tablets that disintegrate quickly.
5. Saliva production reduced shows dryness of the mouth.
6. Patients who take anticholinergic medications on a regular basis might not be the ideal candidates for fast-dissolving pills.
7. The soft, molded metrics and high absorbency of fast-dissolving tablets make them fragile and difficult to handle or construct.
8. For storage and transit, it requires particular packaging.
9. Medications that need to be taken often, have a short half-life, or require controlled or sustained release are not good candidates for FDTs.

IDEAL PROPERTIES: [13]

1. Oral consumption does not need the use of water.
2. Feel good on the tongue not show better taste.
3. Possess a flavor concealing ability that is appropriate.
4. Be less flexible and more firm.
5. After application, nothing remains in the mouth.
6. Show minimal susceptibility to temperatures and moisture in the environment.
7. Permit producing of tablets with normal production and storage tools.
8. Portable
9. Economic

CRITERIA FOR SELECTION OF DRUG : [10, 14]

1. It should have dose lower than 50 mg.
2. Free from bitter taste.
3. The drug needs to dissolve properly in saliva and water.
4. The molecular mass of it need to be modest to moderate.
5. Drug must be able to pass through oral mucosa.
6. The ability to permeate and divide into the GIT epithelium above .
7. Medication that is not appropriate due to its repeated intake and minute half-life .
8. Non ionised in oral cavity.

Ingredients :(10)

Table No 2: Name, weight %, and other excipient details :[12,15]

Name of excipients	% used
Superdisintegrants	1-15%
Binder	5-10%
Antistatic agent	0-10%
Diluent	0-85%

1.Superdisintegrant:

A significant component of fast-dissolving tablets are superdisintegrants. At lower concentrations, superdisintegrants exhibit higher mechanical strength and disintegration efficiency. When superdisintegrants come into interacting with water, they modify, hydrate, alter form or volume, and enlarge. Effective superdisintegrants enhance compatibility and compressibility without negatively affecting the mechanical durability of compounds containing high dose medications. Superdisintegrants include, microcrystalline cellulose, sodium starch glycolate, polyvinylpyrrolidone, cross-linked carboxymethylcellulose (croscarmellose), and maize starch.

Selection criteria for Superdisintegrants: [7.]

1.It should be very little particles.
2. Superdisintegrant should be compatible with other excipients and drugs.
3. It should be non-toxic.
4. It need to show adequate hydration levels.
5. It should having good flow property.
6.Low concentration should be effective for it.
7. When tablets are coming in contact with saliva in oral cavity it should fastly disintegrate.

Classification of superdisintegrant:

1. Natural superdisintegrant:

e.g.-gaur gum,gellan gum, Hibiscus Rosa sinesis,mango peel pectin.

2. Synthetic superdisintegrant:

e.g.crosscarmellose, sodium, sodium starch glycolate, crospovidone, ion exchange resin.

3. Co-processed superdisintegrant:

e.g.ludipress,starlac, starcap1500,ludiflast.

Advantages of Superdisintegrants .[11]
1.Superdisintegrant required in less concentration.
2.Superdisintegrant does not affect compressibility and flowability .

Disadvantages of superdisintegrants.[11]
1.Superisintegrants sensitive to moisture leading to instability.
2.Diluents:
Diluents are the fillers used to increase the volume of tablet. Diluents are generally used to enhance cohesiveness, permit direct compression manufacturing, or promote flow. e.g.: Mannitol, calcium carbonate, sorbitol, calcium sulfate, starch, lactitollactitol magnesium trisillicat.
3. Binder:
Binders are agent employed to impart cohesiveness to the granules. Eg Polyvinylpyrrolidone(PVP), Polyvinylalcohol(PVA), Hydroxypropyl methylcellulose(HPMC).
4. Glidant:
Glidant's is to increase the powder's flowability. E.g.: Talc, starch, magnesium carbonate, silicon dioxide, calcium silicate, and magnesium oxide etc.
5. Antiadherent:
antiadherent works to reduce adhesion between the powder and the punch faces. E.g. Talc, glidant, and magnesium stearate.
6.Flavours and Sweeteners:
To form the tablets more appealing, flavors & sweeteners might be added, masking the tablets' superior taste. In addition to sugar, fructose, and dextrose, non-nutritive sweeteners such sucralose, aspartame, and sodium saccharin are also utilized. Sweeteners are added to the mixture to give it a pleasing taste and body. The flavors peppermint, chilling, anise, clove, bay, eucalyptus soil, thyme, and bitter almond oil are among the flavoring aromatic oils and peppermint oil. Fruit essences, citrus oils, and vanilla are examples of flavoring agents.
7. Colours:
Colouring agents that are commonly used. It includes natural colors, FD&C-approved colors, pigments like titanium dioxide, and more. Colorant concentrations should not be utilized higher than 1%w/w.e.g. Amaranth, sunset yellow, etc

CHALLENGES:[10]
1 .Palatability:
FDTs generally contain undesirable taste. After administration, release the active components that interacting with taste buds by disintegrating or dissolving the FDTs in the patient's mouth. Thus, for the patient compliance taste masking of the drugs is essential.
2. Mechanical strength and disintegration time:
To enable the breakdown of FDTs in the mouth, this are either made from incredibly impermeable soft-molded molds or crushed into tablets with very little compression force, producing tablets that fragile and breakable. Challenging to handle and frequently required blister packaging that could raise and price. WOW Tab abs Durasolv are the only two technologies used for make tablet hard and strong.
3. Aqueous solubility:
Due to the creation of eutectic mixes that decrease the freezing point and may dissolve when dried owing to the lack of structure of supporting when dried, water-soluble pharmaceuticals present a variety of formulation issues. This collapse can occasionally be avoided by using certain excipients that provide a matrix, such as mannitol, which can enhance crystallinity and provide the amorphous compound stiffness.
4 .Hygroscopicity:
Normal humidity level temperature and humidity, a number of hygroscopic orally disintegrating dosage formulations are unable to maintain physical integrity. They therefore require humidity protection, which needs for specific product packaging.
5.Amount of drug:
FDT technology is impacted by the highest quantity of medication that must be included in every dose. A lesser amount than 60 mg of soluble medication or less than 400 mg of insoluble medication are allowed in dehydrated forms of medication. Making oral films or pills that dissolve quickly might be challenging.
6 .Size of tablet:
According to reports, tablets that are 7-8 mm in size are the easiest to swallow, while those that are more than 8 mm are the easiest to handle. It's a challenging the manufacturing of tablet.

SUPERDISINTEGRANT MECHANISMS: [5, 16,17]

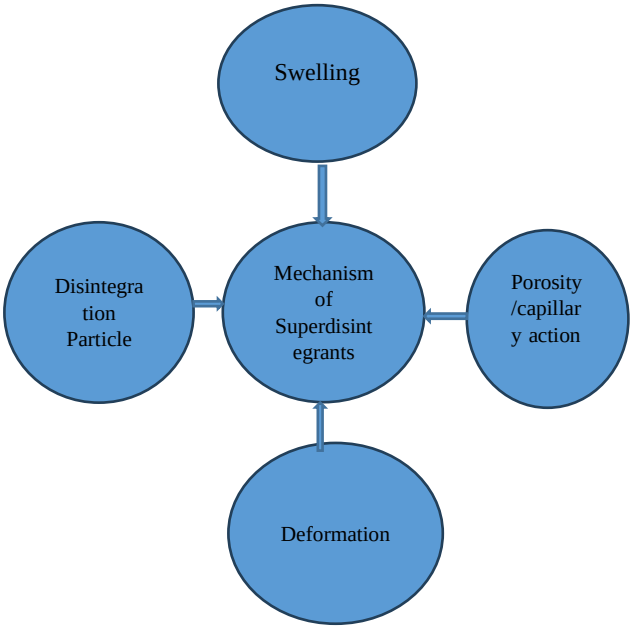

Fig No 2: Superdisintegrant Mechanism

They work by four basic mechanisms:

1.Swelling:

This process causes the formulation to disintegrate When the substance comes into interacting with water since certain breakdown ingredients, such starch, have a dissolving impact. plantago ovata 20 with sodium starch glycolate, for example

2. Capillary Action (Wicking) and Porosity:

Certain super-disintegrants disintegrate due to porosity and capillary action. The broken-down particles work to increase porosity, which creates pathways for liquid to seep into tablets. Subsequently, through wicking or capillary action, such as Crosspovidone and Crosscarmellose**.** [19]

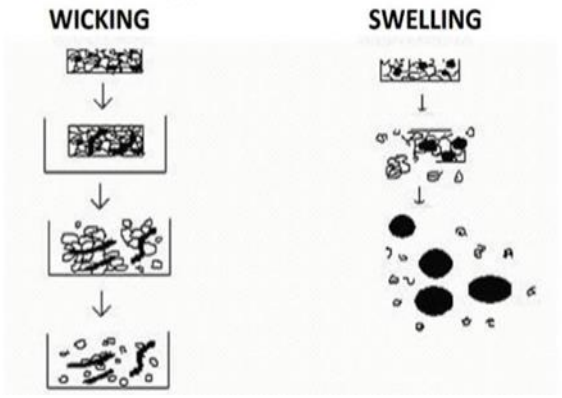

Fig 3:Tablet Disintegration via Wicking and Swelling . [18]

3.Deformation:

The starch grains distorted when pressure was applied, and they returned to their former shape when the pressure was released. Once compacted into tablets, they become distorted when they come into touch with water.

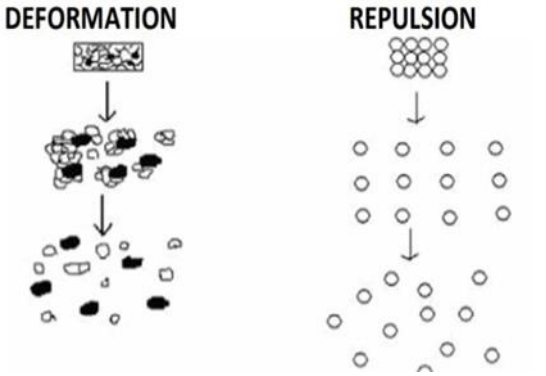

Fig 4: Tablet Breakdown by Wicking and Swelling Repulsion.[18]

4. Due to Disintegrating Particle/Particle Repulsive Forces:

Non-swellable breakdown's are linked to this process. In response, Guyot-Hermann offered the hypothesis of repulsion. This implies that the dissolution of The water creates electric repelling interactions between the particulate matter. [20] Most disintegrants are thought to work through a combination of mechanisms. However, it is the outcome of the interactions between these key mechanisms.[21]

TECHNIQUE USED FOR FDTs:

Various technique used for fast dissolving tablet [22,23,24]

1. Lyophilization &freeze drying .
2. Direct Compression .
3. Tablet Moulding.
4. Spray Drying.
5. Sublimation.
6. Cotton Candy process.
7. Mass Extrution.
8. Nanotization.

1) Lyophilisation and Freeze drying :

This is a pharmaceutical process that uses a vacuum to extract water from medications that are sensitive to heat and biological material that is at a low temperature. The sublimation method is a useful tool. The solutions of the carrier dissolved the medication. In this technique, water sublimates from the substance after freezing. The drug molecule is holds onto a water-soluble aqueous structure then air-dried.In order

to achieve a high drug bioavailability, lyophilization processes involve high porosity, a distinct surface area, and fast dissolution in the mouth.

Disadvantages:

1. Exessive cost .
2.time consuming.

2)direct compression:

Direct compression is the most effective & affordable process for make tablets. Because better excipients are now available, This method is used to manufacture MDT, especially with super disintegrants and sugar-based excipients. This technique does not require preliminary therapy because the tablets are compressed straight from the medication and excipient mixture.Because of Accessibility provides better additives, particularly super disintegrants & sugar-based excipients, this process used to manufactured FDT.

(a)Super disintegrants:[24]

Super disintegrants are added to several oral dissolving tablets techniques, these depends on simple compression as its main foundation. This effectively transmits the rate at disintegration and the dissolution. The breakdawn procedure is further is quickly processed the use of various formulation elements, such as effervescent agents and water-soluble excipients.

(b) Sugar Based Excipients:

The use of excipients derived from sugar, particularly fillers with high aqueous solubility and sweetness, like dextrose, xylitol, fructose, maltilol, lactilol, maltose, mannitol, sorbitol, polydextrose, and starch hydrolysate, It imparts a pleasant mouthfeel and taste masking ability. based on molding and dissolution rate, additives based on sugar are divided into following categories. Lactose and mannitol,

type 1 saccharides, have poor moldability. nonetheless, an accelerated rate of disintegration

Maltose and maltilol,

type 2 saccharides, have high moldability and low dissolution rate.25

3)Tablet Moulding:

Solid dispersion ODTs, also known as molding ODTs, decompose in five to fifteen seconds. [26] the two ways heat and compression molding are ODTs can be prepared using molding techniques. This technique is applied to soluble substances. Compression molding involves compressing the powder blend onto Form molding surfaces a moistened weight after it has been wet with a hydro-alcoholic solvent. After the material has been moistened, Drying in the air eliminates the solvent. The produced tablets have a more permeable structure and are less compact than regular compressed tablets because compression molding has a lower compression force than standard tableting. This accelerates the rates of breakdown and disintegration and dissolution. [27]

4) Spray Drying:

This method uses super disintegrants such croscarmellose, mannitol sodium starch glycolate, or crosspovidone, as well as sodium starch glycolate as a filler and gelatin as a data structure or supporting agent. The very pourous and fine powder is produced by spray drying. The tablets are made with spray-dried powder that contains alkaline and acidic ingredients (citric acid), expanding agent, and super disintegrant. (for example, sodium bicarbonate) were reported to decompose in an aqueous medium in about 20 seconds. The powder that was spray-dried and compacted into tablets proved to dissolve quickly and dissolve better. [24]

5) Sublimation:

After adding additional excipients, volatile substances such as urea, naphthalene, etc., the compound is compacted into tablets or medication. Then the volatile components are then eliminated, which leads to the development of pores in the tablet's structure so that saliva can dissolve the tablet. Using this technique, Highly permeable MDTs with strong mechanical properties have been developed.[24] MDTs with the use of camphor, a subliming ingredient taken from pressed tablets made with mannitol and camphor combined. Camphor was sublimated at 80°C in a vacuum. for half an hour following tablet preparation Volatile material that sublimate from the produced tablet, like camphor, can be utilized in the dispensing method, to enhance porosity created.[28]

6.Cotton Candy process:

It is a process derives its common name uses a unique spin motor to build crystalline formations that resemble cotton candy and floss.[10] The cotton candy technique uses spinning and flash melting simultaneously to generate a combination of polysaccharides or saccharides. For better flow, a matrix that is generated is partially re-crystallized. characteristics as well as compressibility. After being ground and combined with excipients and active

substances, this candy floss matrix is compacted into MDTs.[28]

7.Mass-extrusion:

Smoothing is required for these.the combined materials using a compound dissolved in water, polyethene glycol, methanol used as solvent, and and producing tiny tubes by passing the mixture through a press. which are even further divided into little tablets by slicing them with a hot knife. This method's products have the ability to hide bitter-tasting medications, forming tiny granules that enhance oral bioavailability. [30]or this method entails combining methanol and using a solvent such as dissolved in water polyethylene glycol to soften the mixture of components that are active. After that, the softened mass is forced out of a hollow tube made of the product using an extruder or syringe, and it is split into even pieces with a hot edge to make tablets. [28]

8.Nanotization:

this a recently involved nano technology that use a wet milling apporrach to reduce the drug particle size. The mimuscule crystals medications are surface adsorption stabilized against agglomeration on certain stabilizer that are integrated into FDTs benefit of this technology is that nanoparticles dissovles quickly increasing adsorption and consequency, bioavailability and lowering dosage.

PATENTED TECHNOLOGIES OF FAST DISSOLVING TABLETS:[6]

Table No 3: Patented Technology

S. No	Technology	Process involved	Patent owner	Drugs Used (Brand name)
1.	Zydis	Lyophilization	R.P.Scherer Inc.	Loratidine (Claritin Reditab and Dimetapp Quick Dissolve)
2.	Quicksolv	Lyophilization	Jansen Pharmaceutical	Cisapride monohydrate (Propulsid Quicksolv), Risperidone.
3.	Flashtab	Lyophilization	Ethypharm	Ibuprofen (Nurofen Flashtab)
4.	Lyoc	Multiparticulate Compressed tablets	Farmlyoc	Phloroglucinol Hydrate (Spasfon Lyoc)
5.	Orasolv	Compressed tablets	Cima Labs Inc	Paracetamol (Tempra Quicklets), Zolmitriptan (Zolmig Repimelt)
6.	Durasolv	Molding	Cima Labs Inc.	Paracetamol (Tempra Quicklets)
7.	RapiTab	Compressed Tablets	Schwarz Pharma	Hyoscyamine Sulfate (NuLev)
8.	Wow tab	Compressed Molded Tablets	Yamanouchi Pharma Technologies, Inc.	Famotidine (Gaster D)
9.	Fast melt	Molding	Élan Corp.	
10.	Ziplets	Molding	Eurand	Ibuprofen (Cibalgina Due Fast
11.	Flashdose	Cotton-candy process	Fuisz Technology Ltd	Tramadol HCl (Relivia Flash dose)
12.	Oraquick	Micromask taste Masking	KV Pharm. Co., Inc	Hyoscyamine Sulfate ODT

The quick dissolving properties of fast disintegrating tablet are typically ascribed to the water's quick entry into the tablet matrix, which causes the tablet to dissolve quickly. Numerous technologies have been created using various processes and formulation considerations, and numerous pharmaceutical companies have filed for patents on them.[31]

1.WOWTAB Technology:

For a few years now For many a long time now, the WOWTAB fast-dissolving dosage form has been available in Japan. Mannitol and other excipients that mimic sugar are used in WOWTAB technology, which was only recently introduced in the US market. Two types of saccharide There is variety in forms make a manufacturing of medications that dissolves fast and has the right amount of toughness. Because to WOWTAB's considerable toughness, it is marginally more environmentally secure then Zydis or OraSolv. It works well with blister packaging as well as traditional bottle packaging. The internal use of flavor masking technologies the revolutionary SMOOTHMELT Action of the WOWTAB, despite its exclusive nature, is said to deliver Advanced mouth feel. Within fifteen seconds or less, the WOWTAB product dissolves quickly.[29]

2.Lyoc (cephalon corporation):

With the help of the Cephalon Corporation, the Lyoc method came into ownership. Zydis and Lyoc both use

the same freeze-drying method, however Lyoc's output is frozen.at the racks that the freeze dryers were on. The liquid cure or Medication is added to fillers, thickening agents, sweeteners, surfactants, and non-volatile flavorings during the suspension preparation process. This homogeneous liquid was found in blister cavities and subsequently dried with a freeze. At some point in this process, those formulations require a considerable percentage of mannitol, to strengthen the consistency of the suspensions so as to avoid nonuniformity with the help of sedimentation. The significant percentage of Filler decreases the dry dosage form's porosity and capacity. This results in more dense tablets with slower rates of disintegration are equivalent to fast melts with loose compression.[27]

3.Zydis technology.

The first tablet formulation to be launched by Zydis, for FDT's.tablet PC technology. Moments after being placed on the tongue, the tablet melts. The medicine is freeze-dried or lyophilized in a matrix, usually composed of gelatin, to make a Zydis tablet. The product needs to be administered in a blister pack due to its extraordinary low weight and fragility. The Zydis medication dissolves on the tongue in two to three seconds. .[2]

4.Technology Orasolv:

CIMA LAB developed the Orasolv method. A very identified effervescence helps Orasolv, a direct compression tablet, dissolve in a few seconds, pharmaceutical powder, to spread in saliva in the mouth. Effervescence and covering the powdered medication help to mask its disagreeable taste. Orasolv's mechanical strength as a result of light compression is its main drawback. [1]

5. Technology Flashtab:

Granular excipients are compressed to create tablets using the Flashtab technology (Ethypharm, France). Very similar ingredients are used in this procedure as in traditional crushed tablets preparation. Two types of ingredients are used in these method separating agents (such as insoluble carboxymethylcellulose polyvinylpyrrolidone) & expanding components (e.g., modified starch, starch, and carboxymethylated starch, as well as possibly immediately compressible sugars) and microcrystalline cellulose. Granulation can be done either wet or dry to create the excipient combination. It is known that the created tablets dissolve in a few of seconds in the mouth and have sufficient a physical barrier.[32]

6.AdvaTab technology:

Using a customized tablet formulation created by Kyowa Hakko Kogyo (Japan, Tokyo,), AdvaTab technology (Europe) manufactures FDT tablets. This uses a spray to distribute the lubricant onto each tablet throughout the production process. An internal lubrication system is used in conventional tablet production to apply lubricant to the whole surface and interior of the tablet. The electronic potency of the medications might be weakened by these treatment. AdvaTab is composed with 10 to 30 times less water-repellent lubricant and thirty to zero percent greater than regular medicines [31]

7.Flash dose Technology:

This method produces a chewable sugar-based substrate consisting of a combination of excipients, which can be used alone or in combination with other medications.Ibuprofen has a new version called Nurofen Meltelt that is based on the same technology. [33]

EVALUATION OF FDTs:

1.Preformulation study:

1.Angle of Repose: [12]

To determine the angle of repose, the funnel method was employed. Funnel that fits neatly with a stand at a 3 cm tall. Until the medicine is poured, the funnel's opening end is closed with the thumb. The funnel's maximum cone height (h) can be reached by raising it vertically. The formula for the angle of repose (q)&estimate the radius of the heap (r).

$\tan\Theta = h/r$

Therefore $\Theta = \tan^{-1} h/r$

Where Θ = Angle of repose.

2. Bulk Density (Db) :[12]

In this proportion of the powder's bulk volume to its entire mass. It is provided by and is indicated in g/ml.

$Db = M/Vb$

Where, Vb is the bulk volume of the powder

M is the mass of powder

3.Tapped Density (Dt):

It describe the proportion of the powder's total mass to its tapped volume.

It is given by and is measured in g/ml.

$Dt = M / Vt$

Where, Vt is the tapped volume of the powder

M is the mass of powder.[12]

4. % Compressibility (Or) Carr's Index:

It shows the features of flow of powder. The percentage uses to express it.

I = (Dt – Db)/ Dt x100

Db is the bulk density of the powder Dt is the tapped density of the powder.[12]

Table 4: Percentage Compressibility & flow ability.

% Compressibility	Flow ability
5-10	Excellent
12-16	Good
18-21	Fair Passable
23-25	Poor
33-38	Very Poor
<40	Very Very Poor

5.Hausner Ratio :

Ratio of tapped density and bulk density is the Hausner ratio. This formula is used to calculate it.

Hausner ratio =ñt/ñd

Where, ñt = tapped density

ñd = bulk density.

(<1.25) indicates better flow

properties than higher ones (>1.25). [12]

9.Weight variation: [7]

For weight of 20 tablets are selected randomly and weighted individually to check.

Table 5: Weight variation of tablet specification as per I.P.

Average weight of tablets	% Deviation
80 mg or less	±10
80-250 mg	±7.5
250 mg or more	±5

2.Post Compression Evaluation of Mouth Dissolving Tablet:

FDTs are evaluated by using the following test.

1.General Appearance: [31, 7]

A tablet's general appearance and visual identification. The dimensions, form, color, taste, texture, surface quality, and physical defects of the tablet are among them.

2. Tablet thickness: [7].

In millimeters, tablet the width is given. Using a micrometer screw gauge, the tablets' diameter and thickness were measured.

3.Friability:

To check friability Roche friabiliter used. A Roche friabilator containing four grams of tablets was rotate at 30 revolution per.minutes for four min. After the tablets were weighed, the %b weight loss was computed.[35]

Formula [7]

% Friability = initial weight – final weight / Initial weight ×100/

4.Hardness:

Monsanto, Pfizer, Erweka, Schleuniger used for determination of hardness. It is defined as the force applied on the tablet in order to break the tablet. The FDT's hardness limit s typically maintained at a lower range for better early dissolution in the mouth. [13,36]

5. Disintegration Test:

Six tablets were tested with the equipment described in I.P.Distilled water at 37°C ± 2°C was used as the disintegration media, and the time in seconds the amount of time the tablet needed to totally disintegrate and leave behind no usable bulk in the apparatus was noted.[13,36]

6.Wetting Time:

Diameter of petri dish is 10 cm contains with 5 round tissue papers.

Dish contain ten millimeters of water that has been dissolved with eosin. A medicament put on the tissue paper's surface. To record amount of time it takes for water to

the tablet's upper surface is the wetting time.

7.Finess of Dispersion: [7, 9]

order to ensure full disintegration, two tablets are held in 100 milliliters of water and carefully revolved. When all of the dispersion flows through a sieve with mesh aperture (110 nm) and leaves no residue on the mesh, the formulation is thought to generate a greater dispersion. [35, 39]

8.Absorption ratio:

Six milliliters of water were poured in a tiny Petri dish, and the tissue paper was folded twice.A medicament was put on the tissue paper & check The amount period needed to completely wet . The amount of water absorption is determined by the following equation.[9,37]

R=10(wa/wb) where,

Wb- weight of tablet before water absorption & wa- weight of tablet after water

absorption.

9.. Dissolution test:

This test plays a role since it yields the drug-release profile using both the USP Dissolve Test instrument and the other method. Orodispersible medication dissolution happens rapidly. Therefore, USP 2 paddle-

type apparatus at 50-100 r/min is used for dissolution testing.[36, 37]

10.Stability Studies:

Tablets are subjected to stability testing to determine their level of stability and to assess the integrity of their formulations over time. The prepared mixture needs to be sealed in a unquie manner: First, grease paper is used to cover the dosage form, then covered with aluminum foil, packaged inside an aluminium pouch and heat sealed. Formulas ought to be kept in storage for three months. In order to assess tablets for physical changes and drug content, duplicate sam ples should be taken during the stability study at 3 sa mpling duration, namely 0, 1, and 3 months .

accelerated studies.

(i) 40 ± 1°C

(ii) 50 ± 1°C

(iii) 37 ±1°C and RH 75% ± 5%

The tablets were withdrawn after a period of 15 days and analyzed for physical characterization such as visual defects, Hardness, Friability, Disintegrations, and Dissolution etc. The data obtained is fitted into first order equations to determine the kinetics of degradation.[6, 38]

CONCLUSION

Over the past decade, MDTs have became extremely common. Rapid disintegration is essential to MDT formulations. Dissolving, melting disintegrating or melting in the mouth, can be achieved by adding effervescent or superdisintegrant, excipient, or by creating a porous structure in the tablet matrix. From the studies shows FDT improve patient compliance, increase bioavailability, fast onset of action. This dosage form suitable for paediatric and geriatric patient. Some of these technologies have produced fast dissolving tablets with adequate mechanical strength and quick dissolve in the mouth without the need for water. These items have a bright future ahead of them because of the availability of innovative technologies paired with patient demand and broad commercial acceptability. Through technology is still developing, there are many opportunities for improving the fast-dissolving medication delivery method in the future.

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