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A REVIEW ON FAST DISSOLVING TABLETS: A NEWPERSPECTIVE IN DRUG DELIVERY SYSTEM

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ABSTRACT

Fast dissolving tablets have emerged as one of the most popular and widely accepted dosage forms, particularly for pediatric patients with incomplete muscular and nervous system development, as well as geriatric patients suffering from Parkinson's disease or hand tremors. Few solid dosage forms, such as capsules and tablets, are currently facing issues such as difficulty swallowing (dysphagia), resulting in a substantial amount of noncompliance and rendering therapy ineffective. The oral dosage form and route of administration are the most recommended routes of administration for a variety of medications; however, they have limitations such as first-pass metabolism, mental patients, immobile and unwilling patients. FDTs disintegrate or dissolve quickly in saliva, without the need for water. Fast dissolving tablets are designed to dissolve in saliva much faster, within a few seconds. FDTs formulations contain super disintegrants to enhance the disintegration rate of a tablet in the buccal cavity. FDT formulations have the advantage of both conventional tablet formulation and liquid dosage formulations such as easy portability and manufacturing, accurate dosing, good chemical and physical stability. FDTs have disintegrated quickly, absorb faster so, in vitro drug release time improve and this property of drugs (dosage form) enhanced bioavailability. Several conventional or patented technologies for producing FDTs have been developed, including spray drying, cotton candy process, sublimation, melt granulation, directcompression freezes drying/lyophilization, phase transition process, mass extrusion, and many more. In this review contain detailed information about FDTs including definition, advantages,needs or requirements of FDTs, salient features of FDTs, limitations, challenges to developingFDT, excipients used in formulation, etc.

KEYWORDS: Fast dissolving tablets, disintegration, bioavailability, granulation technique.

INTRODUCTION

A broad range of researches are going on and most are working in direction of developing novel drug delivery system or improving the patient compliance. Most preferred and accepted route to administer drug is the oral route, tablets and capsule being the most celebrated dosage form, but difficulty to consume them by the patient is a major problem on other hand FDTs need not to be swallowed[1,2] known also as mouth-dissolving tablets, mouth-melting tablets, dispersible tablets, quick dissolving porous tablets, etc. If placed on a tongue, quickly dissolving tablets disassemble the product that absorb or spread in the saliva instantaneously.[3]

The problem of swallowing is a common phenomenon in a geriatric patient due to fear of choking, hand tremors, dysphasia and in young individuals due to underdeveloped muscular and nervous systems and in schizophrenic patients which leads to poor patient compliance. Approximately one-third of the population (mainly pediatric and geriatric) has swallowing difficulties, resulting in poor compliance with oral tablet drug therapy which leads to reduced overall therapy effectiveness. For these reason, tablets that can rapidly dissolve or disintegratein the oral cavity have attracted a great deal of attention.[4] Most fast dissolving tablets must include substances to mask the bitter taste of the active ingredient. This masked active ingredient is then swallowed by the patient's saliva along with the soluble and insoluble excipients**.** The fast dissolving solid dosage form turns into a soft paste or liquid form for easy swallowing, and thus it is free of risk of choking. In recent years, a variety of improved methods for delivering drugs have been developed with the aim of improving bioavailability, convenience and patient compliance. Some tablets are designed to dissolve in saliva within a few seconds, and so called true fast-dissolving tablets.[5]

Literature survey revealed that faster the dissolution, greater the absorption and allows rapid onset of action. Some drugs are absorbed from the oral cavity, pharynx and oesophagus as the saliva passes down into the

stomach. Thus the bioavailability of drug is significantly more than those observed from conventional tablets dosage form. The time for disintegration of fast disintegrating tablets is generally considered to be less than one minute.

Advantages of Fast Dissolving tablets[6,7]

- No water needed.
- Improved compliance.
- No chewing needed.
- Better taste.
- Improved stability.
- Suitable for controlled as well as fast release actives.
- Allows high drug loading.
- Ability to provide advantages of liquid medication in the form of solid preparation.
- Adaptable and amenable to existing processing and packaging machinery.
- Cost- effective.

Limitation of FDT's[8]

- The tablets usually have insufficient mechanical strength. Hence, careful handling is required.
- The tablets may leave unpleasant taste and/or grittiness in mouth if not formulated properly.
- Drugs with relatively larger doses are difficult to formulate into MDT e.g. antibiotics like ciprofloxacin with adult dose tablet containing about 500 mg of the drug.
- Patients who concurrently take anticholinergic medications may not be the best candidates for MDT. Similarly, patients with dryness of the mouth due to decreased saliva production may not be good candidates for these tablet formulations.

Mechanism of tablet disintegration[9,10,11]

The tablet breaks to primary particles by one or more of the mechanisms listed below

a. By capillary action (Wicking)
b. By swelling
c. Because of heat of wetting
d. Due to release of gases
e. By enzymatic action
f. Due to disintegrating particle/particle repulsive forces.
g. Due to deformation.

1) By capillary action (Wicking)

Disintegration by capillary action is always the first step. When we put the tablet into suitable aqueous medium, the medium penetrates into the tablet and replaces the air adsorbed on the particles, which weakens the intermolecular bond and breaks the tablet into fine particles. Water uptake by tablet depends upon hydrophilicity of the drug/excipient and on tableting conditions. For these types of disintegrants, maintenance of porous structure and low interfacial tension towards aqueous fluid is necessary which helps in disintegration by creating a hydrophilic network around the drug particles.

2) By Swelling

Perhaps the most widely accepted general mechanism of action for tablet disintegration is swelling tablet with high porosity show poor disintegration due to lackof adequate swelling force. On the other hand, sufficient swelling force is exerted in the tablet with low porosity. It is worthwhile to note that if the packing fraction is very high, fluid is unable to penetrate in the tablet and disintegration is again slow down.*

3) Because of heat of wetting (air expansion)

When disintegrants with exothermic properties gets wetted, localized stress is generated due to capillary air expansion, which helps in disintegration of tablet. This explanation however, is limited to only a few types of disintegrants and cannot describe the action of most modern disintegrating agents.

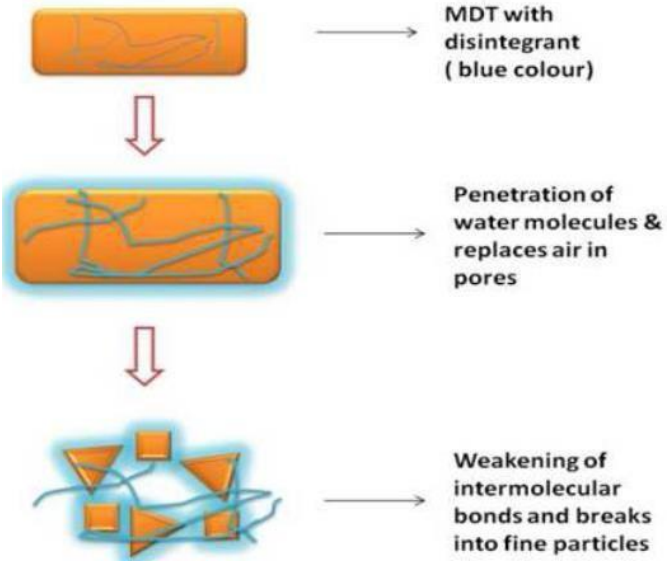

Fig. No. 1: Representation of Disintegration of FDTs by capillary action (wicking mechanism).[9]

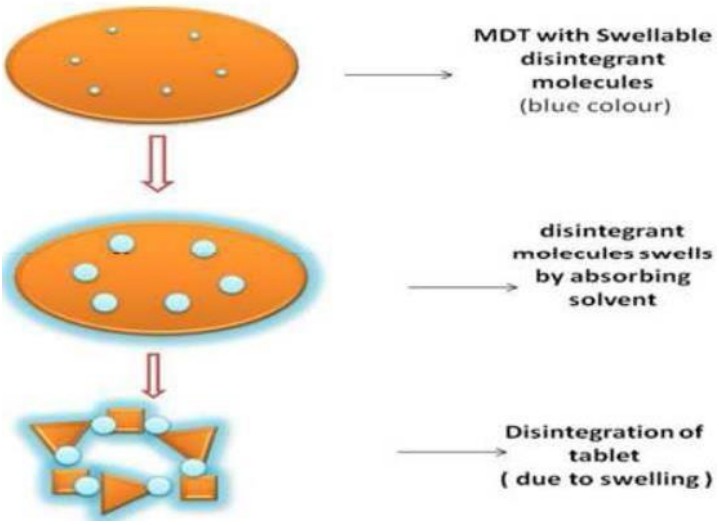

Fig. No. 2: Representation of Disintegration of FDTs by Swelling mechanism.[9]

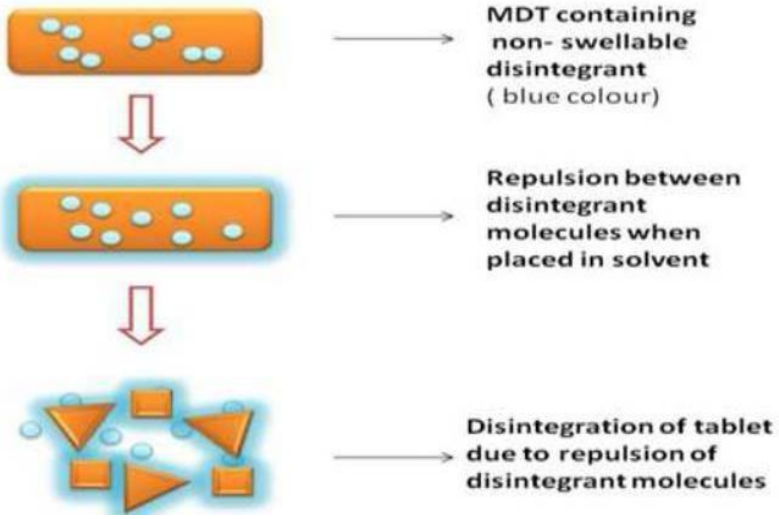

Fig. No. 3: Representation of Disintegration of FDTs by Repulsion mechanism.[10]

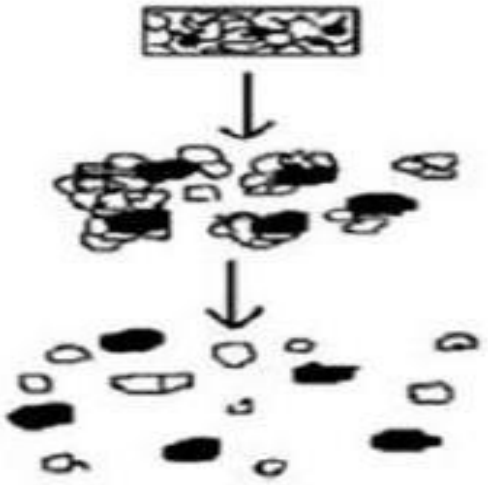

Fig. No. 4: Representation of Disintegration of FDTs by Deformation.[10]

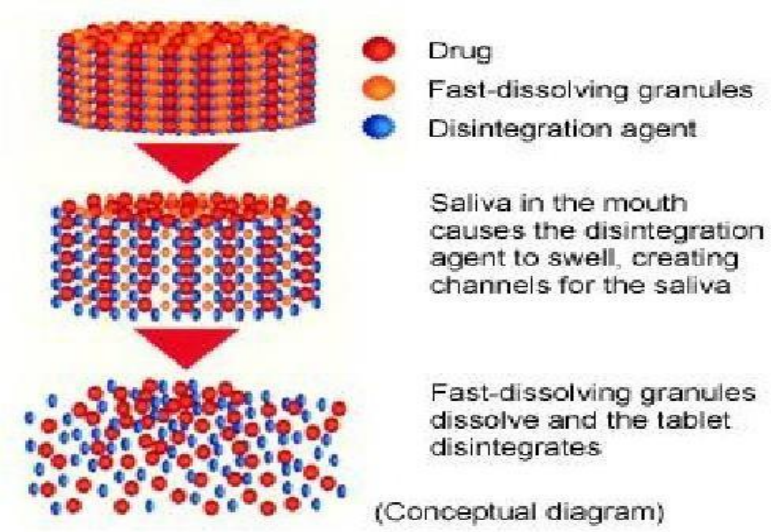

Fig. 5: Conceptual mechanism of FDT.[11]

FORMULATION CONSIDERARTION

1. Criteria for Fast dissolving Drug Delivery System.
2. General Excipients used in Fast Dissolving Tablet.
3. Challenges in the formulation of FDTs.
4. Newer manufacturing technologies used now days for FDTs.
5. Evaluation of Oral Fast Dissolving Tablet.

Criteria for Fast dissolving Drug Delivery System[12,13,14]

The tablets should possess some following criteria

- 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.
- Allow the manufacture of the tablet using conventional processing and packaging equipment at low cost.
- Ease of Administration to the patient who cannot swallow, such as the elderly, stroke victims, bedridden patients, patient affected by renal failure and patient who refuse to swallow such as pediatric, geriatric & psychiatric patients.
- No need of water to swallow the dosage form, which is highly convenient feature for patients who are travelling and do not have immediate access to water.
- Rapid dissolution and absorption of the drug, which will produce quick onset of action.
- Some drugs are absorbed from the mouth, pharynx and esophagus as the saliva passes down into the stomach. In such cases bioavailability of drug is increased.
- Pre-gastric absorption can result in improved bioavailability and as a result of reduced dosage; improve clinical performance through a reduction of unwanted effects.
- Good mouth feel property helps to change the perception of medication as bitter pill particularly in pediatric patient.
- The risk of chocking or suffocation during oral administration of conventional formulation due to physical obstruction is avoided, thus providing improved safety.
- New business opportunity like product differentiation, product promotion, patent extensions and life cycle management.
- Beneficial in cases such as motion sickness, sudden episodes of allergic attack or coughing, where an ultra-rapid onset of action required.
- An increased bioavailability, particularly in cases of insoluble and hydrophobic drugs, due to rapid disintegration and dissolution of these tablets.
- Stability for longer duration of time, since the drug remains in solid dosage form till it is consumed. So, it combines advantage of solid dosage form in terms of stability and liquid dosage form in terms of bioavailability.

General excipients used in fast dissolving tablets

Suitable features of excipient[15,16]

- They must not have an unacceptable microbiological load.
- It must match the colour; it should not change the colour shade in the construction.
- If the product is classified as food, detergents and other additives must be approved forfood additives.
- They must not adversely affect the availability of organic products. They must be non-toxic and non-medical and must be approved by regulatory agencies in the countries where the product will be marketed.
- Must be commercially available at a reasonable level in the countries where the productwill be produced.

- Cost effective.
- They must be physically inactive.
- They must be physically and chemically stable and combined with other medicationsand components of the medication.

Table 1: Excipients used in solid dosage forms.[17]

EXCIPIENTS	FUNCTION	EXAMPLE
Diluent	Serve as bulking agents andfacilitate accurate dosing.	Sugar compounds: lactose, mannitol,dextrose, sorbitol, silicate, calcium, magnesium salt, sodium chloride, potassium chloride, cellulose Derivatives
Binder, compression aid, granulating agents	Facilitate tablet compression.Ensure tablet robustness.	Natural and synthetic polymer:starch, gelatin, and sugars as sucrose, glucose, dextrose, and lactose
Disintegrants Super disintegrants	Aid with tablet disintegration and dissolution by increasing thesurface area of the tablets, facilitate release of drug substance. Improved disintegrant efficacy resulting in decreased use levelswhen compared to traditional disintegrants	Compounds which swell in the presence of water: starch, cellulosederivatives, alginates and crosspovidone. Croscarmellose, crosspovidone, sodium starch glycolate, polacrilinpotassium.
Glidants	Granulation flow enhancer, aidwith tablet compression and eliminate particles Agglomeration (anticaking).	Colloidal anhydrous silicon, silicacompounds, talc.
Lubricants	Tablet compression aid, reduce blend cohesiveness characteristicduring compression, reduce disintegration rate.	Steric acid, salts, and derivatives ofsteric acid, talc, hydrogenated vegetable oils and PEG
Coating agent	Prevent tablet degradation environmental conditions (temperature, light and moisture). Serve as taste maskingagents, inhibit order, facilitate administration and appearance enhancer.	Natural and synthetic polymers,those are insoluble in acid.

Table 2: List of Commercially Available Super disintegrants.[18]

SL.NO	SUPERDISINTEGRANTS	MECHANISMOF ACTION	PROPERTIES	AVIALABLE GRADES
1.	Cross-linked Alginic acid	Worked by wicking movement, prompt bulge upon hydration	Loose cohesionin a wet and dry medium.	Alginic acid, Satialgine
2.	Cross-linked PVP	Act by capillaryaction	Spongy in nature and water-insoluble	Kollidon, Polyplasdone, Crosspovidone, Crosspovidone M
3.	Cross-linked starch	In less than 30seconds swells7-11 folds	Gives sustained release in a matrix andswells in three dimensions	Primogel, Sodium starchglycolate, Explotab
4.	Cross-linked polymerof Polycarboxylic acids	Very high swelling tendency of hydration eitherin contact with water or G.I. fluids	increases the effective surface area forthe absorption of the active substances	Kyron T-314
5.	Cross-linked cellulose	Swells 4 to 8folds in less than 10 seconds. Swelling andwicking	Used in direct compression or granulation, swelling is in two dimensions	Croscarmellose,Ac-Di-sol, Nymce ZSX, primellose, Solutab, Vivasol

Newer manufacturing technologies used now days for FDT's[19,26]

1. Freeze drying/ Lyophilization
2. Moulding
3. Sublimation
4. Spray drying
5. Direct compassion
6. Mass extrusion
7. Nanonization
8. Cotton candy process.

1. Freeze drying/Lyophilization: It is the one of the first-generation techniques for preparing ODT, in which sublimation of water takes place from the product after freezing. The formulations show enhanced dissolution characteristics due to the appearance of glossy amorphous structure to bulking agents and sometimes to drug. The ideal drug characteristics for this process are relative water insolubility with fine particle size and good aqueous stability in suspension. Primary problems associated with water soluble drug are formation of eutectic mixture, because of freezing, which might collapse on sublimation. The addition of mannitol or crystal forming material induces crystallinity and imparts rigidly to amorphous material. The advantage of using freeze-drying process is that pharmaceutical substance can be processed at non elevated temperature thereby eliminated adverse thermal effects. High cost of equipment and processing limits the use of the process. Other disadvantages include lack of resistance necessary for standard blister packs of the final dosage forms.[19]

2. Moulding: These are two types of moulding process i.e., solvent method. Solvent method and heat method. Solvent method involves moistening the powder blend with a hydro- alcoholic solvent followed by compression at low pressure in moulded plates to form a wetted mass (compression moulding). Air-drying is done to remove the solvent. The tabletmanufactured so formed is less compact than compressed tablets and possess a porous structure that hastens dissolution. In the heat moulding process, a suspension is prepared that contains a drug, agar and sugar. This suspension is poured in the blister packing wells, and then agar is solidified at the room temperature to form a jelly and dried at 30 under vacuum. The main concern about this moulded tablet is their mechanical strength, which can be achieved by using blinding agents. The spray congealing if a molten mixture of hydrogenated cottonseed oil, sodium carbonate, lecithin, polyethylene glycol and an active ingredient into lactose-based tablet masked drug particles. As compared to the Lyophilization technique, tablets produced by the moulding technique are easier to scale upfor industrial scale manufacturing.[20]

3. Sublimation: This process involves addition of some inert volatile substance like urea, urethane, naphthalene, camphor, to other excipients and the compression of blend into tablet. Removal of volatile material by sublimation creates pores in tablet structure, due to which tablet dissolves when comes in contact with saliva. Additionally, several solvents like cyclohexane, benzene can also be used as pore forming agents. Mouth dissolving tablets with highly porous structure and good mechanical strength have been developed by this method.[21]

4. Sprays Drying: Spray-drying for the production of MDTs. The formulation contained hydrolysed and nonhydrolysed gelatin as a bulking agents and sodium starch glycolate or crosscarmellose as a disintegrate. By adding an acid (e.g., citric acid) or an alkali (e.g., sodium bicarbonate) disintegration and dissolution were further enhanced. The porous powder was obtained by spray drying the porous powder was obtained by spray drying the above suspension which was compressed into tablets. Tablets manufacturing by this method shows disintegration time < 20 sec in an aqueous medium.[22]

5. Direct compression: Direct compression represents the simplest and most cost- effective tablet manufacturing techniques. MDT can be prepared by using these techniques because of the availability of improved excipients especially super-disintegrates and sugar-based excipients.

- Super-disintegrates
- Sugar based excipients.[23]

6. Mass extrusion: This technology involves softening of the active blend using the solvent mixture of water soluble polyethylene glycol and methanol. This softened mass is extruded through the extruder or syringe and a cylindrical shaped extrude is obtain which are finally cut into even segments using heated blade to form tablets. Granules of bitter drugs can be using this method to mask their taste.[24]

7. Nanonization: A recently developed Nano melt technology involves reduction in the particles size of drugs to nano size by wet-milling technique. Surface absorption of the nano crystals of the drugs is done on selected stabilizers for stabilizing them against agglomeration, which are then incorporated into the MDTs. The technique is mainly advantageous for poor water-soluble drugs and also for wide range of doses (up to 200mg of drug per unit).[25]

8. Cotton candy process: The FLASHDOSE is a MDDDS manufactured using shear form technology in an association with Deform TI technology to eliminate the bitter taste of the medicaments [A matrix known as floss, with a combination of excipients, either alone or with drugs is prepared by using shear from technology. Like cotton-candy fibre floss is fibrous material made of saccharide such as a sucrose, dextrose, lactose and fructose temperatures ranging between 180-266 F. however other polysaccharides such as polymaltodextrin and poly-dextrose can be transformed into fibres at 30-40% lower temperature than sucrose. Due to this modification thermo labile drugs can be safely

incorporate.[26]

CHALLENGES IN THE FORMULATION OF FDT'S[27]

CHALLENGES	COMMENTS
Taste masking	Most drugs need taste masking
Cost	Due to process, material, packaging, andtaste masking
Special packaging	Tablets are fragile and must be protectedfrom water
Novel manufacturing process	Due to new equipment, technology, andprocess
Limited drug loading	Technology limitation, taste masking, andtablet size
Clinical/medical benefits	Need more clinical trials to study medicalbenefits
Older patient acceptance	Do not like taste, flavor, dissolve too fast,and cost
Patient compliance	Frequency, may not remember, taste, taketoo many

RECENTLY REPORTED RESEARCH WORK ON FAST DISSOLVING TABLET

Sl No	AUTHOR	DRUG	SUPERDISINTEGRANTS	METHOD	REMARKS
1	Alburyhi MM (2024)	Clopidogrel bisulfate	Cross carmellose sodium, Crospovidone	Direct compression method	Drug solubility is very low and has very low bioavailability. ODTs of Clopidogrel bisulfate with Superdisintegrants in different ratios were prepared at a view to increase its effect by decreasing the time required for the drug to be released. The highest dissolution rate and the maximum drug release was observed in formulation containing superdisintegrating agents ratio 25:20 concentration, which was found to be 92.34% in 5 minutes.[28]
2	Guhmann M (2018)	Diclofenac	Crospovidone	Micro granules -Wet granulation. ODTs- Direct compression method	A novel fast-acting and palatable Diclofenac ODT formulation was prepared. E PO (amino methacrylate copolymer) was used as taste-masking agents. Mainly Evaluated by in-vitro dissolution profiles in simulated saliva (pH 7.4, 5mL, 3min) and compendial pH-change media (paddle, 50rpm). The prototypes (1.1% and 15.5%) were compared to reference ODTs (without taste-masking). Two ODT prototypes showed fast and complete drug release in phosphate buffer.[29]
3	Obaidat AA (2018)	Meloxicam-β-cyclodextrin	Sodium starch glycolate, Cross carmellose sodium, Crospovidone	Direct compression method	This study aimed to make fast-dissolving meloxicam tablets by mixing it with β-cyclodextrin (β-CD) and trying different disintegrating agents. Tablets also had microcrystalline cellulose and mannitol. Tests before compression showed the mix flowed well, and after

					compression, the tablets had good strength. Sodium starch glycolate made tablets take longer to break down because it formed a gel layer, unlike other agents. Meloxicam released quickly in most tablets except those with lots of sodium starch glycolate.[30]
4	Pandit V (2018)	Pioglitazone hydrochloride	Sodium starch glycolate	Solid dispersion method	This study explores fast-dissolving tablets with pioglitazone hydrochloride (PIO) solid dispersions using Poly vinyl pyrrolidone K 30 (PVPK 30) as a carrier. The kneading method proved most effective in enhancing drug dissolution. In vivo tests on rats showed significantly faster onset of action with the selected formulation compared to the pure drug and marketed product, indicating improved effectiveness.[31]
5	Koseki T (2020)	Furosemide	Crosscarmellose sodium	Direct compression method	Tablets with high hardness (>40N) and rapid disintegration (<20s) were achieved with SSE addition at 0—0.5% (w/w). A tablet containing S1670 at 0.1% (w/w), named TA2, dissolved faster than the commercial FS tablet, Lasix, and exhibited higher plasma concentration in rats upon intragastric administration. This direct compression method with homogeneous FS/S1670/MC powder produced excellent fast-disintegrating furosemide tablets.[32]
6	Singh J (2018)	Rosuvastatin	Sodium starch glycolate, Crosscarmellose sodium,Crospovidone	Solid dispersion method	This research developed fast-dissolving Rosuvastatin tablets via direct compression to enhance solubility and patient compliance. Solid dispersions with PEG 4000 improved dissolution rates, while tablets with crospovidone as superdisintegrant showed rapid dissolution. Formulation F6, incorporating crospovidone, demonstrated the best results, suggesting a promising new oral dosage form for Rosuvastatin.[33]
7	Shinkar DM (2018)	Verapamil Hydrochloride	Sodium starch glycolate, Crosscarmellose sodium	Wet granulation method	Developed and optimized fast-dissolving tablets of verapamil hydrochloride to enhance bioavailability by

					circumventing first-pass metabolism. Increased concentrations of superdisintegrants, facilitated faster tablet disintegration in the oral cavity, potentially enhancing drug availability for dissolution, absorption, and quicker onset of action.[34]
8	Husseiny RA (2017)	Valsartan	Sodium starch glycolate, Crospovidone	Wet granulation method	Optimized formulations demonstrated rapid disintegration and dissolution, leading to a swift reduction in mean arterial blood pressure. These findings suggest that the developed fast-disintegrating tablets could serve as an alternative to conventional Valsartan tablets, particularly beneficial for pediatric and geriatric patients.[35]
9	Akhtar MS (2017)	Lacosamide	Sodium starch glycolate	Direct compression method	The formulation containing MCC 75% showing promise based on various parameters. This achievement fulfills the study's objective, providing a "patient-friendly dosage form" suitable for pediatric, geriatric, bedridden, and non-cooperative patients. This technology promises faster and improved drug release, enhancing drug bioavailability compared to conventional marketed formulations.[36]
10	Alburyhi MM (2024)	Domperidone	Sodium starch glycolate, Crosscarmellose sodium, Crospovidone	Direct compression method	Domperidone orodispersible tablets were developed to address dysphagia, providing a convenient dosage form that dissolves rapidly in the oral cavity without water.. The formulation MCC and Crosspovidone without mannitol exhibited the best drug release, with 95.40% released within 5 minutes, and an assay of 96.9%, meeting acceptable limits.[37]
11	Akdag Y (2020)	Deferasirox	Crosscarmellose sodium	Direct compression and Lyophilization methods	New fast-dissolving tablet (FDT) formulations of deferasirox were developed using direct compression and lyophilization methods. Both types of FDTs met pharmacopoeia requirements and had rapid disintegration times (under 5 s for FD method; under 25 s for DC method) and very rapid dissolution, enhancing

					bioavailability and onset of action. Despite fair powder flowability, the DC-FDT formulation exhibited good compressibility.[38]
12	Bhardwaj S (2020)	Aceclofenac	Sodium starch glycolate	Direct compression method	The study suggests that fast-disintegrating Aceclofenac tablets can be efficiently produced via direct compression with superdisintegrants. Among the two evaluated, Ac-Di-Sol performed the best, exhibiting a disintegration time of 12.2 seconds and releasing over 99% of the drug within 60 minutes at a 4% concentration level.[39]
13	Battu SK (2017)	Fenoverine	Sodium starch glycolate, Crosscarmellose sodium	Direct compression method	This study achieved directly compressible rapidly disintegrating tablet (RDT) formulations of fenoverine with desirable taste, mechanical strength, and short disintegration times (DTs) using CP and other excipients. Optimal formulation CP 6 exhibited the lowest DT and comparable or superior dissolution profile to the marketed Spasmopriv® capsule, highlighting its utility as an effective oral drug delivery system.[40]
14	Kumar JN (2018)	Pravastatin	Crospovidone, Crosscarmellose sodium	Direct compression method	This study investigates fast-dissolving Pravastatin tablets using Crospovidone and Croscarmellose sodium in a 3^2 factorial design, revealing rapid drug release with increasing superdisintegrant concentration. The optimized formulation having Disintegrating agents 1:1 concentration ensures rapid action, improved bioavailability, and reduced per oral cost, enhancing patient compliance for managing hypercholesterolemia and reducing cardiovascular disease risk.[41]
15	Gunda RK (2016)	Carbamazepine	Crospovidone, Crosscarmellose sodium	Direct compression method	This study investigates Crospovidone and Croscarmellose sodium in fast-dissolving Carbamazepine tablets using a 32 factorial design, revealing rapid drug release with increasing

					superdisintegrant concentration, improving solubility. The optimized formulation, F5, follows Higuchi's kinetics, offering improved bioavailability for managing epilepsy, convulsions, tremors, and neuropathic pain, enhancing patient compliance, and minimizing per oral cost.[42]

CONCLUSION

In recent days, oral disintegrating tablets have gained more importance when compared to the conventional dosage forms due to their varied advantages. FDT's are the type of dosage forms that can disintegrate within 60 sec without the need for water. They have many advantages like rapid absorption with increased bioavailability, improved efficiency of the drugs. It can also be administered for patients who are bedridden, pediatric, and geriatrics. The key principle of FDT is to have faster disintegration, dissolution. This can be achieved by adding superdisintegrants or producing a porous structured tablet matrix. There are different methods to formulate FDTs like freeze drying technique, direct compression, sublimation method, etc. Though they have pronounced advantages, they have minimal disadvantages like poor mechanical strength, they are hygroscopic. Apart from having disadvantages, they are used widely due to their better patient's compliance. Due to the high market potentials, many drugs can be formulated as FDT's.

REFERENCES

1. Garg A, Gupta, MM. Mouth dissolving tablets: a review. J Drug Deliv Ther., 2013; 3(2): 207-14.
2. Cheng R, Guo X, Burusid B, Couch R. A review of fast dissolving tablets. Pharm Technol., 2000; 4(1): 52-58.
3. Babu A, Akhtar MS. Overview of formulation & evaluation of fast dissolving tablet: A promising tablet dosage form. J Appl Pharm Res., 2020; 8(3): 01-9.
4. Siddiqui N, Garg G, Sharma PK. Fast dissolving tablets: preparation, characterization and evaluation: an overview. Int J Pharm Sci Rev Res., 2010; 4(2): 87-96.
5. Tambe B. Mouth dissolving tablets: An overview of formulation technology. Int J Inf Res Rev., 2018; 5(5): 5451-9.
6. Shaikh S, Khirsagar R.V, Quazi A. Fast Disintegrating Tablets: An Overview ofFormulation and Technology. Int J Pharm Pharm Sci., 2010; 2(3): 09-15.
7. Chang RK, Guo X, Burnside BA, Couch RA. Fast dissolving tablets. Pharm Technol, 2000; 24(6): 52-8.
8. Kundu S, Sahoo P. K. Recent Trends in The Developments of Orally Disintegrating Tablet Technology. Pharma Times., 2008; 40(4): 11-5
9. Rawat S, Derle DV, Fukte SR, Shinde PR, Parve BS. Superdisintegrants: an overview. World J Pharm Pharm Sci., 2014; 3(5): 263-78.
10. Ashish P, Harsoliya MS, Pathan JK, Shruti S. A review-formulation of mouth dissolving tablet. Int J Pharm Clin Sci., 2011 Jun 16; 1(1): 01-8.
11. Sandeep N, Gupta MM. Immediate drug release dosage form: a review. J Drug Deliv Ther., 2013; 3(2): 155-61.
12. Basu B, Bagadiya A, Makwana S, Vipul V, Batt D, Dharamsi A. Formulation and evaluation of fast dissolving tablets of cinnarizine using superdisintegrant blends and subliming material. J Adv Pharm Technol Res., 2011; 2(4): 266-73.
13. Sunada H, Bi Y. Preparation, evaluation and optimization of rapidly disintegrating tablets. Powder Technol., 2002; 122(2-3): 188-98.
14. Bhasin RK, Bhasin N, Ghosh P. Advances in formulation of orally disintegrating dosage forms: A Review Article. Indo Glob J Pharm Sci., 2011; 1(4): 328-53.
15. Velmurugan S, Vinushitha S. Oral disintegrating tablets: An overview. Int J Chem Pharm Sci., 2010; 1(2): 01-20.
16. Debjit B, Chiranjib B, Krishnakanth, Pankaj, and R. Margret Chandira Fast Dissolving Tablet: An Overview J Chem Pharm Res., 2009; 1(1): 163-177.
17. Upadhyay P, Chaudhary P, Upadhyay S. A Review on Formulation and Evaluation Approaches for Fast Release Tablet. M J Pharm Sci., 2023; 7(1): 1-10.
18. Azeem S, Sharma S. Immediate release drug delivery systems: a review. Int J Biopharm Toxicol Res., 2011; 1(1): 24-46.
19. Joshi R, Garud N, Akram W. Fast dissolving tablets: a review. Int J Pharm Sci Res., 2020; 11(4): 1562-70.
20. Pawar PB, Mansuk AG, Ramteke KH, Sharma YP, Patil SN. Mouth dissolving tablet: A review. Int J Herbal Drug Res., 2011; 1(2): 22-9.
21. Kuchekar BS, Badhan AC, Mahajan HS. Mouth dissolving tablets: A novel drug delivery system. Pharma times, 2003; 35(1): 7-9.
22. Saroha K, Mathur P, Verma S, Syan N, Kumar A. Mouth dissolving tablets: An overview on future compaction in oral formulation technologies Der Pharmacia Sinica, 2010; 1(1): 179-87.
23. Chandan S, Varun D, Ashish G, Dabeer A, Ayaj A.

Orally disintegrating tablets: A review. Int J Pharm Life Sci., 2010; 1(5): 250-6.
24. Sayeed A, Mohiuddin MH. Mouth dissolving tablets: an overview. Int J Res Pharm Biomed Sci., 2011; 2(3): 959-70.
25. Rahane RD, Rachh PR. A review on fast dissolving tablet. J Drug Deliv Ther., 2018; 8(5): 50-5.
26. Gupta A, Mishra AK, Gupta V, Bansal P, Singh R and Singh A.k: Recent trends of fast dissolving tablet- An overview Formulation technology. Int J Pharm Biol Arch., 2010; 1(1): 1-10.
27. Bandari S, MittapalliR K, Gannu R, Rao Y. M: Orodispersible tablets: An overview. Asian J Pharm, 2008; 2(1): 2-11.
28. Alburyhi MM, Saif AA, Noman MA, Hamidaddin MA. Formulation and Evaluation of Clopidogrel Orodispersible Tablets. World J Pharm Res., 2024; 13(6): 42-64.
29. Guhmann M, Preis M, Gerber F, Pöllinger N, Breitkreutz J, Weitschies W. Design, development and in-vitro evaluation of diclofenac taste-masked orodispersible tablet formulations. Drug Dev Ind Pharm., 2015; 41(4): 540-51.
30. Obaidat A, Obaidat R. Development and evaluation of fast-dissolving tablets of meloxicam-β-cyclodextrin complex prepared by direct compression. Acta Pharmaceutica, 2011; 61(1): 83-91.
31. Pandit V, Pai RS, Devi K, Suresh S. In vitro-in vivo evaluation of fast-dissolving tablets containing solid dispersion of pioglitazone hydrochloride. J Adv Pharm Technol Res., 2012; 3(3): 160-70.
32. Koseki T, Onishi H, Takahashi Y, Uchida M, Machida Y. Preparation and evaluation of novel directly-compressed fast-disintegrating furosemide tablets with sucrose stearic acid ester. Biol Pharm Bull., 2009; 32(6): 1126-30.
33. Singh J, Walia M, Harikumar SL. Formulation and evaluation of fast dissolving tablets of rosuvastatin. J Drug Deliv Ther., 2014; 4(5): 173-81.
34. Shinkar DM, Aher PS, Kothawade PD, Maru AD. Formulation and in vitro evaluation of fast dissolving tablet of verapamil hydrochloride. Int J Pharm Pharm Sci., 2018; 10(10): 93-9.
35. Husseiny RA, Lila AS, Abdallah MH, El-ghamry HA. Fast disintegrating tablet of Valsartan for the treatment of pediatric hypertension: In vitro and in vivo evaluation. Drug Deliv Technol., 2018; 43: 194-200.
36. Akhtar MS. Formulation and evaluation of fast dissolving tablets of antiepileptic drug. Univers J Pharm Res., 2019; 4(6): 20-24
37. Alburyhi MM, Noman MA, Saif AA, Salim YA, Abdullah JH. Formulation and Evaluation of Domperidone Orodispersible Tablets. World J Pharm Pharm Sci., 2024; 13(3): 49-68.
38. Akdag Y, Gulsun T, Izat N, Cetin M, Oner L, Sahin S. Characterization and comparison of deferasirox fast disintegrating tablets prepared by direct compression and lyophilization methods. J Drug Deliv Sci Technol., 2020; 57: 1(1): 76-0.
39. Bhardwaj S, Jain V, Jat RC, Mangal A, Jain S. Formulation and evaluation of fast dissolving tablet of aceclofenac. Int J Drug Deliv, 2010; 2(1): 93-97.
40. Battu SK, Repka MA, Majumdar S, Rao Y M. Formulation and evaluation of rapidly disintegrating fenoverine tablets: effect of superdisintegrants. Drug Dev Ind Pharm., 2007; 33(11): 1225-32.
41. Kumar JN, Gunda RK. Design, formulation and evaluation of pravastatin fast dissolving tablets. Pharm Met., 2018; 9: 16-23.
42. Gunda RK, Kumar JS, Satyanarayana V, Batta S, Harika CM. Formulation development and evaluation of carbamazepine fast dissolving tablets. J Pharm Res., 2016; 10(5): 216-25.