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FAST DISSOLVING DRUG DELIVERY SYSTEM: A REVIEW

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ABSTRACT

Swallowing a pill is a major difficulty encountered in case of geriatric and pediatric patient which leads to poor patient compliance due to unpalatable taste of drug. To troubleshoot these problems a new dosage form known as fast-dissolving tablet (FDT), has been developed which rapidly disintegrate and dissolve in saliva. FDT are intended and designed to disintegrate and dissolve in saliva and then easily swallowed without need of water which is a major benefit over conventional dosage form. These dosage forms are also used to attain instant a higher concentration of drug in body for immediate actions.Fast dissolving tablets can be prepared by using various conventional methods like direct Compression, wet granulation, moulding, spray drying, freeze drying, and sublimation method and by using different type of superdisintegrants like Cross linked

carboxymelhylcellulose (Croscarmeliose),Sodium starch glycolate (Primogel, Explotab), Polyvinylpyrrolidone (Polyplasdone) etc. This review discusses the method of preparation, properties, advantages, disadvantage, characterization ,mechanisms; drugs to be incorporated in the mouth dissolving tablet and evaluation of the product and future trend of the mouth dissolving tablet.

KEYWORDS: Fast dissolving tablets, Conventional techniques, patented technology.

INTRODUCTION: [1-3]

A fast-dissolving drug delivery system, in most cases, is a tablet that dissolves or disintrigrants in the oral cavity without the need of water or chewing. Most fast-dissolving delivery system films must include substances to mask the taste of the active ingredient. This Masked active ingredient is then swallowed by the patient's saliva along with the soluble and Insoluble excipients. These are also called melt-in-mouth tablets, repimelts, porous tablets, orodispersible, quick dissolving or rapid disintegrating tablets.

ADVANTAGES: [2-4]

FDT can be administer to the patients who cannot swallow tablets/cap., such as the elderly, stroke victims, bedridden patients, & patients who refuse to swallow Such as pediatric, geriatric & psychiatric patients.

- Rapid drug therapy is possible.
- Certain studies concluded increased bioavailability/proved rapid absorption of drugs through pregastric absorption of drugs from mouth, pharynx & oesophagus as saliva passes down.

DISADVANTAGES OF FAST DISSOLVING TABLETS[5, 6]

- Fast dissolving tablet is hygroscopic in nature so must be keep in dry place.
- Some time it possesses mouth feeling.
- It is also show the fragile, effervesces granules property.
- FDT requires special packaging for properly stabilization & safety of stable product.

IDEAL FAST DISSOLVING DRUG DELIVERY SYSTEM: [7]

- Orally disintegrating drug delivery system should possess following characteristics:
- Utilizes cost effective production method.

- Require no water for oral administration.
- Dissolve / disperse/ disintegrate in mouth in a matter of seconds.
- Have a pleasing mouth feel and taste masking.
- Less friable and have sufficient hardness.
- Leave minimal or no residue in mouth after administration.
- Manufacturing using conventional manufacturing method.

DRUGS USED IN FAST DISSOLVING DRUG DELIVERY SYSTEM8-[10]

Example of some drug candidates best for FDT:

1. **Analgesic andante –inflammarory Agents:** Ibuprofen, Proxicam, Mefenamic Acid
2. **Anti-bacterial Agent-**Erythromycin, Tetracycline, Doxycycline,Rifampcin
3. **Anti-fungal Agents-** Griseofulvin,Miconazole
4. **Anti-Malarials**-Chlorquine, Amodiaquine
5. **Anti-Gout Agent-** Allopurinol, Probenecid
6. **Anti-Hypertensive** -Amlodipine, Nefidipine
7. **Anti-Coagulants-** Glipizide,Tolbutamide
8. **Anti-Protozoal Agents-** Benznidazole, Tinidazole
9. **Anti-Thyroid agent**-Carbimazole
10. **Cardiac Inotropic Agent-** Digitoxin,Digoxis
11. **Gastro-Intestinal Agents-** Omeprazole, Ranitidine, Fomatidine
12. **Nutritional Agents-**Vitamin A, Viitamin B, Vitamin D, etc.
13. **Oral Vaccine**-Influenza, Hepatitis, Polio, Tuberculosis,etcs

FORMULATION OF FAST DISSOLVING TABLETS: [12]

The ideal characteristics of a drug to be selected: No bitter taste, Dose lowers than 20mg.,Small to moderate molecular weight, Good stability in water and saliva, Partially none ionized at the oral cavities pH, Ability to diffuse and partition into the epithelium of the upper GIT, Ability to permeate oral mucosal tissue.

Examples of drugs:

Piroxicam,Loratidine,Rizatriptan,Olanzapine,Famotidine,Ondansetron,Zolmitriptan, Selegilline,AcetaminophenParacetamol,Nimesulide,Rofecoxib,Olanzapine,Montelukast, diphenhydramine and pseudoephedrine

.

SELECTION OF EXCIPIENTS[12-14]

Superdisintegrants:

Crosspovidone, Microcrystalline cellulose, sodium starch glycollate, Sodium carboxy methyl cellulose, pregelatinzed starch, calcium carboxy methyl cellulose, and modified corn starch. Sodium starch glycollate has good flowability than crosscarmellose sodium. Cross povidone is fibrous nature and highly compactable.

Flavours:

Peppermint flavour, cooling flavor, flavor oils and flavoring aromatic oil, peppermint oil, clove oil, bay oil, anise oil, eucalyptos oil thyme oil, oil of bitter almonds. Flavoring agnets include vanilla, citus oils, and fruit essences.

Sweetners: Aspartame, Sugars derivatives.

Fillers:

Directly compressible spray dried Mannitol, Sorbitol, xylitol, calcium carbonate, magnesium carbonate, calcium phosphate, calcium sulfate, pregelatinized starch, magnesium trisilicate, aluminium hydroxide.

Surfaceactive agents:

sodiumdoecylsulfate, sodiumlaurylsulfate, polyoxyethylene sorbitan fatty acid esters (Tweens), sorbitan fatty acid esters (Spans), polyoxyethylene stearates.

Lubircants:

Stearic acid, Magnesium stearate, Zinc state, calcium state, talc, polyethylene glycol, liquid paraffin, magnesium laury sulfate, colloidal silicon dioxide.

Binder:

Polyvinylpyrrolidone

(PVP),Polyvinylalcohl(PVA)

Hydroxypropy lmethylcellulose(HPMC)

Colour: Sunset yellow, Amaranth etc.

PREPARATION OF FAST DISSOLVING DRUGDELIVERY SYSTEM[15, 16]

Various technologies used in the manufacture of Fast dissolving tablets include:

Freeze –drying or lyophylization:

Freeze-drying allows immediate dissolution of the tablets because of their high porosity, and enhances drug stability, especially for moisture-sensitive substances; on the other hand, a porous network is associated with low physical resistance and high friability. Special packaging is required in some cases

.**Tablet Molding**:

In this method, molded tablets are prepared by using water-soluble ingredients so that the tablets dissolve completely and rapidly. The powder blend is moistened with a hydro-alcoholic solvent and is molded into tablets under pressure lower than that used in conventional tablet compression. The solvent is then removed by air-drying. Molded tablets are very less compact than compressed tablets. These possess porous structure that enhances dissolution.

Direct compression:

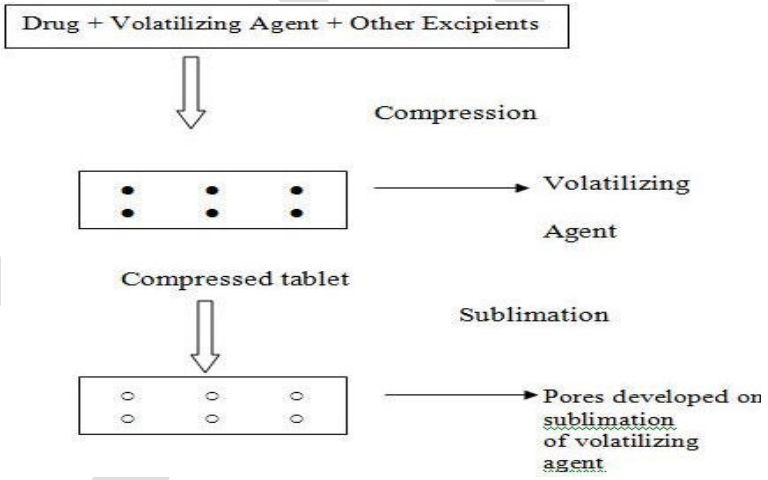
It is the easiest way to manufacture tablets. Conventional equipment, commonly available excipients and a limited number of processing steps are involved in direct compression. Also high doses can be accommodated and final weight of tablet can easily exceed that of other production methods. Directly compressed tablet's disintegration and solubilization depends on single or combined action of disintegrates, water soluble excipients and effervescent agent.

Spray drying:

Spray drying Maximum drug release and minimum disintegration time were observed with Kollidon CL excipients base as compared to tablets prepared by direct compression, showing the superiority of the spray dried excipients base technique over direct compression technique.

Sublimation:

In this method a subliming material like camphor, is removed by sublimation from compressed tablets and high porosity is achieved due to the formation of many pores where camphor particles previously existed in the compressed tablets prior to sublimation of the camphor. A high porosity was achieved due to the formation of many pores where camphor particles previously existed in the compressed mannitol tablets prior to sublimation of the camphor.These compressed tablets which have high porosity (approximately 30%) rapidly dissolved within 15 seconds in saliva. Granules containing nimusulide, camphor, crospovidone, and lactose were prepared by wet granulation technique. Camphor was sublimed from the dried granules by vacuum exposure Conventional methods like dry granulation, wet granulation and direct compression with highly soluble excipients, super disintegrates and/or effervescent systems can also be used.



Taste masking:

Taste masking is an essential requirement for fast dissolving tablets for commercial success. Taste masking of the active ingredients can be achieved by various techniques. Drugs with unacceptable bitter taste can be microencapsulated into pH sensitive acrylic polymers. Cefuroxime axetil is microencapsulated in various types of acrylic polymers (e.g., Eudragit E, Eudragit L-55 and Eudragit RL) by solvent evaporation and solvent extraction techniques. These polymer microspheres

showed efficient taste masking and complete dissolution in a short period. Fine granules of drug and disintegrant (e.g. low substituted hydroxypropyl cellulose) when coated with a water insoluble polymer (e.g. ethylcellulose) masked the bitter taste of sparfloxacin. The addition of low substituted hydroxypropyl cellulose as disintegrant to the drug in cores resulted in increased dissolution rate and bioavailability of sparfloxacin compared to its conventional tablets. A novel technique for taste masking of macrolides (e.g. erythromycin and clarithromycin) is reported by Yajima et al, Monoglycerides having a low melting point which can form good elaborate film, and easily soluble in intestine, and polymers which are insoluble in the mouth (pH 5-8), but are freely soluble in stomach (pH 1-4), are selected for taste masking of drugs with unpleasant taste. The polymer is dissolved or dispersed in monoglyceride, and the drug is granulated with above mixture and the resultant granules are cooled.

Cotton candy:

This process is so named as it utilizes a unique spinning mechanism to produce floss-like crystalline structure, which mimic cotton candy. Cotton candy process involves formation of matrix of polysaccharides or saccharides by simultaneous action of flash melting and spinning. The matrix formed is partially recrystallized to have improved flow properties and compressibility. This candy floss matrix is then milled and blended with active ingredients and excipients and subsequently compressed to ODT. This process can accommodate larger drug doses and offers improved mechanical strength. However, high-process temperature limits the use of this process.

Mass Extrusion:

This technology involves softening of the active blend using the solvent mixture of water-soluble polyethylene glycol and methanol and subsequent expulsion of softened the extruder or syringe to get a cylinder of the product into even segments using heated blade to form tablets.

Melt granulation:

Melt granulation technique is a process by which pharmaceutical powders are efficiently agglomerated by a meltable binder. The advantage of this technique

compared to a conventional granulation is that no water or organic solvents is needed. Because there is no drying step, the process is less time consuming and uses less energy than wet granulation. It is a useful technique to enhance the dissolution rate of poorly water-soluble drugs, such as griseofulvin. This approach to prepare FDT with sufficient mechanical integrity, involves the use of a hydrophilic waxy binder (Superpolystate©, PEG-6-stearate). Superpolystate© is a waxy material with a melting point of 33–37°C and a HLB value of 9. So it will not only act as a binder and increase the physical resistance of tablets but will also help the disintegration of the tablets as it melts in the mouth and solublises rapidly leaving no residues.

IMPORTANT PATENTED TECHNOLOGIES FOR FAST DISSOLVING TABLETS[17-21]

Zydis Technology:

Zydis formulation is a unique freeze dried tablet in which drug is physically entrapped or dissolved within the matrix of fast dissolving carrier material. When zydis units are put into the mouth, the freeze-dried structure disintegrates instantaneously and does not require water to aid swallowing. The zydis matrix is composed of many material designed to achieve a number of objectives. To impart strength and resilience during handling, polymers such as gelatin, dextran or alginates are incorporated. These form a glossy amorphous structure, which imparts strength.

Durasolv Technology:

Durasolv is the patented technology of CIMA labs. The tablets made by this technology consist of drug, filler and a lubricant. Tablets are prepared by using conventional tabletting equipment and have good rigidity. These can be packaged into conventional packaging system like blisters. Durasolv is an appropriate technology for product requiring low amounts of active ingredients.

Orasolv Technology:

CIMA labs have developed Orasolv Technology. In this system active medicament is taste masked. It also contains effervescent disintegrating agent. Tablets are made by direct compression technique at low compression force in order to minimize oral dissolution time. Conventional blenders and tablet machine

is used to produce the tablets. The tablets produced are soft and friable.

Flash Dose Technology:

Flash dose technology has been patented by fuisz. Nurofen meltlet, a new form of ibuprofen as melt in mouth tablets prepared using flash dose technology is the first commercial product launched by Biovail Corporation. Flash dose tablets consist of self-binding shear form matrix termed as "floss". Shear form matrices are prepared by flash heat processing.

Wow tab Technology:

Wow tab technology is patented by Yamanouchi Pharmaceutical Co. WOW means "Without Water". In this process, combination of low mouldability saccharides and high mouldability saccharides is used to obtain a rapidly melting strong tablet. The active ingredient is mixed with a low mouldability saccharide (eg. lactose, glucose, and mannitol) and granulated with a high mouldability saccharide (eg. Maltose, oligosaccharides) and compressed into tablet.

Flash tab Technology:

Prographarm laboratories have patented the Flash tab technology. Tablet prepared by this system consists of an active ingredient in the form of micro crystals. Drug micro granules may be prepared by using the conventional techniques like coacervation, micro encapsulation and extrusion spheronisation. All the processing utilized conventional tabletting technology.

OraQuick:

The OraQuick fast-dissolving/disintegrating tablet formulation utilizes a patented taste masking technology. KV Pharmaceutical claims its microsphere technology, known as MicroMask, has superior mouthfeel over taste-masking alternatives

Quick –Dis Technology:

Lavipharm Laboratories Inc. (Lavipharm) hass invented an ideal intraoral fast-dissolving drug delivery system, which satisfies the unmet needs of the market. The novel intraoral drug delivery system, trademarked Quick- Dis™, is Lavipharm's

proprietary patented technology and is a thin, flexible, and quick-dissolving film. The film is placed on the top or the floor of the tongue. It is retained at the site of application and rapidly releases the active agent for local and/or systemic absorption. The Quick-Dis™ drug delivery system can be provided in various packaging configurations, ranging from unitdose pouches to multiple-dose blister packages. The typical disintegration time, which is defined as the time at which the film begins to break when brought into contact with water, is only 5 to 10 seconds for the Quick-Dis™ film with a thickness of 2 mm. drug delivery system is 50% released within 30 seconds and 95% within 1 minute.

Durasolv Technology:

DuraSolv is Cima's second-generation fast-dissolving/disintegrating tablet formulation. Produced in a fashion similar to OraSolv, DuraSolv has much higher mechanical strength than its predecessor due to the use of higher compaction pressures during tableting. DuraSolv tablets are prepared by using conventional tabletting equipment and have good rigidity (friability less than that 2%). The DuraSolv product is thus produced in a faster and more costeffective manner. DuraSolv is so durable that it can be packaged in traditional blister packaging, pouches or vials. One disadvantage of DuraSolv is that the technology is not compatible with larger doses of active ingredients, because the formulation is subjected to such high pressures on compaction. Unlike OraSolv, the structural integrity of any taste masking may be compromised with high drug doses. The drug powder coating in DuraSolv may become fractured during compaction, exposing the bitter-tasting drug to a patient's taste buds. Therefore, the DuraSolv technology is best suited for formulations including relatively small doses of active compound.

Sheaform Technology:

This technology make Sheaform matrix consisting of floss preparation. Floss is produced by subjecting to a feedshock containing a sugar to flash heat processing.

Ceform Technology:

In this technology microspheres containing active ingredient are prepared. Basic

requirement of this technology is placing dry powder containing either pure drug or special blend of drug and excipients.

Lyoc (Laboratories L. Lafon, Maisons Alfort , France):

Lyoc utilizes a freeze drying process but differ from Zydis in that the product is frozen on the freeze dryer shelves. To prevent inhomogeneity by sedimentation during this process, these formulations require a large proportion of undissolved inert filler (mannitol), to increase the viscosity of the inprocess suspension. The high proportion of filler reduces the potential porosity of the dried dosage form and results in denser tablets with disintegration rates that are Comparable with the loosely compressed fast melt formulations.

Pharmaburst technology:

Pharmaburst™ is a "Quick Dissolve" delivery system patented by SPI Pharma. Pharmaburst is a co-processed excipient system with specific excipients, which allows rapid disintegration and low adhesion to punch facesmouldablilty saccharides are used to obtain rapid melting strong tablet. The active ingredient mixes with low mouldablilty saccharides.

Frosta technology:

Akina patents this technology. It utilizes the concept of formulating plastic granules and compressing them at low pressure to produce strong tablets with high porosity. Plastic granules composed of porous and plastic material, water penetration enhancer, and binder. The process involves mixing the porous plastic material with water penetration enhancer followed by granulating with binder. The tablets obtained have excellent hardness and rapid disintegration time ranging from 15 to 30 sec depending on size of tablet.

Nano technology:

For fast dissolving tablets, Elan's proprietary NanoCrystal technology can enable formulation and improve compound activity and final product characteristics. Decreasing particle size increases the surface area, which leads to an increase in dissolution rate. This can be accomplished predictably and efficiently using NanoCrystal technology. NanoCrystal™ Fast dissolving technology provides for: Pharmacokinetic benefits of orally administered nanoparticles (<2 microns) in

the form of a rapidly disintegrating tablet matrix ·Product differentiation based upon a combination of proprietary and patent-protected technology elements. Cost-effective manufacturing processes that utilize conventional, scalable unit operations.

EVALUATION OF FAST DISSOLVING DRUGDELIVERY SYSTEM[22, 23]

Bulk characterization:

Angle of Repose, Bulk Density, Bulkiness, Void Volume, Porosity, Compressibility characterstics (Carr'sand Hausner index).

Angle of Repose:

The angle of repose was determined by the funnel method suggested by Newman. Angle of repose is determined by the following formula,

tanq = h/r

Therefore **q = tan-1 h/r**

Where q = Angle of repose

h = height of the cone

r= Radius of the cone base

Angle of Repose less than 30 ° shows the free flowing of the material.

Bulk Density:

Specific bulk volume or reciprocal of bulk density is called bulkiness or bulk. Bulkiness increases with a decrease in particle. The bulkiness can be calculated by the following formula,

Bulkiness= I/ Pb

Where,

Pb = Bulk Density.

Loose bulk density:

It is defined as the ratio of weight of blend in gms to the loose bulk volume(Untapped volume) in cm 3 Loose bulk density is given by **Loose bulk density p u = Weight in gms / Vb** Where, Vb = Bulk volume (untapped volume)

Void Volume:

The volume of the spaces is known as the void volume "v" and is given by the

Formula,

V=Vb-Vp

Where, Vb = Bulk volume (volume before tapping)

V = True volume (volume after tapping)

Porosity:

The porosity € of powder is defined as the ratio of void volume to the bulk volume of the packaging. The porosity of the powder is given by

€= Vb - Vp/ Vp =1- Vp/Vb

Porosity is frequently expressed in percentage and is given as **%€ = (1 - Vp/ Vb) X 100.**

Bulk density is defined as the mass of the powder divided by the bulk volume and is expressed as gm/ cm 3. The bulk density of a powder primarily depends on particle size distribution, particle shape and the tendency of particles to adhere together. The particles are pack in such a way so as to leave large gaps between their surfaces 'resulting up in light powder of low bulk density. Here the smaller particles shift between the large particles resulting in heavy powder of high bulk density. Bulk density is very important in the size of containers needed for handling, shipping, and storage of raw material and blend. It is also important in size blending equipment.

Pb=M/Vp

Where,

Pb =Bulk Density

M = Weight of sample in gm

Bulkiness:

Indicates the types of packaging a powder undergoes when subject to vibrations, when stored, or in tablet machine when passed through hopper or feed frame

Percent Compressibility:

It is an important measure obtained from bulk density and is defined as, Pb=before compressed volume, Pu=after compressed volumes **C=Pb-Pu/Pb x100**

If the bed of particles is more compressible the blend will be less flowable and flowing materials.

EVALUATION OF TABLETS: [24-26]

General Appearance:

The general appearances of a tablet include size, shape, colour, taste, odour, surface texture.

Size, Shape, Thickness and diameter:

The size and shape of the tablet can be dimensionally described, monitored and controlled. Thickness of tablets is an important characteristic for appearance and also in counting by using filling equipment. Some filling equipment utilizes the uniform thickness of the tablets as a counting mechanism. Ten tablets were taken and their thickness measured by vernier caliper.

Uniformity of weight:

In Indian Pharmacopoeia procedure for uniformity of weight was followed, ten or twenty tablets were taken and their weight was determined individually and collectively on a digital weighing balance. The average weight of one tablet was determined from the collective weight. The weight variation test would be a satisfactory method of determining the drug content uniformity.

Hardness of Tablets:

Hardness of tablet is defined as the force applied across the diameter of the tablet in the order to break the tablet. The resistance of the tablet to chipping, abrasion or breakage under condition of storage transformation and handling before usage depends on its hardness. Hardness of the tablet of each formulation was determined using Monsato Hardness tester.

Friability of tablets:

Fribrater consist of a plastic-chamber that revolves at 25 rpm, dropping those tablets at a distance of 6 inches with each revolution. The tablets were rotated in the fribrater for at least 4 minutes. At the end of test tablets were dusied and reweighed,

the loss in the weight of tablet is the measure of friability and is expressed in percentage as,

%Friability = intial weight-final weight/intial weight x 100

Wetting time:

In this method measure tablet wetting time. Simple tissue paper (12 cm X 10.75 cm) folded twice was placed in a small petridish (ID = 6.5 cm) containing 6 ml of Sorenson's buffer pH 6.8. A tablet was put on the paper, and the time for complete wetting was measured. Three trials for each batch and the standard deviation were also determined.

Solution volume:

In this test take one tablet in a Petri –dish with suitable solvent. One or two drop of solvent used until the tablet shows soluble property that is called soluble or solution volume. V = Final volume of blend in cm 3

***In Vitro* Disintegration test: [27, 28]**

In Vitro disintegration time was measured by dropping a tablet in a beaker containing 50 ml of Sorenson's buffer pH 6.8. Three tablets from each formulation were randomly selected and *In Vitro* dispersion time was performed.

***In Vivo* Disintegration test: [29]**

The test was carried out on 2 or 3 tablets using in the mouth and the time in second taken for complete disintegration of the tablet was measured in few seconds.

***In Vitro* Dissolution Test[27-30]**

In-vitro dissolution study was performed by using USP Type II Apparatus (Paddle type) [Electro lab (ETC-11L) Tablet Dissolution Tester] at 50 rpm. Phosphate buffer pH 6.8, 900 ml was used as dissolution medium which maintained at 37±0.5°C. Aliquot of dissolution medium (10 ml) was withdrawn at specific time intervals (2 min) and was filtered. The amount of drug dissolved was determined by UV spectrophotometer (Shimadzu, Japan) by measuring the absorbance of the sample at 248.0 nm. Three trials for each batch were performed and average percentage drug release with standard deviation was calculated and recorded.

Stability Study (Temperature Dependent) [27-30]

The fast dissolving tablets are packed in suitable packaging and stored under the following conditions for a period as prescribed by ICH guidelines for 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 (Visual defects, Hardness, Friability, Disintegrations, and Dissolution etc.) and drug content. The data obtained is fitted into first order equations to determine the kinetics of degradation. Accelerated stability data are plotting according Arrhenius equation to determine the shelf life at 25 ° C.

Packaging [30]:

Packaging special care is required during manufacturing and storage to protect the dosage of other fast-dissolving dosage forms. Quick-dispersing and/or dissolving oral delivery systems, the system can be packaged using various options, such as single pouch, blister card with multiple units, multiple unit dispenser, and continuous roll dispenser, depending on the application and marketing objectives.

Future trends:

These dosage forms may be suitable for the oral delivery of drugs such as protein and peptide-based therapeutics that have limited bioavailability when administered by conventional tablets. These products usually degrade rapidly in the stomach. Should next generation drugs be predominantly protein or peptide based, tablets may no longer be the dominant format for dosing such moieties. Injections generally are not favored for use by patients unless facilitated by sophisticated auto-injectors. Inhalation is one good alternative system to deliver these drugs, but the increased research into biopharmaceuticals so far has generated predominantly chemical entities with low molecular weights. The developments of enhanced oral protein delivery technology by ODTs which may release these drugs in the oral cavity are very promising for the delivery of high molecular weight protein and peptide.

CONCLUSION:

The FDTs have potential advantages over conventional oral dosage forms with their improved patient compliance; convenience, bioavailability and rapid onset of action which drawn the attention of many manufactures over a decade. FDT formulations obtained by some of these technologies have sufficient mechanical strength, quick disintegration/dissolution in the mouth. Many drugs can be incorporated in FDT especially unpalatable drugs. The research is still going on. More products need to be commercialized to use this technology properly. Thus FDT may be developed for most of the available drugs in near future.

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