An Overview On Fast Dissolving Tablet

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An Overview On Fast Dissolving Tablet

Author(s): Patwa S, Narang N, Singla M, Singla R K

Abstract

Oral route having the highest patient compliance is regarded as the most convenient, safest and also the most economical method of drug delivery. Fast dissolving tablets is one such most advantageous example of the oral drug delivery. These tablets readily dissolve or disintegrate in the saliva i.e. within less than 60sec without the need for water. They have been formulated for pediatric, geriatric and bedridden patients. These type of dosage forms are also ideal for active patients who are busy and traveling and may not have access to water. FDTs have gained considerable attention for those patients who have difficulties in swallowing because of dysphagia, hand tremors problems and have additional advantage for unconscious, young patients with underdeveloped muscular and nervous system. This review describes the various advantages, limitations, desired characteristics, formulation aspects, super-disintegrants employed, technologies developed for FDTs, evaluation tests, and marketed formulations.

Introduction

Solid dosage forms like tablets, capsules are the most popular form among all other dosage forms existing today because of its convenience of compactness, easy manufacturing and self administration. It is difficult to swallow tablets as well as hard gelatin capsules and also when water is not available in the case of motion sickness, allergic attacks of coughing during the common cold and bronchitis. For these reasons tablets which rapidly dissolve or disintegrate in the oral cavity play a important role and are called fast dissolving tablets. These tablets disintegrate instantaneously when put on tongue, releasing the drug, which dissolve or disperses within 60 seconds in the saliva in the absence of water. FDTs are not formulated for people who have swallowing difficulties, but also are ideal for active people. Fast dissolving tablets are also called as mouth dissolving tablets, melt-in-mouth tablets, orodispersible tablets, rapimelts, porous tablets, quick dissolving tablets etc.some drugs are absorbed from the mouth, pharynx and oesophagus as the saliva passes down into the stomach. In such cases, bioavailability of drug is significantly greater than those observed from conventional tablet dosage form. The faster the drug into the solution, quicker the absorption and onset of clinical effect. The use of superdisintegrants like croscarmellose, sodium starch glycrolate, polyvinlypyrolidone, crosspovidone etc which provide rapid disintegration of tablet and release drug in saliva is the basic approach in development of FDTs. Moreover, the amount of drug that is subjected to first pass metabolism is reduced as compared to standard tablet. Patients for whom chewing is difficult and painful can use FDTs easily. Fast dissolving tablets can also be used easily by children who have lost their teeth but do not have full use of their permanent teeth. The technologies used for manufacturing fast-dissolving tablets are freeze-drying, tablet molding, spray- drying, sugar-based excipients, sublimation, tablet compression, disintegration addition and many other patented technologies. Recent market study indicate that more than half of the worldwide population prefer FDTs as compare to other dosage form today.

Advantages of fast disintegrating tablets(1,2,3,7):
Fast dissolving technology offers:
1. Ease of administration for those patients who have difficulty in swallowing tablet.
2. No need of water to swallow the dosage form.
3. Useful for pediatric, geriatric and psychiatric patients.
4. Have acceptable taste masking property.
5. Achieve increased bioavailability through pregastric absorption of drugs from mouth, pharynx and oesophagus as saliva passes down.
6. Have a pleasant mouth feel and leave minimal or no residue in the mouth after drug administration.
7. Have rapid dissolution and absoption of the drug which will produce quick onset of action.
8. It combines advantages of solid dosage form in terms of stability and liquid dosage form in term of bioavailabilty.

Limitations to mouth dissolving tablets(1,5,7):
1. Careful handling is required because tablets usually have insufficient mechanical strength.
2. If tablets are not formulated properly they may leave unpleasant taste or grittiness in the mouth.
3. Drugs difficult to formulate into FDT with relatively larger doses.
4. Drugs with short half-life and frequent dosing and those whom require controlled or sustained release are unsuitable candidates of FDTs.
**Desired characteristics of fast dissolving tablets(5)**

**Fast Disintegration:**
These tablets should disintegrate in the mouth without additional water or with a very small amount of water. The disintegration fluid is provided by the saliva of the patient. The disintegrated tablet should become a soft paste or liquid suspension, which can provide smooth swallowing and good mouth feel.

**Drug Properties:**
Many drug properties could potentially affect the performance of FDTs. For example, the solubility, crystal morphology, particle size, hygroscopicity, compressibility, bioavailability, flow property and bulk density of a drug can significantly affect the final tablets characteristics, such as disintegration and tablet strength.

**Taste of Active Ingredients:**
FDTs dissolve or disintegrate in the patient’s mouth, the drug will be partially dissolved in close proximity to the taste buds. After swallowing, there should be minimal or no residue in the mouth. An ideal taste-masking technology should provide drugs with good mouth feel and without grittiness.

**Moisture Sensitivity:**
These tablets should have low sensitivity to humidity. This problem can be especially challenging because many highly water soluble excipients are used in formulation to enhance fast dissolving properties as well as to create good mouth feel. Those highly water soluble excipients are susceptible to moisture; some will even deliquesce at high humidity.

**Tablet strength and porosity:**
The tablet porosity is usually maximized to ensure fast water absorption into the tablets. The key properties of the tablets are fast absorption or wetting of water into the tablets and disintegration associated particles into individual components for fast dissolution. This requires that excipients should have high wettability, and the tablet structure should also have a highly porous network. Because the strength of a tablet is related to compression pressure, and porosity is inversely related to compression pressure, it is important to find the porosity that allows fast water absorption while maintaining high mechanical strength.

**Drug Selection Criteria:**
1. Have better solubility. E.g. promethazine
2. Low dose. E.g. terazosin hcl
3. Have better availability to permeate oral mucosal tissue.
4. Less or not bitter in taste.
5. Good stability in both water as well as in saliva. E.g. rizatriptine benzoate

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**SUPER-DISINTEGRANTS**

Superdisintegrants are the agents added to tablet formulations to promote the breakup of the tablets into smaller fragments in an aqueous environment thereby increasing the available surface area and promoting a more rapid release of the drug substance.

**MECHANISM OF SUPERDISINTEGRANTS:**
There are four major mechanisms for tablet disintegration as follows:

1. **Swelling:**
   General mechanism of action for tablet disintegration which is most widely accepted is swelling. Tablets with high porosity due to lack of adequate swelling force show poor disintegration. Sufficient swelling force with low porosity is exerted in the tablet. If the packing fraction is very high, fluid is unable to penetrate in the tablet & disintegration is again slows down.

2. **Porosity and Capillary Action(Wicking):**
   Effective disintegrants that do not swell are believed to impart their disintegrating action through porosity and capillary action. Tablet porosity provides pathways for the preparation of fluid into tablets. The disintegrant particles themselves act to enhance porosity and provide pathways into the tablet. Liquid is drawn up or "wicked" into these pathways through capillary action and rupture the interparticulate bonds causing the tablet to break apart.

3. **Due to disintegrating particle/particle repulsive forces:**
   Another mechanism of disintegrating attempts to explain the swelling of tablet made with ‘nonswellable’ disintegrants. Guyot-Hermann has proposed a particle repulsion theory based on the observation that nonswellening particle also cause disintegration of tablets. The electric repulsive forces between particles are the mechanism of disintegration and water is required for it.

4. **Due to deformation:**
   Disintegrated particles get deformed, during tablets compression and when these deformed particles come in contact with aqueous media or water they get into their normal structure. Swelling capacity of starch was improved during compression. Due to this increase in size of the deformed particles produces a break up of the tablet.

**LIST OF SUPERDISINTEGRANTS:** Table 2

**EXAMPLES OF OTHER EXCIPIENTS USED IN FDTs FORMULATION(8)**

1. Flavours: Peppermint flavour, cooling flavour,
flavour oils, flavouring aromatic oil, clove oil, bay oil, anise oil, eucalyptus oil, thyme oil, oil of bitter almonds. Flavouring agents include vanilla, citrus oils, fruit essences.

3. Fillers: Directly compressible spray dried Mannitol, sorbitol, xylitol, calcium carbonate, magnesium carbonate, calcium phosphate, calcium sulphate, pregelatinized starch, magnesium trisilicate, aluminium hydroxide.
4. Surface active agents: sodiumdocylsulfate, sodiumlaurylsulfate, polyoxyethylene sorbitan fatty acid esters (Tweens), sorbitan fatty acid esters (Spans), polyoxyethylene stearates.
5. Binders: Polyvinylpyrrolidone (PVP), polyvinylalcohol (PVA)
6. Colour: Sunset yellow, amaranth etc.

CONVENTIONAL TECHNIQUES USED FOR PREPARATION OF FDTs (3,6,7)

1) Disintegration Addition:
Disintegration addition technique is one popular technique for formulating FDTs because of its easy implementation and cost-effectiveness. The basic principle involved in formulating FDTs by disintegrant addition technique is addition of superdisintegrants in optimum concentration so as to achieve rapid disintegration along with the good mouth feel.

2) Freeze drying:
A process in which water is sublimated from the product after freezing. Lyophilization is a pharmaceutical technology which allows drying of heat sensitive drugs and biological at low temperature under condition that allow removal of water by sublimation. Lyophilization results in preparations which are highly porous, with a very high specific surface area, which dissolve rapidly show improved absorption and bioavailability.

3) Moulding:
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.

4) Sublimation: Figure 1

5) Spray drying:
Spray drying can produce highly porous and fine powders that dissolve rapidly. The formulations are incorporated by hydrolyzed and non hydrolyzed gelatins as supporting agents, mannitol as bulking agent, sodium starch glycolate or crosscarmellose sodium as disintegrating and an acidic material (e.g. citric acid) and/or alkali material (e.g. sodium bicarbonate) to enhance disintegration and dissolution.

6) Mass Extrusion:
This technology involves softening the active blend using the solvent mixture of water soluble polyethylene glycol, using methanol and expulsion of softened mass through the extruder or syringe to get a cylinder of the product into even segments using heated blades to form tablets.

7) 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 tablets disintegration and solubilization depends on single or combined action of disintegrants, water soluble excipients and effervescent agent.

8) Melt granulation:
It 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 and organic solvent 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.

9) Phase transition process:
It is concluded that a combination of low and high melting point sugar alcohols, as well as a phase transition in the manufacturing process, are important for making FDTs without any special apparatus.

Patented Technologies For Fast Dissolving Tablets (1,7)
1) Zydus technology.
2) Durasolv technology.
3) Orasolv technology.
4) Wowtab technology.
5) Flashtab technology.
6) Ziplets/Advatab technology.
7) Pharmaburst
8) Nanocrystal technology.
9) Lyoc
EVALUATION OF BLEND(3,6)

Preformation studies:-
1. Angle of Repose(?)
The angle of repose(?) can be measured by the friction forces in a loose powder. It is defined as the maximum angle possible between the surface of the pile of the powder and the horizontal plane. The angle of repose was determined by the funnel method suggested by Newman. The weighted amount was taken in a funnel. The height of funnel was adjusted in such a way that the tip of the funnel just touches the apex of the heap of blend. The blend was now allowed to flow through the funnel freely on the surface. The diameter of the powder cone was determined and Angle of repose is determined by the following formula:-

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

Where \( \theta \) = angle of repose
\( h \) = height of the cone
\( r \) = radius of the cone base

2. Bulk Density(Db)
Bulk density(Db) is defined as the mass of the powder divided by the bulk volume and is expressed as gm/cm³. The bulk density is then obtained by dividing the weight of sample in gms by final volume in cm³.

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

Where \( M \) = mass of powder in gm
\( Vb \) = bulk volume of the powder

3. Tapped Density(Dt)
It is the ratio of total mass of the powder to the tapped volume of the powder. It was determined by placing a graduated cylinder containing a known mass of drug-excipients blend. The cylinder was allowed to fall under its own weight onto a hard surface from the height of 10 cm at 2 second intervals. The tapping was continued until the difference between successive volumes is less than 2%. It is expressed in gm/ml.

\[
Dt = \frac{M}{Vt}
\]

Where \( M \) = mass of powder
\( Vt \) = volume of the tapped packing

4. Hausner’s Ratio
Hausner ratio is an indirect index of ease of powder flow and is given by:

\[
\text{Hausner ratio} = \frac{Dt}{Db}
\]

Where \( Dt \) = tapped density
\( Db \) = bulk density
1.25 - Poor flow property

5. Porosity
The porosity \( \varepsilon \) 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

\[
\varepsilon = \frac{Vb - Vp}{Vp} = 1 - \frac{Vp}{Vb}
\]

Porosity is frequently expressed in percentage and is given as

\[
\%\varepsilon = \left( 1 - \frac{Vp}{Vb} \right) \times 100
\]

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

\[
I = \frac{Dt - Db}{Db} \times 100
\]

Where, \( Dt \) = tapped density of the powder
\( Db \) = bulk density of the powder

EVALUATION TESTS FOR FAST DISSOLVING TABLETS(3,4,6)

IN VITRO EVALUATION METHODS:-
1. General Appearance
The general appearance of a tablet, its visual identity and overall “elegance” is essential for consumer acceptance. Include in are tablet’s size, shape, colour, presence or absence of an odour, taste, surface texture, physical flaws and consistency and legibility of any identifying marking.

2. Tablet thickness
Tablet thickness is an important characteristic in reproducing 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 was recorded using micrometer.

3. Uniformity of weight
I.P. procedure for uniformity of weight was followed, twenty tablets were taken and their weight was determined individually and collectively on a digital weighing balance.

4. Tablet hardness
Hardness of tablet is defined as the force applied across the diameter of the tablet in the order to break the tablet. Hardness of the tablet of each formulation was determined using Monsato Hardness tester and many other testers like the Strong-Cobb tester, the Pfizer tester, the Erweka tester, and the Schleuniger tester available for determining hardness of particular tablet.

5. Friability(F)
It is measured of mechanical strength of tablets. Roche friability was used to determine the friability by following procedure. A preweighed tablet was placed in the friabilitor. Friabilitor 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 friabilitor 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

\[
F = \frac{W_{initial} - W_{final}}{W_{initial}} \times 100
\]
Where,

7. Disintegration test
The standard procedure of performing disintegration test for FDTs has several limitations and they do not suffice the measurement of very short disintegration times. The disintegration time for ODT needs to be modified as disintegration is required without water, thus the test should mimic disintegration in salivary contents. For this purpose, a petridish (10 cm diameter) was filled with 10 ml of water. The tablet was carefully put in the center of petridish and the time for the tablet to completely disintegrate into fine particles was noted.

8. Wetting time
The method reported by yunixia et al., was followed to measure tablet wetting time. A piece of 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 was also determined.

9. In Vitro Dispersion Time
In vitro dispersion 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. Time required for complete dispersion of a tablet was measured.

10. Stability Study (Temperature Dependent)
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, 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.

In Vivo Disintegration Test
The test was carried out on 6 tablets using the apparatus specified in I.P.-1996 distilled water at 37°C ±2°C was used as a disintegration media and the time in second taken for complete disintegration of the tablet with no palable mass remaining in the apparatus was measured in seconds.

Conclusion
Introduction of fast disintegrating dosage forms has solved some of the problems encountered in administration of drugs to the pediatric and elderly patient, which constitutes a large proportion of the world’s population. Hence, patient demand and availability of various technologies have increased the acceptance of fast disintegrating tablets, which in prolongs the patient life of a drug. Keeping in view of the advantages of the delivery system, fast disintegrating dosage forms have been successfully commercialized and these dosage forms very well accepted at doctors as well as patient level.

References
Illustrations

Illustration 1

Table 1: Promising Drugs to be incorporated In Fast Dissolving

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>DRUG CATEGORY</th>
<th>EXAMPLES OF DRUG</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Analgesic and anti-inflammatory agents</td>
<td><em>Ibuprofen, Indomethacin, Naproxen, Oxaprozin, Phenylbutazone, Piromicycin, Meloxicam, Ketoprofen</em> etc.</td>
</tr>
<tr>
<td>2.</td>
<td>Anthelmintics</td>
<td><em>Albendazole, Cambendazole, Dichlorophen, Mebendazole, Thiabendazole, Praziquantel</em></td>
</tr>
<tr>
<td>3.</td>
<td>Anti-arrhythmic agents</td>
<td><em>Quinidine sulphate, Amiodrone, Disopyramide, Flecainide Acetate</em></td>
</tr>
<tr>
<td>4.</td>
<td>Anti-coagulants</td>
<td><em>Phenindione, Nicoumalone, Dipyridamole, Dicoumarol</em></td>
</tr>
<tr>
<td>5.</td>
<td>Anti-depressants</td>
<td><em>Trimipramine, Trazodone, Nortriptyline, Mianserin, Maprotiline, Amoxapine</em></td>
</tr>
<tr>
<td>6.</td>
<td>Anti-bacterial</td>
<td><em>Trimetoprim, Tetracycline, Sulphapyridine, Sulphafurazole, Sulphadiazine, Sulphacetamide, Spiramycin, Rifampicin, Nitrofurantoin, Nalidixic acid, Ethionamide, Erythromycin, Ciprofloxacin, Clarithromycin</em></td>
</tr>
<tr>
<td></td>
<td>7. Anti-epileptics</td>
<td>Valproic acid, sulthiame, primidone, phenytoin, phenobarbitone, oxcarbazepine, methoin, ethosoin, clonazepam, carbamazepine</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td>8.</td>
<td>Anti-gout agents</td>
<td>Sulphinpyrazone, allopurinol, probenecid</td>
</tr>
<tr>
<td>9.</td>
<td>Anti-fungal agents</td>
<td>Clotrimazole, econazole nitrate, fluconazole, fluocytosine, griseofulvin, itraconazole, ketoconazole, miconazole</td>
</tr>
<tr>
<td>10.</td>
<td>Anti-hypertensive agents</td>
<td>Amlodipine, carvedilol, prazosin, benidipine, darodipine, diltiazam, diazoxide, felodipine, minoxidil, nifedipine, nimodipine, terazosin</td>
</tr>
<tr>
<td>11.</td>
<td>Anti-malarial agents</td>
<td>Proguanil, mefloquine, halofantrine, chlorproguanil, chloroquine</td>
</tr>
<tr>
<td>12.</td>
<td>Anti-neoplastic agents</td>
<td>Busulphan, chlorambucil, cyclosporin, dacarbazine, etoposide, lomustine, melphalan, methotrexate, procarbazine, tamoxifen citrate, mitomycin</td>
</tr>
<tr>
<td>13.</td>
<td>Anti-migraine agents</td>
<td>Dihydroergotamine mesylate, sumatriptan, ergotamine maleate</td>
</tr>
<tr>
<td>14.</td>
<td>Anti/protozoal agents</td>
<td>Furzolidone, metronidazole, nifurazone, nifurazoletinidazole</td>
</tr>
<tr>
<td>15.</td>
<td>Anti-thyroid agents</td>
<td>Carbimazole, propylthiouracil</td>
</tr>
<tr>
<td>16.</td>
<td>Anxiolytic, sedative, hypnotics and neuroleptics</td>
<td>Alprazolam, amylobarbitone, barbitone, chlorpromazine, clozapine, diazepam, droperidol, lorazepam, haloperidol, oxazepam</td>
</tr>
<tr>
<td>17.</td>
<td>Corticosteroids</td>
<td>Beclomethasone, betamethasone, budesonide, cortisone acetate, prednisolone, hydrocortisone</td>
</tr>
<tr>
<td>18.</td>
<td>Anti-parkinsonian agents</td>
<td>Lysuride maleate, bromocriptine mesylate</td>
</tr>
<tr>
<td>19.</td>
<td>Diuretics</td>
<td>Acetazolamide, amiloride, bumetanide, chlorothiazide, chlorthalidone, frusemide</td>
</tr>
<tr>
<td>20.</td>
<td>Gastro-intestinal agents</td>
<td>Cimetidine, cisapride, ranitidine, domperidone, famotidine</td>
</tr>
<tr>
<td>21.</td>
<td>Anti-histaminic agents</td>
<td>Cinnarzine, cyclizine, flunarizine, loratidine, meclozine, tripolidine</td>
</tr>
<tr>
<td>22.</td>
<td>Local anaesthetics</td>
<td>Lidocaine</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td>23.</td>
<td>Neuro-muscular agents</td>
<td>Pyridostigmine</td>
</tr>
<tr>
<td>24.</td>
<td>Nitrates and other anti-anginal agents</td>
<td>Amyl nitrate, glyceryl trinitrate, isosorbide dinitrate, isosorbide mononitrate, pentaerythritol tetranitrate</td>
</tr>
<tr>
<td>25.</td>
<td>Nutritional agents</td>
<td>Betacarotene, vitamin A, B2, D, E and K</td>
</tr>
<tr>
<td>26.</td>
<td>Opid analgesics</td>
<td>Codeine, diamorphine, dihydrocodeine, meptazinol, methadone, morphine, pentazocine</td>
</tr>
<tr>
<td>27.</td>
<td>Oral vaccines</td>
<td>Vaccines prevent against: influenza, tuberculosis, meningitis, hepatitis, whooping cough, polio, tetanus, diphtheria, malaria, cholera, typhoid, HIV, measles, caries, mump</td>
</tr>
<tr>
<td>28.</td>
<td>Proteins and peptides</td>
<td>Insulin, glucagons, growth hormones</td>
</tr>
<tr>
<td>29.</td>
<td>Sex hormones</td>
<td>Clomiphene citrate, danazol, mestranol, methyltestosterone, norgestrel, oestradiol, conjugated oestrogens, progesterone, testosterone, tibolone</td>
</tr>
<tr>
<td>30.</td>
<td>Stimulants</td>
<td>Amphetamine, pemoline, dexamphetamine, mazindol, dexfenfluramine, fenfluramine</td>
</tr>
</tbody>
</table>
### Illustration 2

### Table 2: List of Superdisintegrants

<table>
<thead>
<tr>
<th>Superdisintegrants</th>
<th>Example</th>
<th>Mechanism of action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crosspovidone M® Kollidon® Polyplasdone®</td>
<td>Crosslinked PVP</td>
<td>- Swells very little and returns to original size after compression but act by capillary action</td>
</tr>
<tr>
<td>Crosscarmellose® Ac-Di-Sol® Nymce ZSX® Primellose®Solutab® Vivasol®L-HPC</td>
<td>Crosslinked cellulose</td>
<td>- Swells 4-8 folds in &lt; 10 seconds. - Swelling and wicking both.</td>
</tr>
<tr>
<td>Sodium starch glycolate Explotab® Primogel®</td>
<td>Crosslinked starch</td>
<td>- Swells 7-12 folds in &lt; 30 seconds</td>
</tr>
<tr>
<td>Calcium silicate</td>
<td></td>
<td>- Wicking action</td>
</tr>
<tr>
<td>Alginic acid NF Satialgine®</td>
<td>Crosslinked alginic acid</td>
<td>- Rapid swelling in aqueous medium or wicking action</td>
</tr>
<tr>
<td>Soy polysaccharides Emcosoy®</td>
<td>Natural super disintegrant</td>
<td></td>
</tr>
</tbody>
</table>
Illustration 3

Table 3: Patended Technologies For Fast Dissolving Tablets

<table>
<thead>
<tr>
<th>TECHNOLOGY</th>
<th>COMPANY’S NAME</th>
<th>TECHNOLOGY BASED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zydis</td>
<td>R.P Scherer Inc.</td>
<td>Freeze drying</td>
</tr>
<tr>
<td>Durasolv</td>
<td>CIMA Labs Inc.</td>
<td>Compressed tablet</td>
</tr>
<tr>
<td>Orasolv</td>
<td>CIMA Labs Inc.</td>
<td>Compressed tablet</td>
</tr>
<tr>
<td>Wowtab</td>
<td>Yamanouchi pharma</td>
<td>Molding</td>
</tr>
<tr>
<td>Pharmaburst</td>
<td>SPI Pharma</td>
<td>Compressed tabled</td>
</tr>
<tr>
<td>Ziplets/ advatab</td>
<td>Furand</td>
<td>Molding</td>
</tr>
<tr>
<td>Nanocrystal</td>
<td>Flan Crop.</td>
<td>Lyophilization</td>
</tr>
<tr>
<td>Lyoc</td>
<td>Pharmalyoc Inc.</td>
<td>Freeze drying</td>
</tr>
<tr>
<td>Flashtab</td>
<td>Ethypharm Inc.</td>
<td>Compressed tablet</td>
</tr>
</tbody>
</table>
**Illustration 4**

Table 4: I.P. Specification for uniformity of weight

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Average weight of Tablets(mg)</th>
<th>Maximum percentage different allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>130 or less</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>130-324</td>
<td>7.5</td>
</tr>
<tr>
<td>3</td>
<td>More than 324</td>
<td>5</td>
</tr>
</tbody>
</table>
Illustration 5

Table 5: Marketed Fast Dissolving Tablets in India

<table>
<thead>
<tr>
<th>NAME OF THE PRODUCT</th>
<th>ACTIVE INGREDIENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imodium lingual</td>
<td>Imodium</td>
</tr>
<tr>
<td>Pepcidin rapitab</td>
<td>Pepcid</td>
</tr>
<tr>
<td>Mosid-MT</td>
<td>Mosapride citrate</td>
</tr>
<tr>
<td>Calritin reditabs</td>
<td>Claritin</td>
</tr>
<tr>
<td>Nimulid-MD</td>
<td>Nimesulide</td>
</tr>
<tr>
<td>Zyrof-meltab</td>
<td>Rofecoxib</td>
</tr>
<tr>
<td>Claritin reditab</td>
<td>Micronized loratadine</td>
</tr>
<tr>
<td>Feldene melt</td>
<td>Piroxicam</td>
</tr>
<tr>
<td>Maxalt-MLT</td>
<td>Rizatriptan</td>
</tr>
<tr>
<td>Pepcid RPD</td>
<td>Famotidine</td>
</tr>
<tr>
<td>Zyprexa Zydis</td>
<td>Olanzapine</td>
</tr>
<tr>
<td>Zofran ODT</td>
<td>Ondansetron</td>
</tr>
<tr>
<td>Remeron Soltab</td>
<td>Mitrazepine</td>
</tr>
</tbody>
</table>
Illustration 6

Figure 1: Steps Involved in Sublimation
Reviews

Review 1

Review Title: An Overveiw On Fast Dissolving Tablet

Posted by Dr. Khushwant S Yadav on 12 Mar 2012 03:15:47 PM GMT

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Rating</th>
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<tbody>
<tr>
<td>1</td>
<td>Is the subject of the article within the scope of the subject category?</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Are the interpretations / conclusions sound and justified by the data?</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Is this a new and original contribution?</td>
<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Does this paper exemplify an awareness of other research on the topic?</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Are structure and length satisfactory?</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>Can you suggest brief additions or amendments or an introductory statement that will increase the value of this paper for an international audience?</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td>Can you suggest any reductions in the paper, or deletions of parts?</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>Is the quality of the diction satisfactory?</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>Are the illustrations and tables necessary and acceptable?</td>
<td>No</td>
</tr>
<tr>
<td>10</td>
<td>Are the references adequate and are they all necessary?</td>
<td>No</td>
</tr>
<tr>
<td>11</td>
<td>Are the keywords and abstract or summary informative?</td>
<td>No</td>
</tr>
</tbody>
</table>

Rating: 1

Comment:
The above review article does not add to any new information to the scientific comminity.

It is copied form some of the previously published (that too which are open access) reviews/papers.

The language used is inappropriate.

There are lots of grammatical mistakes.

The authors are not clear whether they are writing a review or research.

Tables are copied and are not informative.

Its not their own work.

Information on ICH stability studies is WRONG. kindly check your information.

In Vivo Disintegration Test: this is also wrong. How can in vivo be done in vitro?

Publishers should not publish such work.

Competing interests: No

Invited by the author to make a review on this article?: No

Experience and credentials in the specific area of science:
Experience on this review:
It a very bad experience.
I strongly wish the Webmedcentral team at least have a look at the article and briefly review it for 2-3 days AT LEAST CHECK it for Plagiarism.

Publications in the same or a related area of science: No

References: References are properly cited. There is no formatting.

How to cite: Yadav K. An Overview On Fast Dissolving Tablet [Review of the article 'An Overview On Fast Dissolving Tablet' by ]. WebmedCentral 1970;3(3):WMCRW001579
Review 2

Review Title: Review response

Posted by Dr. Oliver Grundmann on 12 Mar 2012 01:33:17 PM GMT

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Rating</th>
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</thead>
<tbody>
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</tr>
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<td>2</td>
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<td>3</td>
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<td>No</td>
</tr>
<tr>
<td>4</td>
<td>Does this paper exemplify an awareness of other research on the topic?</td>
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</tr>
<tr>
<td>5</td>
<td>Are structure and length satisfactory?</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Can you suggest brief additions or amendments or an introductory statement that will increase the value of this paper for an international audience?</td>
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<tr>
<td>7</td>
<td>Can you suggest any reductions in the paper, or deletions of parts?</td>
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</tr>
<tr>
<td>8</td>
<td>Is the quality of the diction satisfactory?</td>
<td>No</td>
</tr>
<tr>
<td>9</td>
<td>Are the illustrations and tables necessary and acceptable?</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>Are the references adequate and are they all necessary?</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td>Are the keywords and abstract or summary informative?</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Rating: 7

Comment:
The review on fast-dissolving tablets submitted by Patwa and others highlights an important and increasing area of research in the formulation of oral drug delivery. The authors describe the various aspects of current and future techniques for fast-dissolving oral tablets succinctly. The diction and formatting will require some revisions - some sentences are not well phrased and should be rewritten. Furthermore, adequate reference formatting is required - please do not include references in the headers and add references to the tables where appropriate so readers can better access the information provided. Overall an interesting topic that deserves publication.

Competing interests: No conflicts of interest to declare

Invited by the author to make a review on this article? : No

Experience and credentials in the specific area of science:
Working as a pharmacist and teaching pharmacy to pharmacy and graduate students

Publications in the same or a related area of science: No

How to cite: Grundmann O. Review response[Review of the article 'An Overview On Fast Dissolving Tablet ' by ].WebmedCentral 1970;3(3):WMCRW001578
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