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A Summary of Fast Dissolving Tablets

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Abstract: Fast dissolving tablets are among the most commonly used dosage forms and are often administered in emergency situations. They serve various drugs as a route of administration due to their proven safety, convenience, and cost-effectiveness. Research and development focus on fast dissolving tablets aim to enhance patient adherence and ease of use. These tablets dissolve quickly and can be swallowed without the need for chewing or extra water. They are particularly beneficial for individuals who have difficulty swallowing (dysphagia), such as paediatric and geriatric patients. Fast dissolving tablets possess several ideal characteristics, advantages, and distinct features, as well as various technological advancements. They are utilized in treating conditions like Parkinson's disease, neurological disorders, and schizophrenia. Additionally, fast dissolving tablets are referred to as mouth dissolving tablets. One of the key benefits of fast dissolving tablets is advantage of oral liquid dosage forms. There are restrictions on the oral dose. Form and administration of different drugs, such as first pass metabolism, mental patients, immobile patients, and unwilling patients.

Keywords: Fast dissolving tablet, mouth dissolving tablet, oral route and dysphagia

Introduction:

Fast dissolving drug delivery systems were developed in the 1970s as an alternative to conventional dosage forms, particularly for paediatric and geriatric patients who experience difficulty in swallowing tablets and capsules [8]. Fast dissolving or fast disintegrating tablets are solid dosage forms that disintegrate or dissolve rapidly in the mouth without the need for water or chewing. These dosage forms offer advantages such as good stability, easy manufacturing, and convenient handling by patients, allowing administration at any time [1]. Typically, fast dissolving tablets disintegrate in the oral cavity within 15–60 seconds with the help of saliva and provide a pleasant mouth feel [2]. Paediatric and geriatric populations often face difficulty in swallowing conventional solid dosage forms, which makes these formulations highly beneficial for such patients [3]. In many situations where water is not readily available, swallowing conventional tablets becomes

challenging; therefore, fast dissolving tablets offer an effective alternative. These tablets are widely used for treating conditions such as diarrheal, cough during common cold, allergic conditions, and bronchial infections [4].

Fast dissolving tablets are also known by various names such as mouth-dissolving tablets, melt-in-mouth tablets, orally disintegrating tablets, rapimelts, porous tablets, and quick dissolving tablets. Most formulations incorporate taste-masking agents to reduce the bitterness of active pharmaceutical ingredients and improve patient acceptability [5,6]. The faster dissolution of these tablets leads to faster drug absorption and a rapid onset of action [7]. Tablets remain the most widely used dosage form for self-administration. According to the European Pharmacopoeia, mouth dissolving tablets should dissolve within three minutes in the oral cavity [9–11]. The preparation of these tablets mainly involves two major techniques: the use of super disintegrants such as croscarmellose sodium, sodium starch glycolate, and crospovidone, or the development of highly porous tablet structures using techniques such as freeze drying and vacuum drying [12,13]. The oral route is generally preferred for patients suffering from dysphagia, a condition characterized by difficulty in swallowing, which affects nearly 35% of the general population. Dysphagia is commonly observed in patients with conditions such as Parkinsonism, motion sickness, unconsciousness, mental disabilities, or situations where water is unavailable [14].

1st method,

It is use of super disintegrate like croscarmellose sodium, sodium starch glycolate and cross povidone.

2nd method,

It is maximizing pore structure of the tablets by freeze drying and vacuum drying.

- The drug is distributed by the oral route is chosen of patients for who are all in the case "Dysphagia".
- Dysphagia means-difficulty swallowing.
- This is affected by nearly 35% of the general population.
- The disorder is also present in the condition like:

1. Parkinsonism
2. Motion sickness
3. Unconsciousness
4. Mentally disabled person
5. Unavailability of water

Advantages:

- It is easy to administer. Since the tablet can be swallowed without the water.
- It is compatible with taste masking
- It is increased bioavailability and decreased the dose and side effects and also decrease in first pass metabolism
- It can be effortlessly administered to paediatric and old patients with mental illness
- The drugs are absorbing and dissolve quickly so rapid onset of action is required
- It is producing the better taste
- It is improving stability
- It is suitable for controlled or sustained release activities
- It allows the high drug loading
- It is cost - effective
- It is acceptable for taste and pleasant mouth feeling.

Disadvantages:

- Poor mechanism strength and FDTs transportation and handling are easily.
- They have high humidity and sensitive.
- The patient compliance its poor taste reduced.
- It has a high product cost.

Aim and Objectives:

The main aim of this review is to develop a solid dosage form that quickly disintegrates or dissolves in the mouth without the need for water, there by improving patient compliance, convenience and onset of action.

- To improve the patient compliance.
- To achieve rapid onset of action.
- To enhance bioavailability (if applicable)
- To improve the drug stability compared to liquid dosage form.

Materials and Methods

Techniques for preparing fast dissolving tablets:

Many techniques are used in the fast-dissolving tablets or dispersible tablets

1. Freeze drying [or] lyophilization

- Freeze drying is a process in which removing water from a frozen product under the vacuum it placed.
- Lyophilization means drying at low temperature.
- The technique an amorphous porous structure can dissolve rapidly.[20]
- The typical procedure involved in manufacturing of oral dispersible tablets using this technique.
- The resulting tablet has rapid disintegration and dissolution placed on the tongue and the freeze-dried unit dissolve instantly to release the drug.[21]
- The major disadvantages of the technique are time consuming and its expensive.
- Lyophilization is useful for heat sensitive drugs.[22]

2. Tablet moulding:

Tablet moulding is two types:

A. Solvent method

B. Heat method

A. Solvent method

- It involves the moistening the powder blend with a hydro alcoholic solvent followed the compression at low pressures in the moulded plates to form a wetted mass.
- The tablets are manufactured by solvent method are less compact than compressed tablet and poses a porous structure hat hastens dissolution.[23]
- The mechanical strength of the tablets is needed to incorporate.

B. Heat method

- The method involves preparation of suspension that contains a drug, agar and sugar [e.g.: mannitol or lactose] and pouring the suspension in the blister packaging wells, solidifying the agar at the room temperature to form a jelly and drying at 30ºC under vaccum.
- Taste masking is added problem to this technology.[24]

3. Spray drying:

- Spray drying can produce highly porous and fine that dissolve rapidly[25,26]
- In this technique gelatin can be used as a supporting agent and as matrix mannitol as a bulking agent and sodium starch glycolate are used as super disintegrates[27]
- A hot gas is used to quickly to turn a liquid or slurry into powder[28]
- It is mixed with active ingredient and compressed into tablet

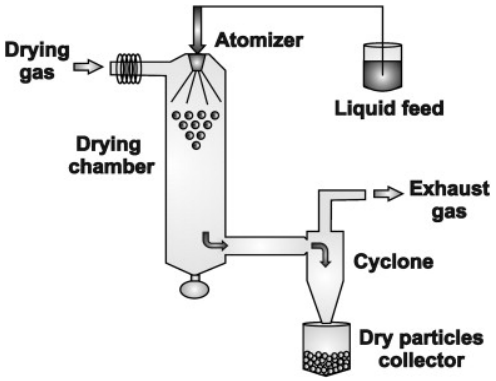


Fig 1: Spray drying

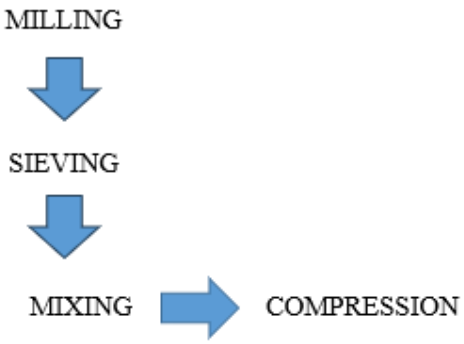
- The formulation technique gives porous powder and disintegration time is greater than 20 seconds.
- The system is high cost and time-consuming procedure[29,30]

4. Direct compression

- The disintegrate addition technology [direct compression]
- I am the most preferred steps technique to manufacture the tablets[31]

Advantages:

- A limited number of processing steps are involved
- Cost effective
- Easiest way to manufacture the tablets
- Conventional equipment and commonly available excipients are used
- High doses can be accorded
- It is economical
- The size of tablet and hardness strongly influence the disintegrate efficacy[32]



5. Mass extrusion:

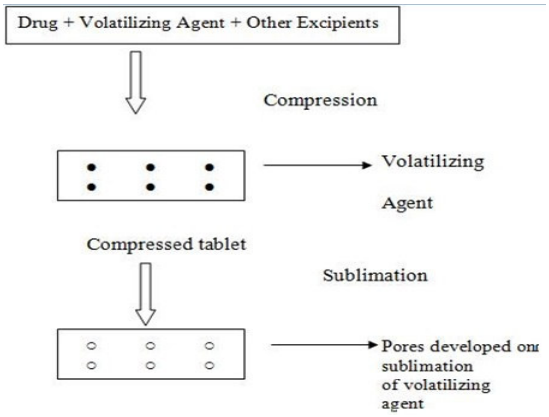


Fig 2: Mass Extraction

- In the mixed ingredients are softened by water-soluble ingredients i.e. polyethane glycol using methanol as solvent passing through an extruder to form this cylinder
- It is sliced a heated blade to form a small tablet
- The dried cylinder is used to coat granules for bitter drugs thereby achieve taste masking.[33]

6. Sublimation:

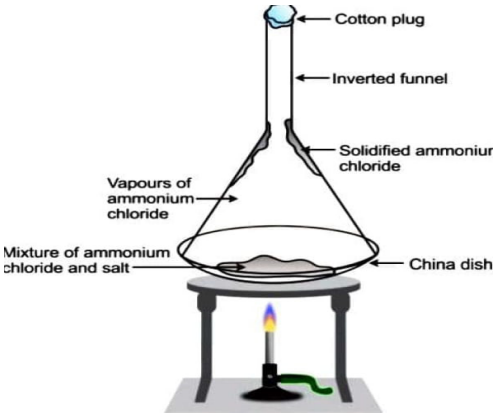


Fig 3: Sublimation

- Fast disintegration and dissolution are acquired by formulating to porous mass by incorporating inert solid ingredients that volatilize rapidly like urea, camphor ammonium carbonate, ammonium bicarbonate and hexamethylene-tetramine.
- The ingredients are mixed and compressed
- The volatile material is reduced pressure and applying slight temperature leaving the mass in porous form.
- In the sublimation method, they are porous in nature, solvents like cyclohexane and benzene are used.[34]

DISCUSSIONS

Fast dissolving tablets have gained significant importance in modern pharmaceutical drug delivery due to their ability to rapidly disintegrate in the oral cavity without the need for water. This property makes them particularly useful for paediatric and geriatric patients who often experience dysphagia or difficulty in swallowing conventional tablets and capsules. The formulation of fast dissolving tablets involves various techniques such as freeze drying, tablet moulding, spray drying, direct compression, mass extrusion, and sublimation. Among these methods, direct compression is widely preferred because it is simple, cost-effective, and requires fewer processing steps. Freeze drying produces highly porous tablets that dissolve rapidly in the mouth, although the method is expensive and time-consuming. Similarly, spray drying and sublimation techniques help in creating porous structures that enhance tablet disintegration and dissolution.

Super disintegrants such as croscarmellose sodium, sodium starch glycolate, and crospovidone play an important role in promoting rapid disintegration of the tablet in the presence of saliva. The use of taste-masking agents is also essential because many active pharmaceutical ingredients possess a bitter taste that can reduce patient compliance. Fast dissolving tablets provide several advantages including improved patient convenience, rapid onset of action, enhanced bioavailability, and better therapeutic effectiveness. However, these tablets also have certain limitations such as sensitivity to humidity, lower mechanical strength, and higher production cost compared to conventional tablets. Despite these challenges, continuous research and technological advancements are improving the formulation techniques and stability of fast dissolving tablets, making them a promising dosage form for future drug delivery systems.

Conclusion:

Fast dissolving tablets have become one of the most widely accepted and promising dosage forms in modern pharmaceutical drug delivery systems, especially in emergency situations. These tablets rapidly disintegrate or dissolve in saliva within 60 seconds without the need for water, making them highly convenient

for patients. They provide an effective solution for paediatric and geriatric patients who experience difficulty in swallowing conventional tablets or capsules. Fast dissolving tablets improve patient compliance, enhance bioavailability, and provide a rapid onset of therapeutic action due to quick absorption of the drug. In addition, they offer advantages such as ease of administration, improved patient acceptability, and better therapeutic efficacy. These dosage forms remain solid outside the body but quickly convert into solution form when placed in the mouth. With sufficient mechanical strength and rapid disintegration properties, fast dissolving tablets represent an important advancement in oral drug delivery systems. Furthermore, they open new opportunities for research and development in both pharmaceutical industries and academic fields for improving drug delivery technologies.

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