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Fast Dissolving Tablet of Terbutaline Sulfate: Review

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Review Article

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ABSTRACT

Terbutaline sulfate is employed to treat respiratory disease and respiratory disorders. Terbutaline belongs to a category of beta-adrenergic agonist bronchodilators. It is a β2 blocker used to treat cardiovascular diseases like high blood pressure, cardiopathy, and disturbances of regular recurrence, myocardial infarct and purposeful heart disorders. Fast dissolving tablets of terbutaline sulfate is ready by adding crystalline cellulose and sodium starch glycolate. Terbutaline sulfate half-life is 2-3 hours oral availability is 38 ± 14 % and it's eliminates quickly from plasma, microcrystalline cellulose and sodium starch glycolate was discharged 95.2% and 96.8% of drug at intervals 8-10 min. These tablets are used for patients who might have problem in swallowing of typical tablets; frequent administration is required to take care of therapeutic concentration. Fast dissolution and absorption of drug might turn out rapid onset of action. Fast dissolving drug delivery systems FDDDSs that disintegrate and release the active ingredient quickly which don't need water for swallowing. Oral administration of bitter medication with associate adequate degree of palatableness is achieved by taste masking. Fast dissolving tablet FDT is employed as super disintegrants which can give immediate disintegration and releases the drug in saliva. Fast dissolving tablets of terbutaline sulfate tablets are ready by the direct compression technique once incorporating with super disintegrants similar to crystalline cellulose and sodium starch glycolate in numerous concentrations. evaluation for prepared tablets were weight variation, thickness, hardness, friability, wetting time, drug content, water absorption quantitative relation, *in vitro* dispersion time, *in vitro* disintegration time and *in vitro* drug release..

INTRODUCTION

Now a days swallowing is tough for all age groups, specifically pediatric medicine, due to physiological changes related to these age groups. Oral route of administration is that the common technique for administering medicines. The parenteral route of administration is very important in treating medical emergencies during which patient cannot swallow [1-6]. However it's probable that a minimum of ninety two of all medication used to give general effects are administered by the oral route. Different classes that have issues using standard oral dose

forms include are they mentally ill, uncooperative and sick patients, those with conditions of motion sickness, sudden episodes of allergic attack and coughing. Sometimes, it's going to be tough to swallow standard product due to unavailability of water. These issues led to the development of a novel kind of solid oral dose type called mouth-dissolving tablets, which disintegrate and dissolve rapidly in saliva without the need of the water [7-15]. They're additionally referred to as fast dissolving tablets, melt-in-mouth tablets, rapid melts, porous tablets, oro-dispersible, fast dissolving or rapidly disintegrating tablets. The main proposal of the present review is to study the usefulness of fast dissolving drug delivery and concisely the ideal properties, limitations and advantages, conventional and patented technologies, assist marketed formulations in FDTs and evaluation [16-25].

Fundamentals of Designing FDT

For rapid dissolution of dose, water should quickly penetrate into the tablet matrix to cause quick disintegration and instant dissolution of tablet many techniques are used to attain these fundamentals to formulate FDT; like

- Tablet molding
- Freeze drying
- Spray drying
- Sublimation
- Addition of disintegrating agent [26-38].

Key Ingredients Used In FDT

Active Ingredients

The main active ingredients used in FDT are Bronchodilators, Beta-blockers, Antitussive, anti-asthmatic agents, Antipyretic, Antiulcer agents, Coronary vasodilators, Peripheral vasodilators, Synthetic antibacterial agents, Antipasmodics, Muscle relaxants, Anticoagulants, Antihistaminic, Vitamins, Antihistamines **(Figure 1).**

- Polyethylene glycol is used as binders
- Alkyl sulfates, propylene glycol esters, lecithin, sucrose esters are used as emulsifying agents
- Mannitol, polydextrose, lactitol and starch hydrolysate, Lactitol are used as bulking agents
- Dextrose, fructose, sucralose are used as flavoring agents

Techniques used in the preparation of FDT are Lyophilization, Spray Drying, Sublimation, Tablet moulding, Taste masking, Addition of disintegrants etc [39-47].

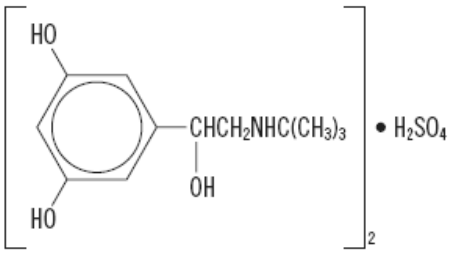

Figure 1: Terbutaline Sulfate [±-α-[tert- butyl amino methyl]-3, 5-dihydroxybenzyl alcohol sulfate 2:1 salt]

Chemical formula: $C_{12}H_{19}NO_{32}$. H_2SO_4

Solubility of Terbutaline sulfate is taken orally. It is freely soluble in water and in 0.1N Hcl, slightly soluble in methanol, and insoluble in chloroform. Pharmacokinetics of Terbutaline sulphate is administered orally as well as subcutaneous route of administration. The pharmacokinetic parameters are as follows Bio availability as 60%, and its onset of action is 30 mins, t ½ is 3-4 hours, Tmax is 2-3 hours, C max is 9.6 3.6 ng/ml, AUC is 54.6 & 53.1 hr.ng/ml and its Duration of action is 8 hrs [48-68].

Clinical pharmacology of terbutaline sulfate it Stimulates β-adrenergic receptors and also stimulates the production of cyclic adenosine-3′, 5′-monophosphate, Decreases resistance of airways, relaxes uterine smooth muscle and inhibits uterine contractions [69-75]. **(Table 1).**

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Table 1: Interactions for Terbutaline Sulfate.

Drug	Interaction	Comments
Antidepressants, tricyclic	Potentiation of vascular effects	Extreme caution recommended with concomitant therapy or in patients receiving terbutaline ≤ 2 weeks after discontinuance of tricyclic antidepressants
β-Adrenergic blocking agents	Potential antagonism of pulmonary effects resulting in severe bronchospasm in asthmatic patients	If concomitant therapy required, consider cautious use of cardio selective β-adrenergic blocking agents
Diuretics, potassium depleting	Potential for decreased serum potassium concentrations and/or ECG changes, especially when recommended β-adrenergic agonist dosage exceeded	Use concomitantly with caution
MAO inhibitors	Potentiation of vascular effects	Extreme caution recommended with concomitant therapy or in patients receiving terbutaline ≤ 2 weeks after discontinuance of MAO inhibitors
Sympathomimetic agents	Potential for additive adverse cardiovascular effects	Concomitant use not recommended Does not preclude use of an inhaled adrenergic agonist bronchodilator to relieve acute bronchospasm during long-term oral terbutaline therapy

CONCLUSION

Fast dissolving tablets of Terbutaline sulfate may propose improved biopharmaceutical properties. The parameters like hardness, friability, diameter, thickness, weight variation and content uniformity was evaluated for all the batches of tablets these technologies have sufficient mechanical strength, quick dissolution/disintegration in the mouth. The characteristic and benefits of quick dissolving tablet administration without water wherever anytime cause their suitableness to geriatric and paediatric patients. The comparison of effect of natural and synthetic super disintegrant was discussed with in-vitro disintegration time and wetting time because these two are very important for quick and effective disintegration which leads to faster dissolution of dosage form.

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