Fast dissolving tablets: Effective Treatment for hypertension

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ABSTRACT

Blood pressure is elevated above normal (less than 120/80 mmHg) in people with hypertension, an age-related chronic condition that has been linked to kidney and heart failure. Numerous variables, including obesity, insulin resistance, excessive alcohol and salt consumption, ageing, lifestyle choices, stress, and insufficient potassium and calcium intake, can result in hypertension. Treatment for hypertension can be administered in one of two ways: either non-pharmacologically or with antihypertensive medications. Common antihypertensive medications include ACE inhibitors, AT1 receptor antagonists, thiazides, and calcium channel blockers. Every time a patient with hypertension needs rapid care, traditional tablets and capsules may not be able to meet that need. As a result, we need an alternate conventional dosage form that can be used. Since they can be administered whenever and, in any circumstance, fast-dissolving pills may prove to be a preferable choice. These tablets can be given to children, the elderly, people with mental disabilities, and patients who are bedridden. They also have a quick beginning of action, good bioavailability, and are simple to take. Fast-dissolving tablets are made with a variety of superdisintegrants, such as mucilage, cross-linked carboxymethyl cellulose (croscarmellose), sodium starch glycolate (primogel), and poly vinyl pyrollidone, to increase tablet disintegration. There are numerous patented technologies (such as the zydis technology, durasolv technology, wowtab technology, flashtab technology, pharmaburst technology, shearform technology, ceform technology, ziplet technology, oraquick technology, frost technology) as well as many conventional technologies (such as freeze-drying or lyophilization, moulding method, melt granulation, mass-extrusion, sublimation, cotton candy process, direct compression, spray-drying, nanoionization and fast dissolving film).The evaluation criteria for fast-dissolving tablets include overall appearance, tablet hardness, disintegration test, friability, weight uniformity, in vitro dissolution time, and wetting time. There are many fast-dissolving tablets available now for the treatment of hypertension, which are more patient-friendly and convenient. These formulations have many benefits and few drawbacks, which make them quite popular with patients.

Keywords: ACE inhibitors, AT1 receptor antagonist, bioavailability, chronic hypertension, elevated insulin resistance, friability, Superdisintegrants

INTRODUCTION

An high blood pressure of up to 140/90 mm Hg is considered to be hypertension. Systolic and diastolic pressure both plays a role in determining hypertension. When our heart's muscles contract, the pressure on our blood vessels is said to be systolic, and when they relax, it is said to be diastolic. Blood pressure readings under 120/80 mm Hg are considered "normal," while readings over 120/80 mm Hg and over 140/90 mm Hg are categorised as "prehypertension"[1].

Our hearts are constantly overworked as a result of hypertensive vascular disorders and steadily rising arterial pressure, which can result in hypertension [2].

EPIDEMIOLOGY

Studies have shown that as people age, their systolic blood pressure also rises, but their diastolic blood pressure only rises until they are 50 years old, at which point it either becomes constant or may even fall. Diastolic blood pressure is a major risk factor in patients under 50, whereas systolic blood pressure and pulse pressure are the main risk factors in patients over 60 because diastolic blood pressure declines and systolic blood pressure rises steadily in these patients. If we focus on patients between 50 and 59 years, all three blood pressures—systolic, diastolic, and pulse pressure-are risk factors[3].

Numerous factors, including age, sex, race, socioeconomic status, blood pressure at birth, early life events, nutrition, alcohol use, physical activity, and exposure to numerous environmental agents, have been reported to increase blood pressure in epidemiological studies [4].According to surveys conducted by the World Health Organization in 2012, hypertension affects 24.8% of women and 29.2% of men globally, but only 23.10% of men and 22.60% of women in India. Another study indicated that although at least 25% of fatalities in middle- or low-income nations are attributable to hypertension, only 7% of deaths in high-income countries are related to hypertension [5].

ETIOLOGY

Although the cause of hypertension is unknown, there are some things that might raise your blood pressure,

Including:

1. Obesity
2. Secondly, insulin resistance
3. Heavy alcohol consumption
4. Heavy salt intake
5. Aging
6. Sedentary behaviour
7. Low potassium consumption and stress
8. A low intake of calcium [6].

With weight gain, blood pressure rises steadily; similarly, excessive alcohol use, excessive salt intake, ageing, unhealthy lifestyle choices, stress, and inadequate potassium and calcium intake can all sporadically raise a person's normal blood pressure [7].

PATHOPHYSIOLOGY

Both primary and secondary hypertension affect the sympathetic nervous system, the renin-angiotensin-aldosterone system, endothelial function, and sodium and water retention, which are all parts of the body's natural system for maintaining blood pressure [8]

System of renin-angiotensin-aldosterone (RAAS)

This mechanism is crucial for maintaining appropriate blood pressure. Juxtaglomerular kidney cells release renin into the circulation. Angiotensinogen, which is created by the liver, is changed into angiotensin-I by rennin, which is then changed into angiotensin-II by the ACE. Angiotensin-II causes vasoconstriction in arteries, sodium reabsorption in the kidney, and the release of aldosterone from the adrenal cortex, all of which contribute to an increase in blood pressure [8].

TREATMENT

Patients who have hypertension can be treated in one of two ways: either through non-pharmacological treatment or by taking antihypertensive medications [9].

Treatment without drugs

Included in non-pharmacological treatment are:

1. Lifestyle adjustments
2. A low-salt diet
3. Getting enough potassium
4. Refraining from drinking too much alcohol
5. Quitting smoking
6. A nutritious, wholesome diet
7. Physical activity
8. Loss of weight.

Antihypertensive medications

There are four types of medications used to treat hypertension.

1. Inhibitors of the enzyme known as ACE
2. Blockers of the AT1 subtype of the angiotensin II receptor (sartans)
3. Dihydropyridine-type long-acting calcium channel blockers
4. Diuretics that resemble thiazides

Antihypertensive medications are chosen for patients with hypertension based on the treatments effectiveness and tolerability. A patient can be administered ACE inhibitors and AT1 receptors if they have diabetic nephropathy. Patients with heart failure may live longer while taking ACE inhibitors [38].The most frequently prescribed antihypertensive medications today are angiotensin-converting enzyme (ACE) inhibitors, which are a critical class of medications widely used to treat hypertension, congestive heart failure, and renal failure, particularly in patients with diabetes mellitus or proteinuria[10]. ACEI have generally been accepted. Cough [11], eczematous responses [12], hypotension, hyperkalemia, and small bowel angioedema[13] a once dailyre a few of the most typical side effects.

The recommended dosages and typical adverse effects of certain antihypertensive medications are included
in the table below.

FAST DISSOLVING TABLETS

Although there are several ways to provide drugs to our bodies, the oral route is still the most popular because of how well-liked it is by patients. As we are all aware, there are numerous dosage forms that can be taken orally, such as tablets, capsules, syrups, etc., but most of them require water, and in some circumstances, finding water can be extremely challenging. In addition, certain medical conditions, such as stroke, Parkinson's disease, head and neck radiation therapy, and other neurological disorders, such as cerebral palsy, make it difficult to swallow those formulations [14].

Fast-acting and avoiding first pass metabolism, fast-dissolving tablets have good bioavailability and can be quickly ingested by patients without the need for water. They also have a quick onset of action. These formulations are well-liked by patients because they outweigh traditional tablets and capsules in many ways. "ODT (Oral Dispersible Tablet) should scatter or disintegrate in less than 3 minutes when placed on tongue," according to the European Pharmacopoeia [14]. Fast dissolving tablets, also known as orally disintegrating tablets, rapid dissolving tablets, fast melting tablets, or dispersible tablets, among other names, have advantages over both solid and liquid dose forms [15].

Fast-dissolving tablets were first developed in the 1970s for paediatric and geriatric patients to address swallowing issues with tablets and capsules. Some of the desirable qualities that a fast-dissolving tablet should have are high stability, transportability, ease of handling and administration, no specific packaging material or processing needs, no need for water during application[16]. Less keratinization of the mucosal lining in our buccal mucosa promotes drug permeability. Tablet disintegration is facilitated by mucilage, cross linked carboxymethyl cellulose (croscarmellose), sodium starch glycolate (primogel), poly vinyl pyrollidone, and other natural and artificial superdisintegrants[17].

IDEAL FDTs

1. Rapidly dissolve in the oral cavity within a few seconds without the need for water.
2. Must possess adequate mechanical strength
3. Capability to transport huge medication doses
4. When inserted, the device should generate a satisfying mouthfeel.
5. Should be able to tolerate external factors like temperature and humidity.
6. It should be economical [18]

ADVANTAGES OF FDTs

1. Swallowed without water
2. No risk of chocking
3. Simplicity of administration for patients who are young, old, intellectually challenged, or bedridden.
4. Quick onset of action.
5. Increased bioavailability

6. Better patient compliance
7. Suitable for sustained/controlled release formulations
8. Convenient dosing
9. Increased patient adherence
10. The medicine has a diminished hepatic first pass effect once it enters the systemic circulation.
11. Localized and site-specific activity
12. The presence of a wide surface area promotes fast breakdown and disintegration within the oral cavity.
13. Dose precision in relation to syrup [19]

CHALLENGES IN FDT FORMULATION

Creating a fast-dissolving tablet presents us with a number of difficulties, some of which are listed here.

1. Mechanical strength
2. Time of disintegration
3. Masking of taste
4 Mouth sensation
5. Environmental sensitivity
6. Palatability
7. The hygroscopic quality
8. The water solubility
9. Tablet size [14]

SELECTION OF DRUG

A drug should have following properties to be formulated as fast dissolving tablet-

1. The medicine must diffuse across the oral mucosa in order for it to be packaged as a fast-dissolving tablet.
2. The medication should be partially non-ionized to match our mouth's pH.
3. The medication must allow the upper GIT epithelium.
4. Drugs that require frequent dosage and have a short half-life cannot be made into tablets that dissolve quickly.
5. The medication must be more stable in saliva.
6. Drugs with a strong bitter taste cannot be made into tablets that dissolve quickly [20]

SELECTION OF SUPERDISINTEGANTS

Superdisintegrants must possess the following characteristics in order to be employed in the production of fast-dissolving tablets:

1. When FDT is introduced in the oral cavity, the superdisintegrant must rapidly dissolve.
2. The tablet produced by the superdisintegrant must not be brittle.
3. The superdisintegrant ought to have a pleasant mouthfeel [20].

METHODS OF PREPARATION

There are numerous traditional methods for producing fast-dissolving tablets, but the ones that are most frequently employed are:

1. Freeze-drying or lyophilization
2. Molding technique
3. Melt granulation
4. Mass-extrusion
5. Sublimation
6. Making cotton candy
7. Direct compression
8. Spray-drying
9. Nanoionization
10. Oral disintegrating or fast dissolving thin films[19]

1. **Freeze Drying or Lyophillization**

   In this technique heat sensitive materials or drugs are dried under low temperature by the application of heat. Prepared an aqueous solution of carrier, drugs are dissolved into it. Nitrogen flushing is done after transferring the solution in blister packs. Process is completed by keeping the entire content in refrigerator. Fast dissolving tablets prepared by this technique have good moth feel with low disintegration time.

2. **Moulding Method**

   In this technique powder is mixed with hydroalcoholic solvent, at the end extra solvent is allowed to evaporate after that the powder is compressed to form tablet. Fast dissolving tablets prepared by this technique are porous and show rapid dissolution.

3. **Melt Granulation**

   In this method, a meltable binder is used to turn granules into tablets. This method requires less time and energy because there is no drying stage. This process produces tablets with a faster rate of dissolving.

4. **Mass-Extrusion**

   This method involves feeding all the materials through an extruder, which softens the produced cylinders with polyethene glycol before they are further sliced into tablet shapes. This process of making tablets can hide a bitter taste and increase bioavailability.

5. **Sublimation**

   In this method, the medication and additional excipients are combined with extremely volatile chemicals to create a tablet that dissolves quickly.

6. **Cotton Candy Process**

   Using a continuous spinning technique, saccharides or polysaccharides are employed to create a matrix. To create a fast-dissolving tablet, the produced matrix is combined with the active components and other excipients. This process produces tablets with a pleasant mouthfeel.

7. **Direct Compression**

   This method involves the following steps:

   1. Milling
   2. Sieving
   3. Mixing
   4. Compression

8. **Spray Drying**

   This approach uses supportive agents, bulking agents, dissolving materials, acidic and alkaline materials to increase disintegration and dissolution. This process produces tablets with a quick disintegration.

9. **Nanoionization**

   In this technology, drugs are sized down to the nanoscale in order to create tablets that dissolve quickly.

   This method of making tablets is preferable for medications that are poorly water soluble.

10. **Fast-dissolving or Orally Disintegrating Thin Film**

    In this method, the medicine and additional excipients are dissolved in a non-aqueous solution along with water-soluble film-forming polymers. After the solvent evaporates, a thin film is created, which quickly melts when put in the mouth.

PATENTED FDT TECHNOLOGIES

In addition to the usual methods stated above, there are numerous patented methods for producing fast-dissolving tablets, including:

1. Zydis Technology
2. Durasolv Technology
3. Wowtab Technology
4. Flashtab Technology
5. Pharmaburst Technology
6. Shearform Technology
7. Céform technology
8. Ziplet innovation
9. Oraquick technology
10. Frosta technology
11. Technology based on nanocrystals [21]

1. **Zydis technology**

   In this method, the medicine is first physically trapped in a water-soluble matrix, which is then freeze-dried. Some Zydis formulations (oxazepam, lorazepam, loperamide, and enalapril) are also offered in the international market. Zydis medicines include Claritin Reditab, Dimetapp Quick Dissolve, Feldene Melt, Maxalt-MLT, Pepcid RPD, Zofran ODT, and Zyprexa Zydis.

2. **Durasolv technology**
   This method was patented by CIMA (certified investment management analyst) labs. The direct compression method is utilised in this technology for making tablets, and lubricants & drug fillers are employed as excipients. The Durasolv technology is appropriate for products that often only need a small amount of active chemicals.

3. **Wowtab technology**
   The pharmaceutical business Yamanouchi has a patent for wowtab technology, which stands for without water. In this method, the active components are first combined with low mouldability saccharides, then high mouldability saccharides are granulated with the active ingredients to produce tablets. Maltose and sorbitol are high mouldability saccharides, while lactose, mannitol, glucose, sucrose, and xylitol are among low mouldability saccharides.

4. **Flashtab technology**
   Patented by Prographarm laboratories. In this technology, the active chemicals are contained in tablets as microcrystals, and the tablets are made using traditional methods (coacervation, microencapsulation, and extrusion-spheronization).

5. **Pharmaburst technology**
   This technology was patented by SPI Pharma. With this method, tablets are created by combining lubricant with a dry combination of medication flavour. The prepared tablet dissolves in 30 to 40 seconds.

6. **Shearform technology**
   This approach involves filling a shearform matrix with the medication and other excipients to create a tablet. For improved mechanical strength, the produced tablets are exposed to higher temperatures and higher humidity for 15 minutes at 400 C and 85% RH.

7. **Céform technology**
   In this technology, there are two steps: the first loads the microsphere with active pharmaceuticals, and the second compresses the created microsphere into a tablet.

8. **Ziplet technology**
   In order to give tablets physical resilience and the best possible disintegration, this technique uses water-insoluble inorganic excipients and disintegrants mixed together in the necessary amounts. Water-insoluble pharmaceuticals or drugs in the form of coated microparticles are also utilised.

9. **Oraquick technology**
   KV Pharmaceuticals holds the patent for this method of taste masking, which eliminates the need for any form of solvent. As a result, the manufactured tablets have a better mouth feel than those made with other taste-masking substances.

10. Frosta technology

This technology has a patent from Akina. In this method, produced plastic granules are compressed into tablets under low pressure after being made. Using this method, it is possible to manufacture many different medications as FDTs, including aspirin, loratidine, caffeine, folic acid, vitamins, and nutritional supplements.

11. Nanocrystal technology

This technique has a patent from Elan, King of Prussia. Nanoparticles that may be taken orally and are less than 2 microns are made in the shape of tablets. This method does not use any steps like granulation, blending, or tableting.

EVALUATION OF FAST DISSOLVING TABLETS

A few of the parameters listed in the Indian Pharmacopoeia for the evaluation of fast-dissolving tablets is described below:

1. General Appearance
2. Tablet Hardness
3. Disintegration Test
4. Friability
5. Uniformity of Weight
6. In vitro Dissolution studies
7. Wetting Time[22]

1. General Appearance

The tablet is typically assessed for its size, form, visual identity, and customer acceptability.

2. Tablet Hardness

It is tested by using hardness tester & it can be determined as diametrically applied force in order to break the tablet.

3. Disintegration Test

Any fast-dissolving pill with a pH close to 6.8 is tested for disintegration time using artificial saliva.The average weight of 6 separate tablets is used for the disintegration test, and the time is measured in seconds after the disintegration is complete.

4. Friability

One tablet from each formulation is taken for testing on friability. Prior to placing all of the tablets into the fribrilator, we weighed them all. The tablets are weighed again after 4 minutes, and the percentage of friability is computed using the formula below:

% Friability is calculated as (Loss in weight/Initial weight) 100.

5. Uniformity of Weight

In this test, we take at least 20 tablets and weigh each one separately before calculating their average weight. Apparently,I.P.

The average pill weight (mg)	Maximum percentage change permitted
130 or <	10
130-324	7.5
>324	5.4

6. *In vitro* Dissoluion Studies

In this testis 900 ml. of artificial saliva is taken having pH near about 6.8 at 37 ± 0.50c at 50 rpm.Additionally, 0.1 m Hcl buffer with a pH of 4.5 may be employed. Samples are removed frequently at intervals to be measured for absorbance.

7. Wetting Time

10.75 x 12 mm of tissue paper will be folded twice and placed in a 6.5 cm diameter petri dish with 6 mL of distilled water coloured with methylene blue dye (2 percent w/v). The amount of time needed for the dye solution to reach the tablet's upper surface will allow us to precisely calculate the tablet's wetting time once it has been carefully put on the tissue paper surface. For proper end point observation, the coloured dye will be used. This test is regarded as a straightforward reproduction of the tongue's physiologically wet surface; however, the impact of the mechanical tension put on the tongue by the human is ignored.

CONCLUSION

On the basis of this review, it is clear that Hypertension is a life threatening disease which needs immediate treatment & fast dissolving tablets can become a better option when patient is unable to take antihypertensive drugs through conventional oral routes of administration. There are so many antihypertensive drugs which are formulated as fast dissolving tablets including captopril, hydrilazine, telmisartan, lisinopril, valsartan and many more.

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TABLE 1: DRUGS USED TO TREAT HYPERTENSION: DOSAGE & REGULAR SIDE EFFECTS [9]

Drug class	Dosages	Side effects
ACE inhibitors		
Benzepril	5-40mg/day in one or two doses	Irritative cough, Hyperkalemia, angioedima (rarely), elevated creatinineleve in people with chronic renal failure & contraindicated in pregnancy
Enalapril	5-20mg/day in one or two doses	
Fosinopril	10-40mg/day in one or two doses	
Lisinopril	5-40mg/day once daily	
Moexipril	7.5-30mg/day in one or two doses	
Perindopril	5-10mg/day in one or two doses	
Quinapril	10-40mg/day in one or two doses	
Ramipril	2.5-10mg/day in one or two doses	
Trandolapril	1-4mg/day in one or two dose	

AT1-receptor antagonists		
Azilsartan	40-80mg once daily	Hyperkalemia, elevated creatinine level in people with chronic renal failure & contraindicated in pregnancy
Candesartan	8-32mg/day in one or two doses	
Eprosartan	600mg/day in or two doses	
Irbesartan	150-300mg once daily	
Losartan	25-100mg/day in one or two doses	
Olmesartan		
Telmisartan	10-40mg once daily	
Valsartan	20-80mg once daily	
	80-320mg once daily	
Thiazide like diuretics		
Chlorthalidone	12.5-25mg/day	Hypokalemia, Hypovolemia&Hyponatremia
Hydrochloro-thiazide	12.5-25mg/day	
Indapamide	2.5mg/day	
Xipamide	10-20mg/day	
Calcium channel blockers		
Amlodipine	2.5-10mg once daily	Constipation & leg/ankle edema
Felodipine	2.5-10mg once daily	
Isradipine	2.5-10mg once daily	
Nifedipine (extended release)	40-80mg/day in two doses	
Nisoldipine	10-40mg/day in two doses	

TABLE 2: SUPERDISINTEGRANTS THAT ARE COMMERCIALLY AVAILABLE [15]

S.no	Superdisintegrants	Mode of action	Properties
1.	Cross linked alginic acid	Upon hydration, wicking activity causes a quick bulge.	Cohesion is loose in a wet and dry medium
2.	Cross linked PVP	acting by capillary action	Water-insoluble and naturally spongy
3.	Cross linked starch	In less than 30 seconds, 7–11 folds swell.	Gives a matrix-based sustained release that swells in three dimensions.
4.	Crosslinked polymer of polycarboxylic acid	Very high tendency to expand when hydrated, whether in touch with water or internal fluids	increases the amount of surface area available for the active compounds to absorb

5.	Cross linked cellulose	In less than 10 seconds, swells 4 to 8 times. expansion and wicking	Swelling has two dimensions and is employed in direct compression or granulation.

TABLE 3: FEW FDTs WITH THEIR MANUFAACTURING TACHNOLOGIES & INGREDIENTS [23]

Drugs	Used Ingredientd	Used Technologies	Disintegration time
Rizatriptan benzoate	Talc, Aerosil, Avicel PH102, Orocell, Primogel, Ac-di-sol, Kollidon, Aspartame, Magnesium stearate and Sucralose.	Direct Compression	85 sec
Capecitabie	Mannitol, MCC, HPMC, and crospovidone.	Direct Compression	50 sec
Granisetron Hcl	Magnesium stearate, Lactose, Mannitol, Cyclodextrin, and CCS	Direct Compression	17.1 sec
Amlodipine Besilate	Mannitol, Eudragit EPO, and Avicel PH 101 or 301.	Direct Compression followed by sublimation	15-37.8 sec
Aceclofenac	Mannitol, SSG, and MCC.	Direct Compression	12.2- 27.5 sec
Resperidone	Aspartame, mannitol, PEG 400 and 4000, MCC (Ph 200), and Gelucire 44/14.	Spray drying & compression	Below 30 sec
Clarithromycin	Tricalcium, Carrageenan NF, Tricalcium phosphate, PH 105 Avicel, Sucrose stearate and LS HPC.	Extrusion spheronization	Less than 60 sec
Famotidine	Dextran, Sucralose, Sugar, Mannitol, PVP K30, and Lactose.	Freeze Drying	2-6 sec
Epinephrine bitartrate	Magnesium stearate, Crospovidone, Mannitol, LSHPC(LH11), and	Direct Compression	Less than 10 sec

	Avicel PH-301		
Ondensetron	SSG, polacrillin potassium, MCC, colloidal silicon dioxide, aspartame, and talc.	Direct Compression	10-15 sec
Fexofenadine	Sucralose, magnesium stearate, precipitated silica, mannitol, and crospovidone.	Direct Compression	15-20 sec

TABLE 4: BRAND PRODUCTS OF PATENTED TECHNOLOGIES [23]

Technology	**Process Involved**	**Drug used (Brand name)**
Zydis	Lyophilization	(Claritin Reditab and Dimetapp Quick Dissolve) Loratidine
Flashtab	Lyophilization	(Nurofen Flashtab) Ibuprofen
Durasolv	Molding	(NuLev)Hyoscyamine Sulfate (Zolmig ZMT) Zolmitriptan
Wow tab	Compressed molded tablets	(Gaster D) Famotidine
Ziplets	Molding	(Cibalgina Due Fast) Ibuprofen
Oraquick	Micromask taste masking	Hyoscyamine Sulfate oral disintegrating tablet

TABLE 5: FEW FAST DISINTEGRATING TABLETS FOR HYPERTENSION [19]

S.No	**Author**	**Drug**	**Method**
1.	Patel D.M, *et al,* 2020	NebivololHCl (NEB) &Valsartan (VAL)	Direct compression
2.	Hussain Amjad, *et al,* 2020	Captopril	Fused diffusion modelling
3.	Genedy Samar, *et al.*, 2018	Hydralazine HCL	Direct compression
4.	ShinkarDattatraya M, *et al,* 2018	Verapamil hydrochloride	Wet granulation
5.	S.Muthukumar, *et al.*, 2017	Hydralazine HCL	Direct compression & Sublimation
6.	Das Bijitha, *et al,* 2017	Telmisartan	Direct compression
7.	Roy Harekrishna, *et al,* 2017	Urapidil	Direct compression
8.	M Hesham, *et al,* 2017	Enalarapril maleate	Direct compression
9.	B.V. Bhagat, *et al*., 2016	Indipamide	Solvent casting
10.	M. Rajashekar, *et al*., 2015	Lisinopril (ODF & ODT)	Solvent casting & Direct compression
11.	Prabhu.P, et al., 2014		Solvent casting

		Lisinopril	
12.	Kaza Rajesh, *et al*, 2014	Valsartan	Solvent casting
13.	Bansal. Sumedha, *et al*, 2013	Losartan potassium(ODF)	Solvent casting
14.	Chander Harish, *et al*, 2011	Ramipril	Direct compression
15.	Basu Biswajit, *et al*, 2011	Cinnarizine	Direct compression
16.	GY. Narmada, *et al*, 2009	Amlodipine besylate	Sublimation Method

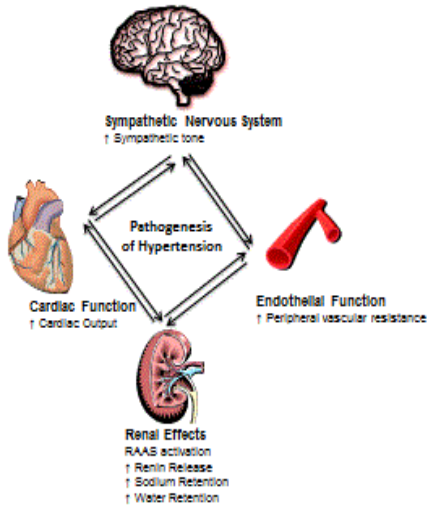

Fig1: System that contributes and maintains hypertension

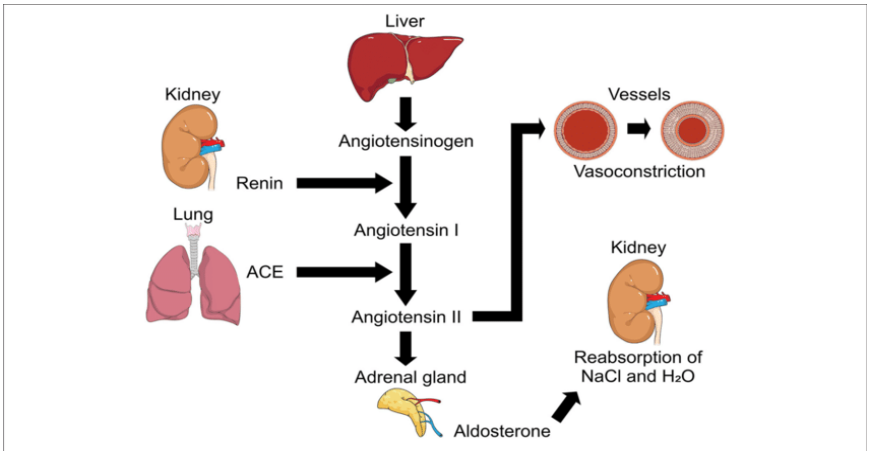

Fig 2: Mechanism of action of rennin angiotensinaldosteron system

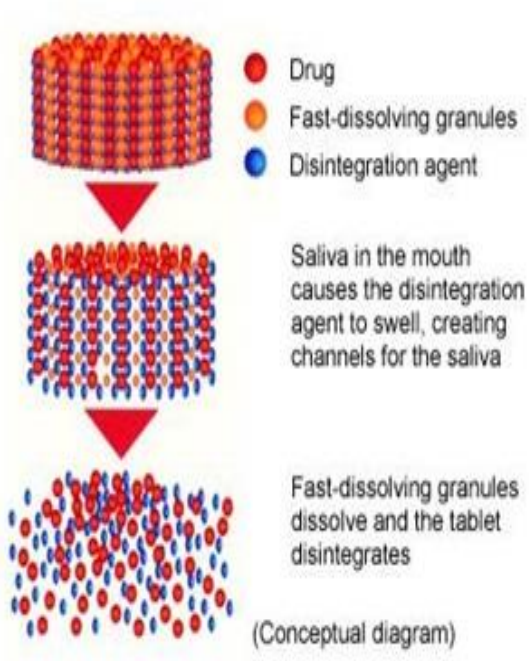

Fig 3: Mechanism of action of superdisintegrants

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TABLE 1: DRUGS USED TO TREAT HYPERTENSION: DOSAGE & REGULAR SIDE EFFECTS [9].

TABLE 2: SUPERDISINTEGRANTS THAT ARE COMMERCIALLY AVAILABLE [15].

TABLE 3: FEW FDTs WITH THEIR MANUFAACTURING TACHNOLOGIES & INGREDIENTS [23].

TABLE 4: BRAND PRODUCTS OF PATENTED TECHNOLOGIES [23].

TABLE 5: FEW FAST DISINTEGRATING TABLETS FOR HYPERTENSION [19].

Fig1: System that contributes and maintains hypertension.

Fig 2: Mechanism of action of rennin angiotensinaldosteron system.

Fig 3: Mechanism of action of superdisintegrants.