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SUPERDISINTEGRANTS: IMPORTANCE AND ROLE IN FORMULATION OF ORODISPERSIBLE TABLETS

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ABSTRACT

Orodispersible tablets dissolve or disintegrate immediately on the patients' tongue or buccal mucosa. This drug delivery system is suitable for drugs undergoing high first pass metabolism. It improves bioavailability, reduces dosing frequency, and thereby minimizes the side effects and also makes the dosage form more cost-effective. This type of property in dosage form can be attained by addition of different excipients, from which disintegrant is the key adjuvant. In recent years, several newer agents have been developed known as superdisintegrants. Different types of superdisintegrants have been using such as semi synthetic, synthetic, natural and co-processed blends employed to develop effectual orodispersible tablets and to overcome the limitations of conventional tablet dosage forms. This review article describes the various kinds of superdisintegrants along with their role in tablet disintegration and drug release.

KEYWORDS: Orodispersible tablets, Superdisintegrants and Bioavailability.

INTRODUCTION

Oral drug delivery remains the preferred route for administration of various drugs .Disintegrating agents are substances routinely included in the orodispersible tablet formulations to aid in the break-up of the compacted mass into the primary particles to facilitate the dissolution or release of the active ingredients when it is put into a fluid environment. They endorse moisture penetration and dispersion of the tablet matrix. The major function of disintegrants is to oppose the efficiency of the tablet binder and physical forces that act under compression to structure the table. Recently new materials termed as "superdisintegrants" have been developed to improve the disintegration processes.

Superdisintegrants are another version of super-absorbing materials with tailor-made swelling properties. These materials are not planned to absorb significant amounts of water or aqueous fluids, but planned to swell very fast. Superdisintegrants are used as a structural weakener for the disintegrable solid dosage forms. They are physically dispersed within the matrix of the dosage form and will expand when the dosage form is exposed to the wet environment. These newer substances are more effective at lower concentrations with greater disintegrating efficiency and mechanical strength. Superdisintegrants are generally used at a low level in the solid dosage form, typically 1 - 10 % by weight relative to the total weight of the dosage unit. Superdisintegrant particles are generally small and porous, which allow for rapid tablet disintegration in the mouth without an objectionable mouth-feel from either large particles or gelling.

Selection of Superdisintegrants: Since superdisintegrant is used as an excipient in the tablet formulation, it has to meet certain criteria other than its swelling properties. Ideal properties of superdisintegrants are[1-2]

- Super disintegrants should have poor soluble property, and then only it helps for the quick disintegration of the tablet.
- It should have less gel formation capacity. If it has gel formation capacity tablet can't disintegrate quickly.
- Super disintegrants should have good hydration capacity, because this hydration capacity it quickly absorbs water and helps in the fast disintegration of the tablet.
- Super disintegrants should have good moulding and flow properties because of this property we can mould the orodispersible tablets in various sizes.
- Superdisintegrants should be inert it should not show any tendency to form complexes with the drugs.
- Superdisintegrants should possess good mouth feel.
- It should also be compatible with the other excipients and have desirable tableting properties.

Methods of Incorporating Disintegrants into orodispersible tablets: There are two methods of incorporating disintegrating agents into the tablet, they are [3-4]

1. **Internal Addition (Intragranular)**

In this method disintegrant is mixed with drug and other excipients before the addition of the granulating fluid, by this way we can incorporate the disintegrant before the granules formation.

2. **External Addition (Extragranular)**

In this method we are going to add the disintegrant after granules formation and these granules are compressed in to tablets.

3. **Partly Internal and External**

In this method some amount of disintegrant added before the formation of the granules and other amount of the disintegrant added after granules formation. The disintegrant which added before the granules formation helps in the immediate disruption of the tablet and the disintegrant which added after the granules formation helps in the erosion of the granules into original powder particles.

Mechanism of Superdisintegrants: Superdisintegrants are used to improve the efficacy of solid dosage forms. This is achieved by various mechanisms. They are.

1. **Swelling:** In this mechanism when superdisintegrants come in contact with suitable medium they swells and exert swelling force on the tablet formulation , which helps in the quick breakup of the tablet into pieces and helps in faster disintegration and dissolution of the orodispersible tablet.[5]
2. **Porosity and Capillary action (Wicking):** in this mechanism porosity of the tablets helps in the penetration of the fluid into tablet and replaces the air absorbed on the particles which leads to the weakening of the intermolecular bonds and breaks the tablets intofine particles.[6]
3. **Heat of wetting[7]:** Disintegrants are having the exothermic properties because of this property heat liberates out from the disintegrants and get wetted, internal stress is created in the tablet due to capillary air expansion which leads to disintegration of the tablet into small particles.
4. **Chemical reaction (Acid-Base reaction)[8]:** Chemical reaction also called as Acid –Base reaction. In this tablet is having both acidic and basic excipient. In presence of water these acidic excipients like tartaric acid and citric acid reacts with the alkali metal carbonates or bicarbonates and liberates the CO_2 and tablet gets broken in to small pieces.

Liberation of CO_2 gas from tablet while coming in contact with water helps in the quick dissolution of drug and masks the bitter taste of the drug.

5. **Particle repulsive forces[9]:** In this mechanism water penetrates into the tablet by hydrophilic pores which are present on the surface of the tablet and form continuous starch network. This continuous starch network helps in the absorption of more water in to the tablet and exerts pressure for breaking of the hydrogen bonds and other forces there by disintegrates tablet into small pieces and leads to improve bioavailability.
6. **Deformation recovery:** In this mechanism shape of the disintegrant plays a main role in the breaking of the tablet into small particles. When tablet come in contact with the water, the shape the of the disintegrant increases which is distorted during compression and leads to the breakup of the tablet into small particle and helps in increased dissolution rate of the tablet.
7. **Enzymatic reaction:** In this mechanism enzymes present in our body acts as disintegrant and helps in the breakup of the tablet into small pieces. This enzyme reduces the binding action of binders in tablet and helps in breakup of the tablet. In this tablet swells by exerting pressure on outer direction leads to bursting of tablet and helps in the disintegration.

Type of Superdisintegrant and their examples

Superdisintegrants shall be divided into two types, they are

1. Synthetic superdisintegrant.
2. Natural superdisintegrant.

1. Synthetic superdisintegrant

Synthetic super- disintegrants are frequently used in tablet formulations to improve the rate and extent of tablet disintegration thereby increasing the rate of drug dissolution. The most widely used synthetic superdisintegrants are described below.

a) **Cross-linked polyvinyl Pyrrolidone (Crospovidone)[10]:** Crospovidone uses the basic priciple of swelling and wicking. Crospovidone having the high crosslink density which helps in the swelling of tablet without formation into gel and because of its porous nature of the particles present in the Crospovidone helps in the wicking of the liquid into tablet and leads to rapid disintegration of the tablet. Crospovidone having the solubility enhancing property along with disintegration action. Crosspovidone can be divided into 2 types based on its particle size; they are Polyplasdone XL and Polyplasdone XL-10.

b) **Croscarmellose Sodium[11-12]:** Crosscarmellose sodium uses both swelling and wicking property for the disintegration of the tablet. It is cross linked polymer of the carboxy methyl cellulose sodium. Crosslinked polymer nature helps in swelling of the tablet when it is come in contact with water by forming minimum amount gel and helps in rapid disintegration of the tablet. Fibrous nature of the croscarmellose sodium helps in the wicking of the liquid into the tablet and exerts pressure on the tablet and leads disintegration of the tablet. Croscarmellose sodium used as disintegrant in both direct compression and wet granulation processes. In wet granulation process it can be added to the formulation by intra and extra granulation addition method.

c) **Sodium Starch Glycolate:** Sodium starch glycolate can be prepared by crosslinking the potato starch. Sodium starch glycolate can also be called as Modified starches derived from the sodium salt of carboxymethyl ether of starch. It swells in water by 200-300 percent when compared to the natural starches. The main mechanism involved in this is it absorbs more amount of water into the tablet and enormous increase in the volume of the granules which leads rapid disintegration of the tablet. Sodium starch glycolate available as explotab and primogel which are low substituted carboxy methyl starches.

2. Natural superdisintegrant

Superdisintegrants which are obtained from the plants called as Natural superdisintegrants. Natural superdisintegrants can be used as alternative inplace of synthetic superdisintegrants because of its low cost,local availability and eco friendly nature. Follwing are the natural superdisintegrants derived from the plant products, they are

a) ***Hibiscus rosa-sinensis* Linn. Mucilage[13]:** Hibiscus rosa-sinensis mucilage acts as natural superdisintegrant which helps in the disintegration of the tablet.

b) **Isapghula Husk Mucilage (*Plantago ovata*)[14]:** *Plantago ovate* plant dried seeds provides the mucilage called as Isapghula Husk. Epidermis of the dried seeds contains the mucilage which acts as a Superdisintegrant. Isapghula husk mucilage having the property of the binding and sustaining along with disintegration property. Because of its high swelling index around 89±2.2%v/v helps in the rapid disintegration of the tablet.

c) ***Cucurbita maxima* pulp powder[15]:** Powder obtained from *Cucurbita maxima* pulp acts as natural superdisintegrant. It is having the comparable dissolution property to synthetic super disintegrants like Sodium starch glycolate. The tablets which are prepared by using the *Cucurbita maxima* pulp powder will have good hardness and friability property.

d) ***Lepidium sativum* Seed Mucilage[16]:** Mucilage obtained from the *Lepidium sativum* seeds acts as a natural superdisintegrant. It is having the binding, disintegrating and gelling properties.

e) **Fenugreek Seed Mucilage [17]:** Mucilage obtained from the *Trigonella Foenum-graceum* (family Leguminosae) acts as natural superdisintegrant. It is also called as Fenugreek seed mucilage. When it comes in contacts with warm water forms the viscous colloidal solution leads to disintegration of the tablet.

f) **Chitosan[18]:** Chitosan is a most widely available polysaccharide, it is obtained by deacetylation of chitin. Chitosan shows capillary action by which it absorbs more amount of water when comes in contacts with aqueous medium and exerts pressure on the tablet leads to the rapid dissolution of the tablet by formation uniform dispersion inside the body.

g) **Mango Peel Pectin:** Pectin obtained from the dried mango peel powder acts as natural superdisintegrant because of its good swelling index and rich solubility in biological fluids.

h) **Gums:** Gums acts as natural superdisintegrant because it's swelling property. When we add 2-10% w/w to the tablet provides the disintegration property.

i) **Guar Gums[19]:** Guar gums are also known as Jaguar gum. It shows disintegration property based on its particle size, if it is having the finer particle size shows greater disintegrating property compared to coarse particle size. Guar gum can be obtained from guar seed extract. It shows better disintegrating property compared to corn starch, cellulose, alginates and magnesium aluminium silicate.

j) **Gellan Gums[20]:** Gellan gums shows its disintegration property because its high hydrophilic nature. It swells when comes in contact with water exerts pressure on the tablet and helps in the disintegration of the tablet.

k) **Gum Karaya[21]:** Gum karaya can be obtained from gum exudates of the traces of *Sterculiaurens* belonging to family *Sterculiacea.*it shows disintegrating property by absorbing more amount water and swells into 60-100 times more than its original size and exerts pressure on the tablet helping it to disintegrate into small pieces. It shows high viscosity nature.

l) **Agar[22]:** Agar can be obtained from *Gelidium amansii* (Gelidanceae) and from red algae like Gracilaria (Gracilariaceae) and Pterocadia (Gelidaceae).Agar is a dried gelatinous substance and it posses high gel strength. High gel strength is because of its Agarose polysaccharide. Agar consists of another polysaccharide like Agarose which is

responsible for its viscous nature. It acts as a naturally occurring potential superdisintegrant.

m) **Starch[23]:** Starch is the most widely used natural superdisintegrant. It shows its disintegrating property by capillary action. When it comes in contact with water draws more amount of the water inside leading to disruption of tablet and helps in quick disintegration.

n) **Pregelatinized Starch (Starch 1500)[24]:** Pregelatinized starch can be prepared by modifying the potato starch. It shows the disintegrating property by its swelling action.It shows effective super disintegrating action if it is added to formulation is between 5-10% concentrations.

o) **Microcrystalline Cellulose[25]:** Microcrystaline cellulose in combination with starch shows excellent superdisintegrating property. It consists of capillary pores, which draws the water inside and helps in the breaking of the hydrogen bonds in between cellulose microcrystals. In this way it shows the disintegration property. It also having high wicking rate for water. Microcrystalline cellulose is available in different particle sizes and moisture grades as Avicel pH - 101, pH - 102, pH – 105.

p) **Alginates:** Alginates can be extracted from certain species of Kelp. It shows disintegrating property by its hydrophilic nature. It is most effective when we used as 1-5 % concentration. It is widely used in the preparation of multivitamin formulations.

q) **Chitin[26]:** It is the most abundant natural polymer after cellulose. Tablets containing Chitin shows faster disintegration and better dissolution. Moisture sorption and water uptake was found the major mechanism of disintegration while dissolution related to swelling capacity.

r) **Co-processed:** Desired disintegrating action can be obtained by using mixture of blend of more than two excipients. These are called as co-processed excipients, they are

- **Ludiflash[27]:** It consists blend of mannitol (95%),crospovidone (5%) and polyvinyl acetate (5%). It is an innovative co-processed blend. It shows rapid disintegration within seconds by providing soft and creamy consistency. Ludiflash commonly used in the direct compression technique with high speed tablet machine. It gives required hardness, low friability and extremely faster release to the tablet.
- **F-melt[28]:** F-MELT® is most widely used in the orally disintegrating tablets which contain sachharides, disintegrating agent, and inorganic excipient. It is spray dried excipient which facilitates the rapid water penetration in to the tablet and provides faster disintegrating action.

- **Pharmaburst[29]:** Pharmaburst excipients are mixed with the API and compressed into tablets. It provides the rapid disintegration to the tablet.
- **Modified chitosan with silicon dioxide[30]:** It is prepared by co-precipitation of chitosan and silica. The physical interaction between chitosan and silica create an insoluble, hydrophilic highly absorbent material, resulting in superiority in water uptake, water saturation for gelling formation.it is most widely used in the wet granulation formulations. It is the only disintegrant that is effective at all concentrations in tablet formulation.

s) Modified Mannitols

- **Pearlitol 200 SD:** It is a granulated mannitol which shows the disintegration property by its porous crystalline particles. It dissolves rapidly when it comes in contact with water. It has great physical and chemical stability along with organoleptic properties.
- **Mannogem EZ[31]:** It is spray dried mannitol which is widely used in the direct compressed formulations.it provides quick disintegration property when it comes in contact with water. It is highly compatible, chemically inert and non hygroscopic nature.

t) Modified Resins

- **Polacrilin Potassium (Tulsion 339)[32]:** It is obtained from a crosslinked polymer of methacrylic acid and divinylbenzene. It shows disintegrating property by its swelling action when comes in contact with water it swells 150% more than its normal size and helps in disintegration of the tablet into small pieces. It is available in different grades like tulsion-335, tulsion-344, and tulsion-345 and tulsion-412. Polacrilin Potassium is bio-compatible and non-toxic in nature.

u) Modified sugars

- **Glucidex It[33]:** Glucidex IT is obtained by moderate hydrolysis of starch. It is micro granulated form enables almost instantaneous dispersal and dissolution in water.

Following Table-1 describes about the list of superdisintegrants along with their brand names.

Table 1: List of Superdisintegrants Along With Their Brand Name.

Superdisintegrants	Brand name
Crosslinked cellulose	Crosscarmellose®,Ac-Di-Sol®,Nymce ZSX®, Primellose®,solutab®,Vivasol®,L-HPC,Nymcel.
Crossslinked PVP	CrosspovidoneM®,Kollidone®,Polyplasdone®,XL®,Kollidone CL®
Crosslinked starch	Explotab®,Primogel®,Tablo®,Vivastar®
Crosslinked alginic acid	Alginic acid NF ®,Staialgine®,
Soyapolysacchrides	Emcosoy®
Gallen gum	Kilcogel®
Xanthium gum	Grindsted®,xanthum SM®
Ion exchange resin	Indion 414®,tusion 339®,Amberlite IRP 88®

Following table-2 describes the research work on orodispersible tabltes which are carried by using different natural and synthetic super disintegrants.

Table-2: Latest Research Work on Superdisintegrants used in Or dispersible Tablets.

Drug name	Category	Technology used	Superdisintegrant used	Result
Atenolol[34]	Anti-hypertensive drug.	Phase transition technology	Xylitol, perlitol SD 200-as sugar alcohols and Maize Starch.	The formulation containing xylitol,perlitol SD 200 and maize starch showed best results with lease disintegration time
Alfuzosin[35]	Anti-hypertensive drug.	Sublimation method	Camphor , Croscarmellose Sodium ,Cross Povidone and Sodium Starch Glycolate	The formulation containing 10% w/w crosspovidone and 30 % w/w camphor showing best results of with in vitro dispersion time of approximately 6seconds. This formulation shows 50% of drug release with in 1.44 minutes.
Baclofen[36]	Used in the treatment of spasticity resulting from multiplesclerosis.	Direct compression method	AC-Di-Sol, Crosspovidone,SSG	The formulation containing Ac-Di-Sol as superdisintegrant shows best results of disintegration time of 28.6±1.22sec with a cumulative drug release of 100.51±0.30%at the end of 6 minutes.
Carvedilol[37]	Anti hypertensive drug.	Direct compression method	Lactose and Crosspovidone and SSG, PVPK-30	The formulation containing 15% crosspovidone showing better results with a disintegration time of

Drug name	Category	Technology used	Superdisintegrant used	Result
				16sec and 100% drug release with in 15 minutes.
Diazepam [38]	Anti-convulsant Drug	Wet granulation and direct compression method	AC-Di-Sol ,SSG, Crosspovidone and Camphor and Ammonium Bicarbonate	The formulation which contains 10% of crosspovidone and 20% ammonium bicarbonate as a sublimating agent by wet granulation method shows lower disintegration time of 30.8 ±2.4sec with a 92.90% drug release.
Domperidone [39]	Anti-emetic drug	Direct compression method	Kyron T-314 and Avicel 102	The formulation which contains 1.5mg of kyron T-314 and 5 mg of avicel 102 has shown better results of drug release of 99.22% and disintegration time of 29sec.
Famotidine[40]	Anti-ulcer drug	Sublimation method	Sodium starch glycolate, Crosscarmellose Sodium and Camphor	The formulation which containing camphor as sublimating agent along with crosscarmellose sodium shows better results
Finasteride [41]	Used for the treatment of benign prostatic hyperplasia and male pattern baldness	Direct compression method	Microcrystalline cellulose, Crosscarmellose Sodium, SSG and Crosspovidone	The formulation which contains 5%crosspovidone with coprocessed granules of MCC with aerosol and mannitol showing best results of in vitro disintegration time (9.7±0.1sec)
Granisetron hydrochloride [42]	Antiemetic drug	Direct compression method	Explotab,Crosspovidone, Ac-Di-Sol	The tablets prepared with crosspovidone at 5% level was found to be the best formulation with higest percent drug release 99.45% at 10 min and shows leaset disintegration time
Indomethacin [43]	NSAID	Non aqueous wet granulation	Camphor,Ammonium Bicarbonate,Mannitol,Colloidal Silicone Dioxide and Spray Dried Lactose	The formulation which contain 14%camphor,10%ammonium

Drug name	Category	Technology used	Superdisintegrant used	Result
		technique		bicarbonate,45mannitol showed better disintegration time of 34.2±2.9 sec.
Itopride HCl[44]	Anti ulcer drug.	Solvent evaporation method	Acetone solvent ,Eugragil EPO ,Light Liquid Paraffin	The formulation which contains Itopride HCl and Eudragil EPO in 1:2 ratio shows short in vitro disintegration time and improved dissolution patterns.
Lornoxicam [45]	NSAID	Wet granulation	KYRON T-314,Menthol,Magnesium Stearate,Aspartame and Mannitol	The tablets prepared with Kyron T-314 disintegrate within few seconds without need of water, thereby enhancing the absorption leading to its increased bioavailability.
Meloxicam[46]	NSAID	Non aqueous wet granulation technique	Crosspovidone and Mannitol	The formulation which contains 5%w/w of crosspovidone and 44%w/w mannitol shows 99.5% of drug release with in 30 minutes.
Meclizine hydrochloride [47]	Antihistaminic drug	Direct compression technique	Sodium Starch Glycolte (SSG),Crosscarmellose Sodium (CCS),Crosspovidone (CP) and Microcrystalline cellulose.	The formulation which contains 4% w/w crosspovidone,10% w/w Microcrystalline cellulose shows 80 % drug release with in 6.28 minutes.
Montelukast sodium[48]	Anti allergic drug	Direct compression method	Ac-Di-Sol, Crosspovidone, Sodium Starch Glycolate	The formulation which contains 15 mg of Ac-Di-Sol as a disintegrate shows best results of disintegration time of 28..6±1.22sec and drug release of 100.51±0.30% at the end of 6 minutes.
Metformin HCl [49]	Hypoglycemic agent	Direct compression technique	Ispagula Husk, Micrcrystaline cellulose,Starch, Crosspovidone.	The formulation which containing Isphagula husk shows best results with disintegration time of 23 sec and 98.7 %drug release in 10 minutes.
Metoclopramide ydrochloride	Used in the treatment of Gastrointestinal	Direct compression	Indion 234,SSG,Crosscarmellose sodium ,Crosspovidone	the formulation which containing Microcrystalline

Drug name	Category	Technology used	Superdisintegrant used	Result
[50]	disorders such as gastric statis,Gastroesophageal reflux.	technique	and Microcrystalline cellulose	cellulose and mannitol in 1:1 ratioslong with 1 mg of crosspovidone shows 99.12±1.98 drug release at the end of 15 minutes.
Norfloxacin [51]	Anti-bacterial agent	Direct compression technique	Sucralose, Avicel PH 101,Starch 1500x	The fromualtion which contains crosscarmellose sodium and plantago ovate husk shows better drug release properties of 90% of drug release within 15 minutes.
Olanzapine [52]	Anti-pyretic drug	By inclusion comlex technique	Sodium Starch Glycolate, Crosscarmellose Sodium, Crosspovidoen, Tulsion 339 and Indion 414	The formulation which contains 5% w/w crosscarmellose sodium showed minimium disintegration time of 39±1.76 sec and in vitro drug release of 99.19 ±0.18% within 6 minutes.
Ondansetron hydrochloride [53]	Anti-emetic drug	By dry granulation method	Modified Gum Karaya,Modified Natural Agar, Crosscarmellose Sodium and Soium Starch Glycolate	The formulation which contains 8% modified gum karaya shows better results of disintegration time of 11seconds and complete drug release within 6 minutes.
Olmesartan medoxomil[54]	Anti –Hypertensive drug	By inclusion complex method	Sodium Starch Glycolate and Crosspovidone	The formulation which contains 15 % of sodium starch glycolate showed fastest disintegration time and in vitro drug release.
Pheniramine maleate [55]	Anti-histamine drug	By effervescent method	Pre gelatinized starch,Sodium Starch Glycolate,Crosscarmellose Sodium and Crosspovidone	The formulation which containing 4%w/w crosspovidone and mixture of sodium bicarbonate and tartaric acid (each of 12 % W/W) shows the best results of in vitro dispersion time of 19 sec and the best results of in vitro dissolution profile
Piroxicam [56]	NSAID	Direct compression	Crosspovidone , Crosscarmellose Sodium ,Sodium Starch Glycolate	The formulation containing 7% of crosspovidone shows

Drug name	Category	Technology used	Superdisintegrant used	Result
		technique		better results of disintegration time of 10±1 sec and less time of dissolution time
Promethazine Hcl[57]	Anti-emetic drug	Sublimation method (direct compression)	Sodium starch glycolate, Crosscarmellose Sodium ,Tulsion 414,Camphor	Sodium starch glycolate 10%w/w,camphor 10%w/w shows the 93% of drug release with in 10 minutes with disintegration time of 26 seconds.
Propranalol hydrochloride [58]	Anti-hypertensive drug	Direct compression technique	Crosspovidone , crosscarmellose sodium ,sodium starch glycolate, Microcrystalline cellusoe	The formulation which containing 4% crosspovidone gives disintegration time of 25 seconds,hihest drug release of 97.89% at 12 minutes.
Roxithromycin [59]	Anti-biotic	Direct compression technique	Co grinded treated agar and Co Grinded Treated Guar Gum, Mannitol	The formulation which containing 5% w/w of modified polysaccharides and 15 % w/w MCC shows better drug release of 93.04±77 % within 30 minutes.
Simvastatin[60]	It is lipid lowering agent	Direct compression technique	Hyroxypropyl β-cyclodextrin,Crosscarmellose, Crosspovidone	The formulation which contains Hyroxypropyl β-cyclodextrin showed fastest dissolution profile (99.30% of drug release in 120 minutes)
Tizanidine [61]	It is centrally acting α-2 adrenergic against muscle relaxant	Direct compression technique	SSL-hydroxy propyl cellose ,Microcrystalline Cellulose (Avicel PH 102),Eudragit.	The formulation which contains 1:3 ratio of microcrystalline cellulose with SSL-hydroxy propyl cellulose was prepared by using spray drier shows minimum disintegration time of 9.15±0.04 and drug release of 93.75 % at the end of 15 minutes.
Valsartan [62]	Anti-Hypertensive drug	Freeze drying technique	Spray dried lactose,sucrose,pregelatini [zed starch,sorbitol,Xanthium gum,Pectin	The formulation which contains 4:6 valsartan:mannitol and 2 % pectin shows better results of disintegration

Drug name	Category	Technology used	Superdisintegrant used	Result
				time of 4.29 sec and 100 % drug release with in 6minutes.
Venlafaxine hydrochloride [63]	Anti-Hypertensive drug	Direct compression	Sodium starch glycolate and crosscarmellose sodium	The formulation which containe 20 mg of crosspovidone shows better results of drug release of 99.4±0.54at the end of one hour.

CONCLUSION

With the increase demand of novel drug delivery, the fast disintegrating drug delivery system has become one of the mile stone of present investigations. Although, there are many superdisintegrants, the search for newer disintegrating agents is ongoing and researchers are experimenting with modified natural products like formalin casein, chitin, chitosan, polymerized agar acrylamide, xylan, smecta, key-jo-clay, crosslinked carboxymethyl guar, mango peel pectin, cassia tora, cassia nodosa and modified tapioca starch etc. Studies have suggested that the water insoluble superdisintegrants show better disintegration property than the slightly water soluble agents, since they do not have a tendency to swell. Superdisintegrants that tend to swell show slight retardation of the disintegration property due to formation of viscous barrier. Therefore, in coming era, there is going to be continued interest for the development of natural polymers based orodispersible tablets.

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