Review Article

Utilization of natural superdisintegrant in mouth dissolving tablet: A simplified review

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ABSTRACT

Many drugs belong to BCS class-2 having poor solubility in water requires enhancement in solubility and dissolution rate for increasing its oral bioavailability; however, in many cases, immediate onset of action is required than conventional therapy. Tablet is the most popular among all dosage forms existing today because of its convenience of self-administration, compactness, and easy manufacturing, because of physiological changes associated with, especially elderly and pediatrics, are quite unable to swallow (dysphagia), rather this common problem of all age group patients. Solid dosage forms that can be disintegrated, dissolved, or suspended by saliva in the mouth resulting in easy swallowing, can provide significant benefits to the pediatric and geriatric population, as well as other patients who prefer the convenience of easily swallow able dosage forms. Mouth dissolving tablets (MDT) disintegrate instantaneously when placed on the tongue, releasing the drug that dissolves or disperses in the saliva. In MDT, superdisintegrants are incorporated in the right amount for quick disintegration with improved bioavailability. Based on the source, various types of superdisintegrants are available. They are synthetic, semi-synthetic, natural, and co-processed. In this review, the main emphasis is given on different types of natural superdisintegrants used in MDT, their mechanisms, and applications.

Keywords: Bioavailability, dispersible, dysphagia, natural, superdisintegrant

Introduction

Mouth dissolving or oro-dispersible or fast dissolving tablets are defined as a solid dosage form comprising a medicinal constituent, which instantaneously disperses within seconds into the saliva when kept on the tongue. As per WHO, "MDT intended to be dispersed within few seconds in water before administration, giving a homogeneous dispersion." Some of the advantages of mouth dissolving tablets (MDT) are no need of water to swallow the dosage form, good mouths feel property produced by the use of flavors and sweeteners especially in the pediatric patient, it gives fast action when it comes in contact with saliva, superdisintegrants are the key ingredient which gives faster disintegration and/or dissolution of a drug in the form of MDT. MDTs are prepared using both natural and synthetic superdisintegrant. The faster the drug into solution, quicker is the rate of absorption and onset of pharmacological action. Some drugs are absorbed from the mouth, as the saliva passes down into the stomach.[1,2]

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Superdisintegrant facilitates the breakdown of the tablets within a second in the mouth in the presence of saliva without any complexity of swallowing. The term superdisintegrant, as its name proposes superior to disintegrate. Superdisintegrant is the substances that facilitate the lowering of disintegration time (DT) even at low concentration, typically 1–10% by weight relative to the total weight of the dosage unit. Taste masking is a must for the bitter drug; therefore, different approaches are mentioned in the literature for taste masking. Solid dispersion is one of them.[3]

The United States Food and Drug Administration (FDA) defined FDT as "A solid dosage form containing the medicinal substance or active ingredient which disintegrates rapidly usually within a matter of seconds when placed upon the tongue."The DT for FDTs generally ranges from several seconds to about a minute. The bioavailability of some drugs may be increased due to the absorption of drugs in the oral cavity and also due to pre-gastric absorption of saliva containing dispersed drugs that pass down into the stomach. Moreover, the amount of drug that is subjected to the first-pass metabolism is reduced as compared to standard tablets.[4,5]

Direct compression can be regarded as the easiest, most appropriate, and simplest way to obtain a rapidly disintegrating tablet with adequate

structural integrity. In the direct compression method, the most important factor to be taken in concern is the selection of suitable excipients with good disintegration properties and compatibility. Several factors should be considered in selecting the superdisintegrants because these agents do not affect the rate of disintegration only, but they also affect friability, hardness, and how the tablet feels in the mouth. The disintegration and dissolution properties of the direct compressible ODTs are based on the single or combined action of disintegrants and water-soluble excipients. However, disintegrants have a major role. Choosing of a suitable disintegrant type and in optimal concentration is essential for ensuring high disintegration rate.[6]

Superdisintegrants

Disintegrating agents are substances routinely included in the 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 tablet. 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. 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. Their particles are generally small and porous, which allow for rapid tablet disintegration in the mouth without an objectionable mouthfeel from either large particles or gelling. The particles are also compressible which improves tablet hardness and its friability. Effective superdisintegrants provide improved compressibility and compatibility and have no negative impact on the mechanical strength of formulations containing high-dose drugs. In general, 1 g of superdisintegrant absorbs 10–40 g of water or aqueous medium. After absorption, swelling pressure and isotropic swelling of the superdisintegrants particles create stress concentrated areas where a gradient of mechanical properties will exist due to which whole structure will break a part.[2,7]

Ideal Characteristics on Mouth Disintegration Tablet[8,9]

Fast disintegration tablet should following characteristics:

1. They should not require water or other liquid at the time of administration.
2. Should easily disintegrate and dissolve.
3. Mask or overcome unacceptable taste of drug.
4. They should have high drug loading.
5. They should have a pleasant feel in mouth.
6. They should have negligible or no residue in the oral cavity after administration.
7. They should have low sensitivity against environmental conditions such as moisture and temp.
8. Ease of administration for patients who are mentally ill, disable, and uncooperative.
9. Should be portable without fragility concern.
10. They should be manufactured using conventional tablet processing and packing equipment at low cost.

Selection Criteria for Superdisintegrants[10]

- Particle size should be small.
- Should be non-toxic.
- Compatible with other excipients and drug.
- Good hydration capacity.
- Good flow property.
- Good mouthfeel.
- Effective in less quantity.

As the superdisintegrants can be easily available, less expensive, and direct compressible, use of superdisintegrant is more suggestible and profitable method to prepare fast dissolving tablets as compared to other patented technologies. Particles of superdisintegrants are small and porous which facilitate rapid disintegration of tablets without giving objectionable mouthfeel. The ideal superdisintegrants should give good flowability, compressibility, and compatibility without affecting mechanical strength of tablets.

Advantages of Superdisintegrant

- Required in less concentration.
- Compatible with a large number of drug and excipients.
- Does not affect compressibility and flowability.

Advantages of Mouth Dissolving Systems[11]

- Ease of administration to geriatric, pediatric, mentally disabled, and bed-ridden patients who have difficulty in swallowing the tablet.
- The FDTs do not need water for swallowing, unlike conventional dosage forms. This is very easy for patients who are traveling or do not have immediate access to water, and thus, provide enhanced patient compliance.
- Being unit solid dosage forms provide the advantage of accurate dosing, easy portability and manufacturing, good physical and chemical stability, and an ideal alternative for pediatric and geriatric patients.
- Bioavailability of drugs is enhanced due to absorption from mouth, pharynx, and esophagus.
- Pre-gastric absorption can result in improved bioavailability and, because of reduced dose, improved clinical performance through a reduction of unwanted effects.
- Rapid onset of therapeutic action as the tablet is disintegrated rapidly along with quick dissolution and absorption in the oral cavity.

- Good mouthfeel, especially for pediatric patients as taste-masking technique issued to avoid the bitter taste of drugs.
- Minimum risk of suffocation in airways due to physical obstruction when FDTs are swallowed; thus, they provide improved safety and compliance with their administrations.
- Rapid drug therapy intervention is possible.
- Conventional processing and packaging equipment allow the manufacturing of tablets at a low cost.
- No specific packaging is required. It can be packaged in push-through blisters.
- Provide new business opportunities in the form of product differentiation, patent-life extension, uniqueness, line extension, and lifecycle management, and exclusivity of product promotion.

Methods of Incorporation of Superdisintegrants[12]

The incorporation of superdisintegrants in the dosage forms are mainly of three types:

- Intragranular or during granulation – in this process, the superdisintegrants are blend with other powders and granulation is carried out. Thus, the superdisintegrants are incorporated within the granules.
- Extragranular or before compression – in this process, the superdisintegrants are mixed with prepared granules before compression.
- Incorporation of superdisintegrants at intra and extra granulation steps – in this process, part of superdisintegrants is added to intragranular and a part to extra granules. This method usually produces better results and more complete disintegration than type I and type-II.

Mechanism of Disintegrations by Superdisintegrants[13,14]

Swelling

Although not all effective disintegrants swell in contact with water, swelling is believed to be a mechanism in which certain disintegrating agents (such as starch) impart the disintegrating effect. By swelling in contact with water, the adhesiveness of other ingredients in a tablet is overcome, causing the tablet to fall apart.

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 penetration of fluid into tablets. The disintegrant particles (with low cohesiveness and compressibility) themselves act to enhance porosity and provide these pathways into the tablet. The liquid is drawn up or "wicked" into these pathways through capillary action and ruptures the interparticulate bonds causing the tablet to break apart [Figure 1].

Deformation

Starch grains are generally thought to be "elastic" in nature, meaning that grains that are deformed under pressure will return to their original shape when that pressure is removed. However, with the compression forces involved in tableting, these grains are believed to be deformed more permanently and are said to be "energy rich" with this energy being released upon exposure to water. In other words, the ability for starch to swell is higher in "energy rich" starch grains than it is for starch grains that have not been deformed under pressure. It is believed that no single mechanism is responsible for the action of most disintegrants. But rather, it is more likely the result of inter-relationships between these major mechanisms.

Due to disintegrating particle/particle repulsive forces

Another mechanism of disintegration attempts to explain the swelling of the tablet made with "nonswellable" disintegrants. Guyot-Hermann has proposed a particle repulsion theory based on the observation that nonswelling particle also causes disintegration of tablets. The electric repulsive forces between particles are the mechanism of disintegration and water is required for it. Researchers found that repulsion is secondary to wicking [Figure 1].

Chemical reaction (acid-base reaction)

The tablet is quickly ruptured apart by the internal release of CO_2 in water due to the interaction between tartaric acid and citric acid (acids) with alkali metal carbonates or bicarbonates (bases) in the presence of water. Due to the generation of pressure tablet disintegrates. The dissolution of active pharmaceutical ingredients in water and taste masking is due to liberation in CO_2 gas. During

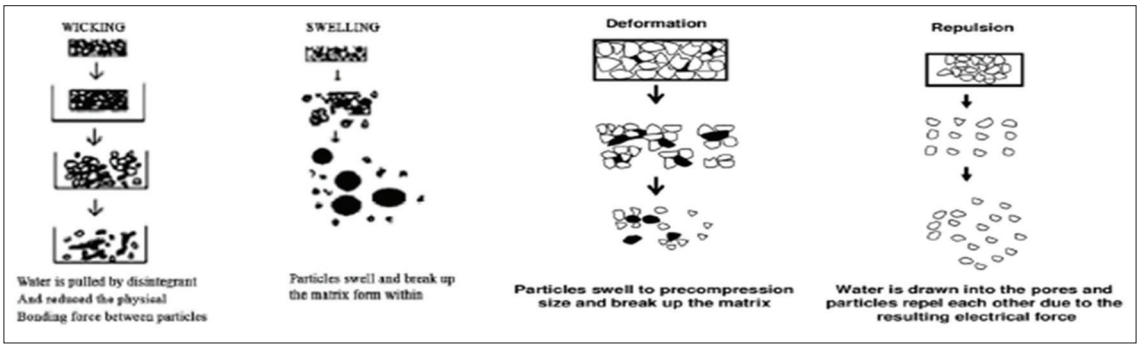

Figure 1: Mechanism of Disintegrations by Wickning, Swelling, Deformation and Repulsion

the preparation of the tablets, the strict control environment is necessitated for these disintegrants are highly sensitive to a small change in humidity level and temperature.

Enzymatic-reaction

Enzymes also act as disintegrants that are present in the body. These enzymes have a deficiency of binding action of binder and assist in disintegration. Due to swelling, the pressure is applied in the outer direction that the reason for the tablet to burst or the accelerated absorption of water leads to a vast increase in the volume of granules to stimulate disintegration.

Heat of wetting

This mechanism is applicable for the disintegrant having exothermic property. When these disintegrant comes in contact with suitable media and get wetted, there is a capillary air expansion leads to localized stress which causes disintegration of the tablet.

Source of Natural Gums[15]

A large number of studies on various plant-based gums primarily the plant exudates and seed gums have resulted in the identification of valuable natural sources of complex polysaccharides that promote the desired application due to their apt stabilities and texture. Their physical, chemical, and functional properties depend on their chemical compositions and molecular structures. Recently, substantial interest has been generated to elucidate the relationship between the chemical composition, molecular structure, and their respective physical characteristics. Natural gums are one of the polysaccharide categories, capable of enhancing the viscosity of a solution even at very small concentrations. More often, gums are derived from the woody parts of a plant or tree or in seed coatings. Natural gums come from varied sources that can be aquatic and/or terra firma. Some gums originating from seaweeds derived either as the cell walls of various algae or deposited in intracellular regions as reserve food materials constitute excellent sources of food gums such as carrageenan and alginates, whereas pectin, guar, and locust bean gums are obtained from the land plants. Exudate gums are obtained through the gummosis process by involving the fragmentation of plant cellulose and seed gums are obtained from the seed kernels. The source of gelatin is animal tissue and the xanthan gum is a product of the microbial fermentation process. Whatever the sources, gums are chemically inherent polysaccharides that have their innate organic origin.

Types of Superdisintegrants[12,16-19]

The superdisintegrants can be classified into two categories on the basis of their availability:

- Natural superdisintegrants.
- Synthetic superdisintegrants.

Natural superdisintegrants

These super disintegrating agents are natural in origin and are preferred over synthetic substances because they are comparatively cheaper, abundantly available, non-irritating, and non-toxic in nature. The natural materials such as gums and mucilages have been extensively used in the field of drug delivery for their easy availability, cost-effectiveness, eco-friendliness, emollient and nonirritant nature, non-toxicity, capable of a multitude of chemical modifications, and potentially degradable and compatible due to natural origin. There are several gums and mucilages are available which have super disintegrating activity.

Natural polymers used in fast dissolving tablets[13]

Chitin and chitosan

Chitin (β-(1→4)-N-acetyl-D-glucosamine) is a natural polysaccharide obtained from crab and shrimp shells. It possesses an amino group covalently linked to the acetyl group as compared to the liberate amino group in chitosan. The DT in the oral cavity, as well as wetting time, could be analyzed by surface free energy. Chitosan is the best kenned natural polysaccharide utilized for its multifarious applications in the pharmaceutical industry.

Guar gum

Guar gum is mainly consisting of the high molecular weight (approximately 50,000–8,000,000) polysaccharides composed of galactomannans. It is utilized as a thickener, stabilizer, and emulsifier and approved in most areas of the world (e.g., EU, USA, Japan, and Australia). It is naturally occurring gum. It is free flowing, consummately soluble, a neutral polymer composed of sugar units and is approved for use in food. It is not sensitive to pH, moisture contents, or solubility of the tablet matrix. It is not always pristine white and sometimes varies in color from off-white to tan and inclines to discolor with time in alkaline tablets.

Gum karaya

Gum karaya is a vegetable gum produced as an exudate by trees of the genus *Sterculia*. The high viscosity nature of gum limits its uses as binder and disintegrant in the development of conventional dosage form. Gum karaya has been investigated for its potential as a tablet disintegrant. Different results showed that modified gum karaya produces rapid disintegration of tablets. Gum karaya can be utilized as an alternative superdisintegrant to commonly available synthetic and semisynthetic superdisintegrants due to its low cost, biocompatibility as well as facile availability.

Agar and treated agar

It is the dried gelatinous substance obtained from *Gelidium amansii* (Gelidanceae) and several other species of red algae such as *Gracilaria* (Gracilariaceae) and *Pterocladia* (Gelidaceae). Agar is yellowish-gray or white to proximately colorless, inodorate with mucilaginous taste, and is available in the form of divests, sheet flakes, or coarse powder. Agar consists of two polysaccharides, agarose, and agar pectin. High gel vigor of agar makes it a potential candidate as a disintegrants.

Fenugreek seed mucilage

Trigonella foenum-graceum commonly kenned as fenugreek is an herbaceous plant of the leguminous family. Fenugreek seeds contain a high percentage of mucilage (a natural gummy substance present

in the coatings of many seeds). Albeit it does not dissolve in water, mucilage forms a viscous tacky mass when exposed to fluids. Like other mucilage-containing substances, fenugreek seeds swell up and become slick when they are exposed to fluids. Hence, the study revealed that this natural disintegrant (fenugreek mucilage) showed more preponderant disintegrating property than the most widely used synthetic superdisintegrants like Ac-di-sol in the formulations of FDTs. Studies betokened that the extracted mucilage is a good pharmaceutical adjuvant and concretely a disintegrating agent.

Soy polysaccharide

It is a natural superdisintegrants that does not contain any starch or sugar so can be utilized in nutritional products. Halakatti *et al*. 2010 evaluated soy polysaccharide (a group of high molecular weight polysaccharides obtained from soybeans) as a disintegrant in tablets made by direct compression utilizing lactose and dicalcium phosphate dihydrate as fillers. Soy polysaccharide performs well as a disintegrating agent in direct compression formulations, with results paralleling those of cross-linked CMC.

Gellan gum

Gellan gum is a water-soluble polysaccharide produced by *Pseudomonas elodea*, a bacterium. Gellan gum is an anionic, high molecular weight, and deacetylated exocellular polysaccharide gum. Antony and Sanghavi 1997 studied the gellan gum as a disintegrant and the efficiency of gum was compared with other conventional disintegrants such as dried corn starch, Explotab, Avicel (pH 10.2), Ac-di-sol, and Kollidon CL. The disintegration of tablet might be due to the instantaneous swelling characteristics of gellan gum when it comes in contact with water and due to its high hydrophilic nature. The consummate disintegration of tablet was proved itself as superior disintegrant.

Mango peel pectin

Mango peel which constitutes 20–25% of the mango processing waste was found to be a good source for the extraction of pectin of good quality, felicitous for the preparation of film, and acceptable jelly. Malviya *et al*. (2011) investigated and found that mango peel pectin stands as a good candidate as superdisintegrant, though not as more strong than synthetic superdisintegrants, due to its good solubility and higher swelling index, it may be utilized in the formulation of fast dispersible tablets.

Lepidium sativum mucilage

L. sativum (family: Cruciferae) is kenned as Asaliyo and is widely utilized as herbal medicine in India. It is widely available in market and has a very low cost. Components used are leaves, root, oil, seeds, and so forth. Seeds contain a higher amount of mucilage, dimeric imidazole alkaloids lepidine B, C, D, E, and F, and two incipient monomeric imidazole alkaloids, semilepidinoside A and B. Mucilage of *L. sativum* has different characteristics such as binding, disintegrating, gelling, and so forth.

Plantago ovata seed mucilage

Psyllium or ispaghula is the prevalent name utilized for several members of the plant genus *Plantago* whose seeds are utilized commercially for the production of mucilage. Mucilage of *Plantago ovate* has different characteristics such as binding, disintegrating, and sustaining properties. In an investigation, fast disintegrating tablets of amlodipine besylate were yare by direct compression method utilizing different concentrations of *Plantago ovate* mucilage as natural superdisintegrants.

Aegle marmelos gum (AMG)

It is obtained from the fruits of *A. marmelos* belonging to the disintegrated faster and consistently than the croscarmellose sodium. The ripened fruit pulp is red in color with mucilaginous and astringent taste. The pulp contains carbohydrates, proteins, Vitamin C, Vitamin A, angelenine, marmeline, dictamine, O-methyl fordinol, and isopentenyl halfordinol. AMG is prepared by the heat treatment technique. It increases the solubility of poorly soluble drugs. Purified, bael gum polysaccharide contains D-galactose (71%), D-galacturonic acid (7%), L-Rhamnose (6.5%), and L-arabinose (12.5%).

Locust bean gum

It is known as carob bean gum. It is a galactomannan vegetable gum extracted from the seeds of carob tree (*Ceratonia siliqua*). Locust bean gum is utilized as a gelling and thickening agent in the food industry and utilized as a bioadhesive, and it enhances the solubility. The gum is a white to yellowish-white, odorless powder. It is insoluble in most organic solvents, including ethanol. It is partially soluble in water at ambient temperature and soluble in hot water and needs heating to above 850 for 10 min for complete solubility.

Ficus indica Fruit Mucilage

The mucilage of ficus indica fruit is utilized as superdisintegrant which is obtained from the pulp of fruit ficus indica. Ficus indica is an astronomically immense tree up to 3 m and very fast-growing with spread branches and aerial roots. The fruits of ficus indica are of the size of a cherry. It has nutritional as well as medicinal value. The dried and uncooked ficus indica fruit gives 230 kcal (963 KJ) of energy per 100 g or 3.5 oz. (ounce). It is utilized in assuaging fever, pain, inflammation, wound rejuvenating, blood quandaries, and urinary quandaries.

Mangifera indica gum

Mundane name of *M. indica* is mango and it belongs to Anacardiaceae family. It is non-toxic and utilized as a disintegrant, binder, suspending agent, and emulsifying agent in different formulations. The gum powder is white to off white in color, and the powder was soluble in water and virtually insoluble in acetone chloroform, ether, methanol, and ethanol.

Hibiscus rosa-sinensis mucilage and treated agar

It is withal called shoe flower plant, China rose, and Chinese hibiscus and belongs to the family Malvaceae. Mucilages are utilized as thickeners, suspending agent, water retention agent, and disintegrants. The plant is facilely available and its leaves contain mucilage and are present in mucilage L-rhamnose, D-galactose, D-galacturonic acid, and D-glucuronic acid. Treated agar is yare by treating it with water for 1 day.

Dehydrated banana powder (DBP)

Banana is additionally called plantain. DBP is yare from the variety of banana called Ethan and nenthran (*nenthra vazha*) and belongs to

the family Musaceae. It contains Vitamin A, so it is utilized in the treatment of gastric ulcer and diarrhea. It withal contains Vitamin B6, which avails in reducing the stress and solicitousness. It is a very good source of energy due to high carbohydrate content, and it contains potassium, which is responsible for more preponderant brain functioning.

Current regulatory status of these polymers

All these polymers are approved by the US FDA. The FDA recognizes these polymers as generally recognized as safe, as listed in the Code of Federal Regulations (CFR 21), for example, chitosan, guar gum, Locust, and bean gum. Gum karaya fully meets all specifications as outlined in the Food Chemicals Codex and may be safely used in foods as described in the Federal Register (21 CFR). Gellan gum is approved as a food additive in the European community under the number E 418, with acceptable daily intake confirming its status as a safe food additive. The gellan gum food grade fully meets the standards and the purity criteria issued in different regions of the world or internationally, such as the Food Chemicals Codex and JECFA, the US Pharmacopoeia/National Formulary, and the European Directives. Hence, these polymers are safe and can be safely used [Table 1].

Table 1: Natural polymers used in fast dissolving tablets

Natural polymer	Marketed drug	Drug disintegration time	Concentration used (%)
Chitin and chitosan	Cinnarizine	60 s	3 w/w
Guar gum	Glipizide	30 s	1 w/w
Gum karaya	Amlodipine, granisetron hydrochloride	17.10 s	4 w/w
Agar and treated agar	Theophylline	20 s	1–2 %w/w
Fenugreek seed mucilage	Metformin HCl	15.6 s	4 w/w
Soy polysaccharide	Lornoxicam	12 s	8 w/w
Gellan gum	Metronidazole	155 s	4 w/w
Mango peel pectin	Aceclofenac	11.59 s	0.1–4 w/w
Lepidium sativum mucilage	Nimesulide	17 s	5–15 w/w
Plantago ovata seed mucilage	Granisetron HCl	17.10 s	5 w/w
Aegle marmelos gum	Aceclofenac	8–18 min	6 w/w
Locust bean gum	Nimesulide	13 s	10 w/w
Lepidium sativum	Nimesulide	17 s	10 w/w
Mangifera indica gum	Metformin HCL, paracetamol	3–8 min	6 w/w
Hibiscus rosa-sinensis mucilage	Aceclofenac	20 s	6 w/w
Dehydrated banana powder	Ondansetron HCl/propranolol, gabapentin	15–36 s	6 w/w

Advantages of natural polymers

The various advantages of natural plant-based materials include the following.

1. Biodegradable: Biodegradable as they are naturally available, and they are produced by all living organisms.
2. Biocompatible and non-toxic: Basically, all of these plant materials are reiterating sugar polysaccharides.
3. Low cost: They are cheaper to utilize as natural sources. The production cost is less compared with synthetic material. India and many other developing countries are dependent on agriculture, and there are substantial amounts of money investment on agriculture.
4. Environmental-friendly processing: There are many types of natural compounds obtained from different *plant* sources which are widely utilized in the pharmaceutical industry and collected in immensely large quantities due to the simple production processes involved.
5. Local availability (especially in developing countries): In India and homogeneous developing countries, there is a promotion for the production of plants as pharmaceutical excipients being done by government, and it withal provides the facilities for bulk production such as gum and mucilage's because of their wide applications in industries.
6. Patient tolerance as well as public acceptance: There is less chance of side and adverse effects with natural materials compared with synthetic one.

Synthetic superdisintegrants

A group of superdisintegrants, including croscarmellose sodium (Ac-Di-Sol) sodium starch glycolate (Primojel and Explotab) and crospovidone (Polyplasdone XL), alleviate most of these problems. The use of the superdisintegrants in a fast dispersible tablet is possible as a tablet shows optimum physical properties.

Advantages of synthetic superdisintegrants

- Effective in lower concentrations than starch.
- Less effect on compressibility and flow ability.
- More effective intragranularly.

Examples of synthetic polymers

- Sodium Starch Glycolate.
- Cross-linked polyvinylpyrrolidone.
- Modified cellulose (croscarmellose sodium, Ac-Di-Sol).
- Resins.

Conclusion

Most of the patients need quick therapeutic action of the drug, resulting in poor compliance with conventional drug therapy which leads to reduced overall therapy effectiveness. MDT is designed to release the medicaments with an enhanced rate. Superdisintegrants play a critical role in the formulation of MDT. These agents help and facilitate tablets to disperse into its smaller fragments. It is

observed that natural disintegrant has more preponderant effects on fast dissolving tablets than synthetic disintegrant. It is also seen from the literature review that natural disintegrant is preferred over synthetic disintegrant as they are non-toxic, easily available at low cost, utilized in low concentration, and are naturally extracted. Natural superdisintegrants exhibit faster drug dissolution and increased bioavailability, thereby availing in efficacious therapy and improved patient compliance. Thus, it can be concluded that the natural superdisintegrant can be efficaciously utilized as a disintegrant in mouth dissolving tablet formulations.

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