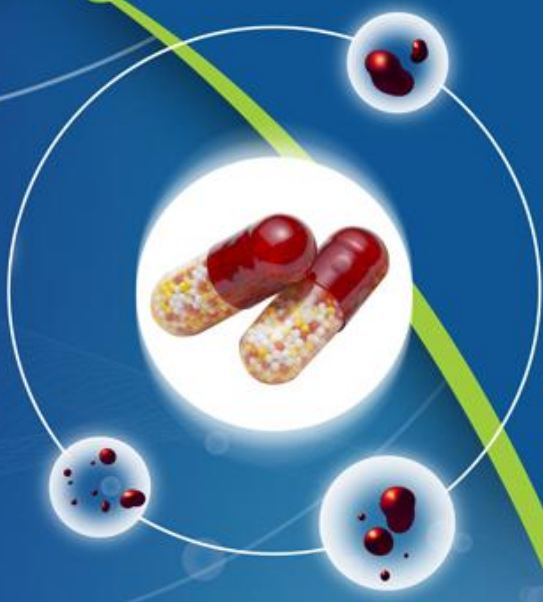
ISSN : 2320 4850

BI MONTHLY

Asian Journal of Pharmaceutical Research And Development

(An International Peer Reviewed Journal of Pharmaceutical Research and Development)



AJPRD

Volume - 02 Issue - 04 JUL-AUG 2014

website: www.ajprd.com
editor@ajprd.com

Asian Journal of Pharmaceutical Research and Development
(An International Peer-Reviewed Journal of Pharmaceutical Research and Development)
www.ajprd.com
ISSN 2320-4850

Review Article

SUPERDISINTEGRATION: A REVIEW UPDATE AND APPLICATION

Ramakant M. Narke*,D. S. Kaspate, G. S. Kulkarni, R. B. Chintamani

Department of Pharmaceutics, University of Pune, RJSPM'S Institute of Pharmacy, Pune, Maharashtra, India

Department of Quality Assurance Techniques, University of Pune, AISSMS College of Pharmacy, Pune, Maharashtra, India

***Received:* October 2014** ***Revised and Accepted:* October 2014**

ABSTRACT:

The need of improved palatability in orally administered products has encouraged the development of numerous formulations with improved performance and acceptability. Orally disintegrating tablets are an emerging trend in novel drug delivery system and have received ever-increasing demand during the last few decades. The field has become a rapidly growing area in the pharmaceutical industry and gaining popularity due to ease of administration and better patient compliance especially for geriatric and pediatric patients. Disintegration plays a most important role in improving the drug activity and hence increases the patient compatibility. The therapeutic activity of the formulations is obtained by disintegration followed by dissolution. The inclusion of right disintegrant is a prerequisite to get optimal bioavailability in tablets and capsules. Disintegrants are the substances that cause the rapid disintegration of the capsules or tablets into smaller particles that dissolves more rapidly than in the absence of the disintegrants. On the other hand superdisintegrants, as it name suggests superior to disintegrants are the substances which facilitates or increases the disintegration time even at low level ,typically 1-10% by weight relative to the total weight of the dosage unit. This review is focused on a variety of natural and synthetic superdisintegrants and their modification to improve disintegration property and efficiency.

Keywords: *Disintegrants, Tablets, Superdisintegrants, Patient compliance.*

INTRODUCTION:

An oral solid dosage form should dually diffuse into the primary particles from which it is prepared. The addition of the right disintegrant is a requirement to get optimal bioavailability in tablets and capsules which need rapid disintegration. Oral route of drug administration is perhaps most useful and important route for drug delivery [1,2]. Tablets are the most favored oral solid dosage form mainly because of several advantages like:

**Corresponding Author:*
Ramakant M. Narke
Parasmani Niwas, Near Tapovan Mandir Road, Pimpri Pune-411017.
Contact no.: 9975010041
Email id: rmkntnarke55@gmail.com

- *Ease of administration*
- *Good chemical and microbiological stability*
- *Easy to swallowing*
- *Lowest cost among all other solid dosage form*
- *Dose precision and least content variability*
- *Ease of packing*
- *Self –medication*
- *Patient compliance*

DISINTEGRANTS:

Disintegrants are agents added to tablet (and some encapsulated) formulations to promote the breakup of the tablet (and capsule "slugs") into smaller fragments in an aqueous environment thereby increasing the available surface area and promoting a more rapid

release of the drug substance. They promote moisture penetration and dispersion of the tablet matrix. A disintegrant used in granulated formulation processes can be more effective if used both "intragranularly" and "extra-granularly" thereby acting to break the tablet up into granules and having the granules further disintegrate to release the drug substance into solution. Most common tablets are those anticipated to be swallowed whole and to disintegrate and release their medicaments rapidly in the gastrointestinal tract (GIT). The proper choice of disintegrant and its consistency of performance are of significant importance to the formulation development of such tablets [3].

SUPERDISINTEGRANTS:

In more recent years, increasing attention has been paid to formulating not only fast dissolving and/or disintegrating tablets that are swallowed, but also orally disintegrating tablets that are anticipated to dissolve and/or disintegrate rapidly in the mouth. The task of developing rapidly disintegrating tablets is accomplished by using a suitable superdisintegrants. Superdisintegrants are those substances which facilitate the faster disintegration with smaller quantity in contrast to disintegrants. Various categories of superdisintegrants such as synthetic, semi-synthetic, natural and co-processed blends etc. have been employed to develop effective mouth dissolving tablets and to overcome the limitations of conventional tablet dosage forms. Superdisintegrants are used to improve the efficacy of solid dosage forms. This is achieved by decreasing the disintegration time which in turn enhances the drug dissolution rate [4].

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. The disintegration of dosage forms are depends upon various physical factors of Disintegrants /superdisintegrants. They are as follows [5, 6]:

- *Percentage of disintegrants present in the formulation.*
- *Proportion of disintegrants used.*
- *Compatibility with other excipients.*
- *Presence of surfactants.*
- *Hardness of the tablets.*
- *Nature of Drug substances.*
- *Mixing and types of addition*

IDEAL CHARACTERISTICS OF SUPERDISINTEGRANTS:

The following ideal characters of superdisintegrants are included here [7- 9]:

- *Poor water solubility with good hydration capacity*
- *Poor gel formation*
- *Good compressibility*
- *Inert*
- *Non-toxic*
- *Good flow properties*
- *Requirement of least quantity*
- *Good mouth feel*
- *Particle size*

GOOD COMPRESSIBILITY AND FLOW PROPERTIES

If the powders have 12-16% compressibility, they are said to be good flow powders. Crospovidones are extensively more compressible than other superdisintegrants.

POOR SOLUBILITY

The solubility of the major element in a tablet formulation can affect both the rate and the mechanism of tablet disintegration. Water soluble materials tend to dissolve rather than disintegrate, while insoluble materials generally produce quickly disintegrating tablets.

POOR GEL FORMATION CAPACITY

Gels can postponement dissolution as the drug must first diffuse through the gel layer before being released into the body. Sodium starch glycolate is used as superdisintegrant in tablet formulation at a concentration of 4-6%.

GOOD HYDRATION CAPACITY

Drugs or other excipients, which are hydrophobic and could be adsorbed on disintegrant surfaces, advertently control the extent of hydration and the efficacy of these disintegrants. Addition of fast disintegrants of high hydration capability is reported to reduce this problem, and therefore, enhance dissolution.

COMPLEXATION

Anionic disintegrants like croscarmellose sodium and sodium starch glycolate may complex with cationic drug actives and slow dissolution. Crospovidone a non-ionic polymer does not interact with cationic drug actives to hold up drug release. The effects of superdisintegrants like croscarmellose sodium, sodium starch glycolate and polyplasdone XL on the dissolution performance of several cationic drugs with varying water solubility reports that polyplasdone XL had a more rapid dissolution rate for the model cationic drugs, irrespective of their aqueous solubilities.

ADVANTAGES OF SUPERDISINTEGRANTS:

Superdisintegrants combine the advantages of both liquid and conventional tablet formulations and at the same time, offer added advantages over both the traditional dosage forms [10 - 12].

ENHANCED BIOAVAILABILITY

Pregastric absorption of drugs result in enhanced bioavailability and as a result of reduced dosage; improved clinical performance.

FAST ACTION

Fast onset of therapeutic action as tablet gets disintegrated rapidly along with quick dissolution and absorption in oral cavity. Hence, it is advantageous in cases such as motion sickness, sudden episodes of allergic attack or coughing.

PATIENT COMPLIANCE

No need of water to swallow the dosage form. Hence, it is convenient for traveling patients and busy people who do not have immediate access to water.

EASE OF ADMINISTRATION

Convenient to administer specially for geriatric, paediatric, mentally disabled and stubborn patients who have difficulty in swallowing.

ACCURATE DOSING

Being unit solid dosage form, provide luxury of accurate dosing, allows high drug loading and an ideal substitute for paediatric and geriatric patients.

OBSTRUCTION FREE

No risk of suffocation in airways due to physical obstruction when swallowed, thus providing improved safety and compliance.

IMPROVED PALATABILITY

Leaves minimal or no residue in mouth hence provides good mouth feel and also, taste masking technique is used to keep away from the bitter taste of drug.

GOOD STABILITY

Superdisintegrants has good stability because of less sensitivity to environmental conditions.

SIMPLE PACKAGING

It can be packaged in push through blisters. Hence, no need of specific packaging.

BUSINESS AVENUES

Provide new business opportunities in the form of product discrimination, product promotion, line extension, uniqueness and life cycle management.

COST EFFECTIVE

Proves to be cost effective due to lower production, packaging and distribution cost compared to other commercially available products.

VERSATILE TECHNOLOGY

As this technology is versatile therefore suitable for the development of enhanced products for veterinary medicines, OTC, Rx medicines.

DISADVANTAGE OF SUPERDISINTEGRANTS:

Superdisintegrants have great resemblance for water that can impact the stability of moisture sensitive material under accelerated stability storage condition [13].

MECHANISM OF SUPERDISINTEGRANTS:

Superdisintegrants provide quick disintegration due to combined effect of swelling and water absorption by the formulation. Due to swelling of superdisintegrants, the wetted surface of the carrier increases, this promotes the wettability and dispersibility of the system, thus enhancing the disintegration and dissolution. The optimal concentration of the superdisintegrant can be selected according to critical concentration of disintegrant. Below this concentration, the tablet disintegration time is inversely proportional to the concentration of the superdisintegrant, whereas if concentration of superdisintegrant is above critical concentration, the disintegration time remains almost constant or even increases [4].

The following mechanisms of superdisintegrants are given below:

- *Swelling action*
- *Capillary action (Wicking)*
- *Combination action*
- *Heat of wetting*
- *Enzyme reaction*
- *Deformation recovery*
- *Particle repulsive forces/ due to disintegrating particle*

SWELLING ACTION

Swelling is widely accepted mechanism for tablet disintegration. Although water infiltration is a necessary first step for disintegration. Particles of disintegrants swell on coming in contact with suitable medium the adhesiveness of the other ingredient in tablet is overcome causing the tablet to fall apart shown in Figure 1. Tablets with high porosity show poor disintegration due to lack of enough swelling force. On the other hand, sufficient swelling force is exerted in the tablet with low porosity. It is worthwhile to note that if the packing fraction is very high, fluid is unable to penetrate in the tablet and disintegration is again slows down.

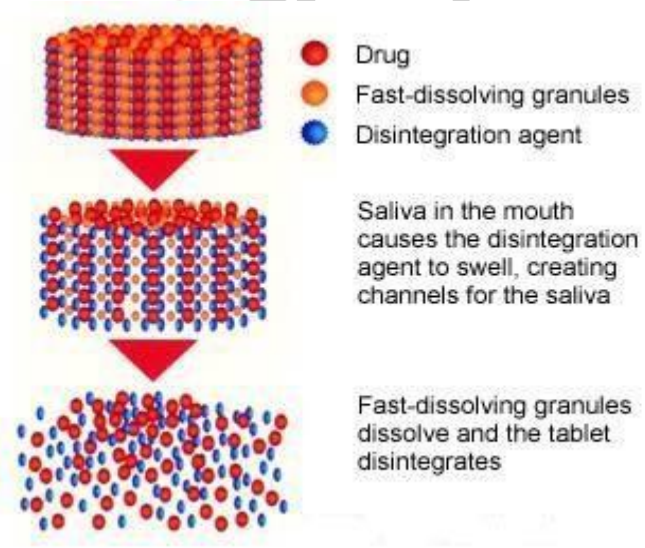


Figure: 1 Swelling Action

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 shown in Figure 2.

When we put the tablet into suitable aqueous medium, the medium penetrates into the tablet and replaces the air adsorbed on the particles, which weakens the intermolecular bond and breaks the tablet into fine particles. Water uptake by tablet depends upon hydrophilicity of the drug/excipient and on tableting conditions. For these types of disintegrants maintenance of porous structure and low interfacial tension towards aqueous fluid is necessary which helps in disintegration by creating a hydrophilic network around the drug particles [8].

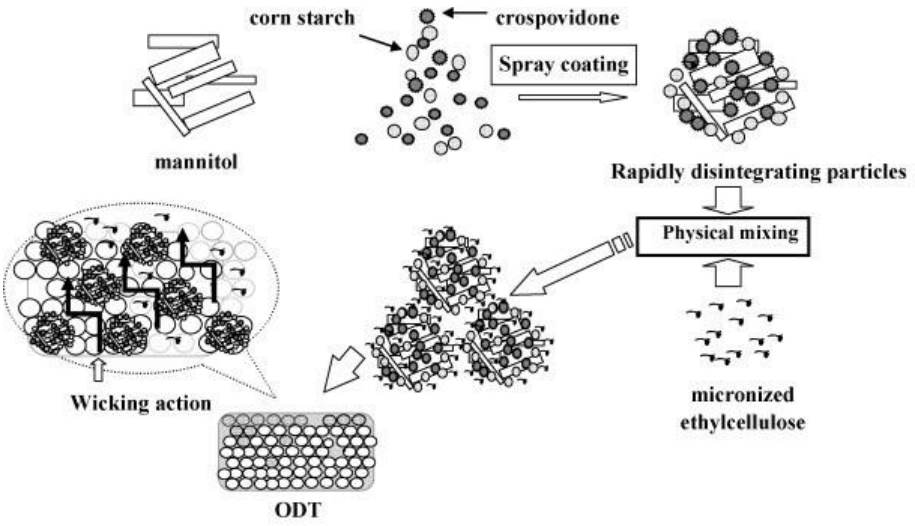


Figure: 2 Capillary Action

COMBINATION ACTION

In this mechanism, the combination of both wicking and swelling action facilitate disintegration.

HEAT OF WETTING

When disintegrants with exothermic properties get wetted, localized stress is formed due to capillary air expansion, which aids in disintegration of tablet. This explanation, however, is limited to only a few types of disintegrants and cannot describe the action of most modern disintegrating agents.

ENZYME REACTION

Enzymes present in the body also act as disintegrants. This enzyme does the binding action of binder and helps in disintegration. Due to swelling, pressure is exerted in the outer direction that causes the tablet to burst or the accelerated absorption of water leads to an enormous increase in the volume of granules to promote disintegration [8].

DEFORMATION RECOVERY

This mechanism had proved that during tablet compression, disintegrated particles get deformed and these deformed particles get into their normal structure when they come in contact with aqueous media or water shown in Figure 3.

Occasionally, the swelling capacity of starch was improved when granules were widely deformed during compression. In case of starch (such as potato starch and corn starch) are believed to be elastic in nature, but due to high compaction force in case of tableting the elasticity deformed to plasticity with energy rich potential. When these tablets are exposed to aqueous environment, the energy potential of deformed starch grain will be triggered to cause disintegration [7, 14].

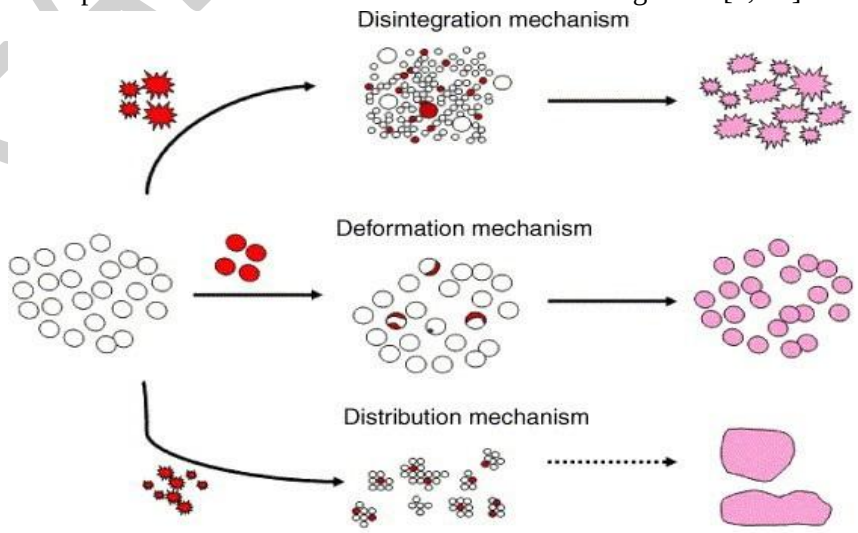


Figure: 3 Deformation Action

PARTICLE REPULSIVE FORCES/ DUE TO DISINTEGRATING PARTICLE

This is another mechanism of disintegration that attempts to explain the swelling of tablet made with non-swellable disintegrants. According to Guyot-Hermann's particle-particle repulsion theory, water penetrates into tablet through hydrophilic pores and a continuous starch network is created that can convey water from one particle to the next, imparting a significant hydrostatic pressure.

The water then penetrates between starch grains because of its affinity for starch surfaces, thereby breaking hydrogen bonds and other forces holding the tablet together shown in Figure 4. The electric repulsive forces between particles are the mechanism of disintegration and water is required for it. Researcher found that particle repulsion force is secondary to wicking [8, 14, 15].

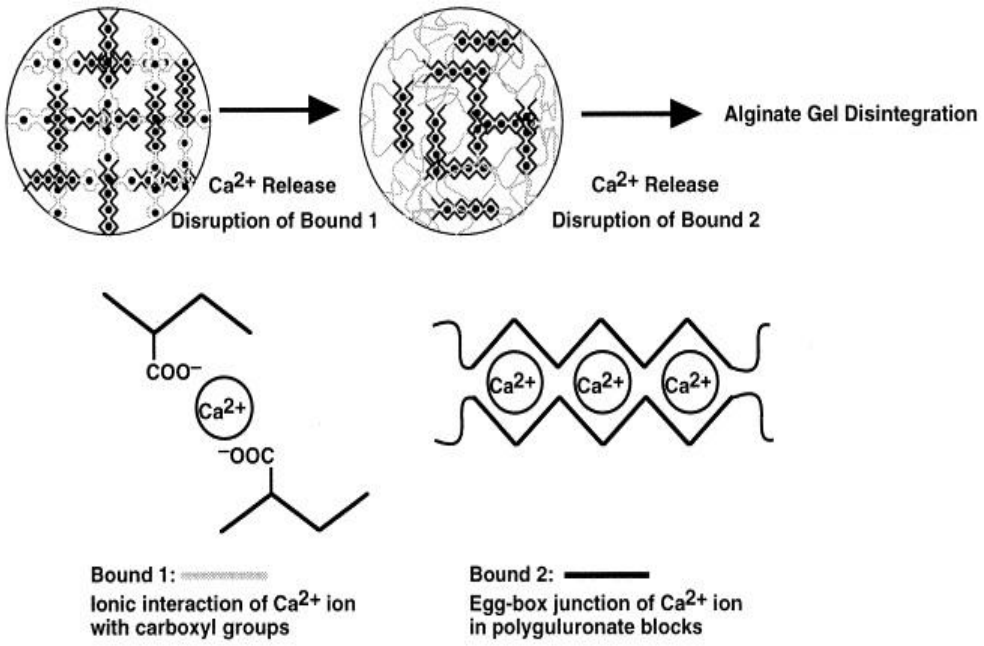


Figure: 4 Repulsive Force Action

TYPES OF SUPER DISINTEGRANTS:

Two types of Superdisintegrants:

- *Natural superdisintegrants*
- *Synthetic superdisintegrants*

NATURAL SUPERDISINTEGRANTS:

These superdisinegrating agents are natural in origin and are preferred over synthetic substances because they are comparatively cheaper, abundantly available, non-irritating and nontoxic in nature. The natural materials like gums and mucilage have been extensively used in the field of drug delivery for their easy availability, cost effectiveness, Eco friendliness, emollient and non-irritant nature, non-toxicity, capable of multitude of chemical modifications, potentially degradable and compatible due to natural origin. There are several gums and mucilage are available which have super-disintegrating activity [16].

PLANTAGO OVATA SEED MUCILAGE (ISAPGULA)

Isapghula consists of dried seeds of the plant plantago ovata and it contains mucilage which is present in the epidermis of the seeds. The seeds of *Plantago ovate were* soaked in distilled water for 48 hrs and then boiled for few minutes for complete release of mucilage into water. The material was squeezed through muslin cloth for filtering and separating out the marc. Then, an equal volume of acetone was added to the filtrate so as to precipitate the mucilage. The separated mucilage was dried in oven at temperature less than 60°C [17]. The mucilage of *plantago ovata* is a recent innovation for its superdisintegration property when compared with Crospovidone. It shows

faster disintegration time than the superdisintegrant crosspovidone [18, 19].

LEPIDIUM SATIVUM MUCILAGE

Lepidiumsativum (family: Cruciferae) is known as a saliyo and is widely used as herbal medicine in India. It is widely available in market and has very low cost. Parts used are leaves, root, oil, seeds etc. Seeds contain higheramount of mucilage, dimeric imidazole alkaloids lepidine B, C, D, E and F and two new monomeric imidazole alkaloids semilepidinoside A and B. Mucilage of Lepidiumsativumhas various characteristic like binding, disintegrating, gelling agents [20].

FANUGREEK SEED MUCILAGE

Trigonella Foenum-graceum, commonly known as Fenugreek, is an herbaceous plant of the leguminous family. It has found wide applications as a food, a food additive, and as a traditional medicine. The leaves and both the ripe and unripe seeds of TrigonellaFoenum-graceumare used as vegetables. Fenugreek has been used in treating colic flatulence, dysentery, diarrhoea, dyspepsia with loss of appetite, chronic cough, dropsy, enlargement of liver and spleen, rickets, gout, and diabetes. It is also used as gastro protective, antiurolithiatic, diuretic, antidandruff agent, Anti-inflammatory agent and as antioxidant. The seed is stated to be a tonic [21].

It also is used in post-natal care and to increase lactation in nursing mothers. Fenugreek seeds contain a high percentage of mucilage (a natural gummy substance present in the coatings of many seeds). Although 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. The resulting soft mass is not absorbed by the body, but instead passes through the intestines and triggers intestinal muscle contractions [22].

GUAR GUM

Guar gum is a galactomannan, commonly used in cosmetics, food products and in pharmaceutical formulations. Guar gum is mainly consisting of the high molecular weight (approximately 50,000-8,000,000) polysaccharides composed of galactomannans and is obtained from the endosperm of the seed of the guar plant, Cyamopsistetragonaloba (L) Taub. (Synonym-Cyamopsispsoraloides). It is used as thickener, stabilizer and emulsifier, and approved in most areas of the world (e.g. EU, USA, Japan, and Australia) [23]. Its synonyms are Galactosol; guar flour; jaguar gum; meprogat; meyprodor.

It has also been investigated in the preparation of sustained release matrix tablets in the place of cellulose derivatives such as methylcellulose. In pharmaceuticals, guar gum is used in solid-dosage forms as a binder and disintegrant, and in oral and topical products as a suspending, thickening, and stabilizing agent, and also as a controlled-release carrier. Guar gum has also been examined for use in colonic drug delivery [24].

GUM KARAYA

Gum Karaya is a negative colloid and a complex polysaccharide of high molecular weight. On hydrolysis it yields galactose, rhamnose and galacturonic acid. Gum Karaya occurs as a partially acetylated derivative. It is a dried exudation of *sterculia Urenstree* (Family - Sterculiaceae). Its synonyms are Karaya, sterculia, Indiantragacanth, Bassoratragacanth, kadaya, Kadira, katila. Gum Karaya is compatible with other plant hydrocolloids as well as proteins and carbohydrates [25].

CASSIA FISTULA GUM

Seeds of *Cassia fistula* gum obtained from cassia fistula tree. Gum obtained from the seeds of *Cassia fistula* comprises β-(1→4) linked d-mannopyranose units with random distribution of _α (1→6) linked d-galactopyranose units as side chain having mannose:galactose ratio of 3.0). Carboxymethylation as well as carbamoylethylation of Cassia gum is reported to improve cold water solubility, improve viscosity and increase microbial resistance as compared to native gum Therefore, an attempt was made to incorporate calcium or sodium salts of carboxymethylated or carbamoylethylated *C. fistula* gum as

superdisintegrant in the formulation development of FDT.

LOCUST BEAN GUM

Locust bean gum is extracted from the endosperm of the seeds of the carob tree *Ceretonia siliqua*, which grows in Mediterranean countries. It is also called Carob bean gum. Some other familiar polysaccharides are starch and cellulose, which are made of long chains of the sugar glucose. In locust bean gum, the ratio of mannose to galactose is higher than in guar gum, giving it slightly different properties, and allowing the two gums to interact synergistically so that together they make a thicker gel than either one alone.

It shows binder and disintegrant property at different concentrations. Pharmaceutical Locust bean gum has been widely used in food industry as a thickening and gelling agent. Locust bean gum has also been reported to have bioadhesive and solubility enhancement properties. There are various reports that Locust bean gum can be used in pharmaceutical and biotechnological purpose.

CO-PROCESSED SUPERDISINTEGRANT

New and improved superdisintegrants continue to be developed to meet the needs of advanced tablet manufacturing. It requires the development of various added functionality excipients, which are used to achieve formulations with desired end effects. Until now only superdisintegrants are available to prepare the dosage forms, but now days different blend of excipients are available which can give disintegration property.

SYNTHETIC SUPERDISINTEGRANTS

A group of superdisintegrants including croscamellose sodium (Ac-Di-Sol), sodium starch glycolate (Primojeland Explotab) and crospovidone (Polyplasdone XL) alleviate most of these problems. Use of the superdisintegrants in fast dispersible tablet is possible as tablet shows optimum physical properties [26, 27].

ADVANTAGES OF SYNTHETIC SUPERDISINTEGRANTS:

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

LIMITATIONS OF SYNTHETIC SUPERDISINTEGRANTS:

- *More hygroscopic (may be a problem with moisture sensitive drugs).*
- *Some are anionic and may cause some slight in-vitro binding with cationic drugs (not a problem in-vivo).*
- *An acidic medium significantly reduces the liquid uptake rate and capacity of sodium starch glycolate and crosscarmellose sodium, but not crospovidone.*
- *The degree of swelling of Primojel (sodium starch glycolate) and Polyplasdone XL101 (crosspovidone) is minimized following wet granulation formulation. Finally, the medium ionic strength was found to have an adverse effect on the swelling capacity of crosscarmellose* [8, 14, 15].

SODIUM STARCH GLYCOLATE: (EXPLOTAB, PRIMOGEL)

Sodium starch glycolate is widely used in oral pharmaceuticals as a disintegrant in capsule and tablet formulations. It is recommended to use in tablets prepared by either direct-compression or wet-granulation processes. The recommended concentration in a formulation is 2-8%, with the optimum concentration about 4% although in many cases 2% is sufficient. Disintegration occurs by rapid uptake of water followed by rapid and enormous swelling.

The disintegrant efficiency of sodium starch glycolate is unimpaired in the presence of hydrophobic excipients, such as lubricants unlike many other disintegrants. Increasing the tablet compression pressure also appears to have no effect on disintegration time. These are modified starches with dramatic disintegrating properties and are available as explotab and primogel which are low substituted carboxy methyl starches. Explotab consists of granules that absorb water rapidly and swell. The mechanism by which this action takes place involves rapid absorption of water leading to an enormous increase in volume of granules result in rapid and uniform

disintegration. The natural pre-dried starches swell in water to the extent of 10-20 percent and the modified starches increase in volume by 200-300 percent in water [28].

MODIFIED CELLULOSE (CROSCARMELLOSE SODIUM, AC-DI-SOL)

Croscarmellose sodium is described as a cross-linked polymer of carboxy methyl cellulose (CMC). This polymer is different in synthesis and structure as compare to Sodium starch glycolate. Most importantly, the degree of substitution using Williamson‟s ether synthesis of croscarmellose sodium is higher than that of sodium starch glycolate, and the mechanism of crosslinking is also different [29 - 30].

RESINS (ION EXCHANGE RESIN)

The INDION 414 and KYRON 314 have been used as a superdisintegrant for ODT. It is chemically cross-linked polyacrylic potassium (Polacrillin potassium), with a functional group of – COO – and the standard ionic form is K+. It has a high water uptake capacity. It is a high purity pharmaceutical grade weak acid cation exchange resin supplied as a dry powder. It is an extremely effective tablet disintegrant which provides the necessary hardness and chemical stability to the tablet. The product swells up to a very great extend when in contact with water or gastrointestinal fluids causing rapid disintegration without the formation of lumps. It is a high molecular weight polymer; therefore it is not absorbed by the human tissues and totally safe for human consumption [31 - 33].

L-HPC (LOW SUBSTITUTED HYDROXYL-PROPYL CELLULOSE)

Insoluble in water rapidly swells in water. Greatest degree of swelling is exhibited by Grades LH-11 & LH-21. Certain grades while retaining disintegration capacity can also offer some binding properties. Recommended concentration is 1-5%. The main advantages of synthetic super disintegrants are their efficacy in lower concentrations than starch, less intervention with compressibility and flow ability. They are also more effective intragranularly [34 - 35].

CROSS-LINKED POLYVINYL PYRROLIDONE (CROSPOVIDONE, POLYPLASDONE XL, XL10):

Crospovidone quickly wicks saliva into the tablet to generate the volume expansion and hydrostatic pressures essential to provide rapid disintegration in the mouth. Unlike other superdisintegrants, which rely mainly on swelling for disintegration, Crospovidone superdisintegrants use a combination of swelling and wicking. When examined under a scanning electron microscope, crospovidone particles appear granular and highly porous. This unique, porous particle morphology facilitates wicking of liquid into the tablet and particles to generate rapid disintegration. Due to its high crosslink density, crospovidone swells rapidly in water without gelling. Other superdisintegrants have a lower crosslink density and, as a result, form gels when fully hydrated, particularly at the higher use levels in ODT formulations. Swells very little and returns to original size after compression but act by capillary action [36 - 38].

SOME APPLICATIONS OF SUPER-DISINTEGRANTS:

FAST DISINTEGRATING TABLETS

A fast disintegrating tablet comprising Nimesulide and one or more disintegrants. In this research superdisintegrants used are croscarmellose cellulose, crospovidone and sodium starch glycolate.

DISINTEGRATING LOADABLE TABLETS

A disintegrating loadable tablet product in compressed form. A disintegrant or a mixture of disintegrants has a) porosity of 45% v/v or more, b) a hardness of at least 20 Newton, and c) a loading capacity of at least 30% of a liquid.

RAPIDLY DISINTEGRATING TABLET

The study relates to rapidly disintegrating tablets intended to be used as orodispersible tablets or dispersible tablets. The tablets include silicified microsrystalline cellulose. They are especially suitable for antibiotics.

Rapidly disintegrating tablets which contain amoxicillin and clavulanic acid are also described

PHARMACEUTICAL SUPERDISINTEGRANT

Superdisintegrants which provide enhanced compressibility compared to prior art superdisintegrants. The superdisintegrants include a particulate agglomerate of coprocessed starch or cellulose and a sufficient amount of an augmenting agent to increase the compactibility of the superdisintegrant.

RAPIDLY DISINTEGRATING ENZYME-CONTAINING SOLID ORAL DOSAGE COMPOSITIONS

Invention relates to rapidly disintegrating solid oral dosage forms having an effective amount of an enzyme and a superdisintegrant. The enzyme lactase is claimed in this patent for solid oral formulations.

METHOD OF PRODUCING FAST DISSOLVING TABLETS

The method does not involve any granulation step, thereby making the process more energy efficient and cost effective. The fast dissolving sugar alcohol is selected from the group comprising: mannitol; sorbitol; erythritol; xylitol; lactose; dextrose; and sucrose. The active component is suitably provided in the form of microparticles or microcapsules having an average diameter of less than 125 microns.

CONCLUSION

With the help of various and different types of superdisintegrants patient compliance, a commercial and therapeutic benefit has improved. At a time when formulators are faced with increasing numbers of weakly soluble drugs, it is very important to select superdisintegrants that maximize drug dissolution. With the improvement in the formulation of solid disintegrating tablets, it has now become possible to formulate these tablets with lesser amount of superdisintegrants. Rapidly disintegrate solid dosage forms have been successfully commercialized by using various kinds of superdisintegrants. Due to rapid acceptance of solid disintgrating tablets by patients and pharmaceutical companies, the market for this dosage form is increasing and the product pipeline rapidly but without the field of superdisintegrants it would not have been possible.

REFERENCES

1. *Gohel M.D., et al., Preparation and Assessment of Novel co-processed Superdisintegrant consisting of Crospovidone and Sodium Starch Glycolate: A Technical Note, AAPS PharmSci Tech, 2007; 8(1): E1-E6.D.*
2. *Bhowmik C. B., Krishnakanth P., Chandira R. M., Fast Dissolving Tablet: An Overview, Journal of Chemical and Pharmaceutical Research, 2009; 1(1): 163-177.*
3. *Mohanachandran PS., Sindhumol PG., Kiran TS., Superdisintegrants: An Overview, International Journal of Pharmaceutical Sciences Review and Research, 2011; 6:105-109.*
4. *Kaur T., et al; Mouth Dissolving Tablets: A Novel Approach to Drug Delivery, International Journal of Current Pharmaceutical Research, 2007; 3:1-7.*
5. *Schimidt P C., Brogramann B, Pharmaceutical Technology, 1988; 34: 22.*
6. *Cohen Y., Lach J L., Journal of Pharmaceutical Sciences, 1963; 52:122.*
7. *Shihora H., Panda S, Superdisintegrants, utility in Dosage Forms: A Quick Review, Journal of Pharmaceutical Science and Biosientipic Resarch. 2011; 1(3): 148-153.*
8. *Pahwa R., Gupta N, Superdisintegrants in the Development of Orally Disintegrating Tablets: A Review, International Journal of Pharmaceutical Sciences and Research, 2011; 2(11): 2767-2780.*
9. *Sharma V., Arora V., Ray C., Use of Natural superdisintegrant in Mouth Dissolving Tablet an Emerging Trend, International Bulletin of Drug Research, 2010; 1(2): 46-54.*
10. *Pahwa R., Piplani M., Sharma PC., Kaushik D., Nanda S., Orally disintegrating tablets – friendly to pediatrics and geriatrics, Archives of Applied Science Research, 2010; 2(2): 35-48.*
11. *Vaibhav S., Mahaveer PK., Gupta MK., Agarwal D., Sharma N, Orally disintegrating tablet: friendly dosage form, International Journal of Research in Ayurveda and Pharmacy, 2010; 1(2): 399-407.*
12. *Deshmukh KR., Vidyanand P., Shekhar V., Kumar PA., Dewangan P, A review on mouth dissolving tablet techniques, International Journal of Research in Ayurveda and Pharmacy, 2011; 2(1): 66-74.*
13. *Charles R., Laura K, Evaluation of a Partially Pre-gelatinized Starch in Comparison with Superdisintegrants in a Direct-Compression Hydrochlorothiazide Formulation, American Association of Pharmaceutical Scientists, 1999; 1-6,.*
14. *Vimal V Aarathi., John SB., Superdisintegrants in Fast Disintegrating Drug Delivery Systems: A Brief Review. International Journal of Pharmacy, 2013; 3(2): 380-385.*
15. *Mangal M., Thakral S., Goswami M., Ghai P, Superdisintegrants: An Updated Review..International Journal of Pharmacy and Pharmaceutical Science Research, 2012; 2(2): 26-35.*

16. Khinchi MP., Gupta MK., Bhandari A., Agarwal D., Sharma N, Studies on the Disintegrant Properties of Seed Powder, Husk Powder and Mucilage of Plantago Ovata By Formulation of Orally Disintegrating Tablet, International Journal of Pharmaceutical Sciences and Research, 2011; Vol.2:145-152.
17. Jyothi G., Lakshmi PK, Comparative evaluation of natural and synthetic superdisintegrants with newer superdisintegrant Kyron T-314, Acta Pharmaceutica Sciencia, 2011; 35-44.
18. Deveswaran R., Bharath S., Furtado S., Basavaraj BV., Abraham S., Madhavan V, Studies on the Disintegrant properties of Mucilage and Seed Powder of Plantago ovata, International Journal of ChemTech Research, 2009; 1 :621-626.
19. Shirsand S., Suresh S., Para M, Swamy P, Kumar DN, Plantago ovata mucilage in the design of fast disintegrating tablets, Indian Journal OfPhrmaceutical Science, 2009; 71:41-45.
20. Mehta KK., Patel HH., Patel ND., Vora CN., Patel NJ, Comparative Evaluation of Natural And Synthetic Superdisintegrant For Promoting Nimesulide Dissolution For Fast Dissolving Technology, International Journal of Pharmacy And Pharmaceutical Sciences, 2010; 1:102-108.
21. Malviya R., Srivastava P., Kulkarni GT, Applications of Mucilages in Drug Delivery A Review, Advances in Biological Research, 2011; 5:1-7.
22. Kumar R., Patil S., Patil MB., Patil SR., Paschapur MS, Isolation and Evaluation of Disintegrant Properties of Fenugreek Seed Mucilage, International Journal of Pharm Tech Research, IJPRIF, 2009; 1: 982-996.
23. Kawamura Y, Guar Gum Chemical and Technical Assessment. JECFA, 2008; 69:1-4.
24. Chudzikowski RJ, Guar gum and its Application, J SocCosmt Chem, 1971; 22: 43-60.
25. Bansal N., Sharma G, Formulation and Evaluation of Orally Disintegrating Tablets of Ondansetron Hydrochloride Using Natural Superdisintegrants, International Journal of Pharmtech Research, IJPRIF, 2011; 1616-1621.
26. Bhise S., Chaulang G., Patel P., Patel B, Bhosale A., Hardikar S, Superdisintegrants as solubilizing agent, Research J. Pharm. and Tech, 2009; 2(2):387-391.
27. Bala R., Khanna S., Pawar P, Polymers In Fast Disintegrating Tablet A Review, Asian Journal of Pharmaceutical and Clinical Research, 2012; 5:8-14.
28. Selvi S., Chandrasekhar BS., Perumal P, Orodispersible Tablets of Lornoxicam with Natural and Synthetic Super Disintegrants, International Journal of Pharmacy And Technology, 2011; 3:3130-3142.
29. Kayastha RR., Bhatt NM., Pathak NL., Chudasama AH., Darediya AA, Formulation and Evaluation of Fast Disintegrating Tablet of Diclofenc Sodium, International Journal of Pharmaceutical Research and Development, 2011; 3: 17-22.
30. Zhao N., Augsburger LL, Functionality Comparison of 3 Classes of Superdisintegrants in Promoting Aspirin Tablet Disintegration and Dissolution, AAPS PharmSci Tech, 6 2005; E634-E640.
31. Singh I., Rehni AK., Kalra R., Joshi G., Kumar M., Aboul-Enein HY, Ion Exchange Resins: Drug Delivery and Therapeutic Applications, FABAD J. Pharm. Sci, 2007; 32:91-100.
32. Mahore JG., Wadher KJ., Umekar MJ, Ion Exchange Resins: Pharmaceutical Applications and Recent Advancement, International Journal of Pharmaceutical Sciences Review and Research, 2010; 2:8-13.
33. Saroha K., Mathur P., Verma S., Syan N., Kumar A, Mouth dissolving tablets: An overview on future compaction in oral formulation technologies, Pelagia Research Library, 2010; 1:179-187.
34. Mohanachandran PS, Sindhumol PG, Superdisintegrants: An Overview. International Journal of Pharmaceutical Sciences Review and Research, 2011; 6(1): 105-109.
35. Bhowmik D, Chiranjib B, Yadav J, Chandira RM, Sampath KP. Emerging Trends of Disintegrants used in Formulation of Solid Dosage Form. Scholars Research Library, 2(1): 495-504, 2010.
36. Kiran RS., Vishnu P., Ravendrababu B., Sudeerbabu B., Naveenbabu K., Prasad M, Influence of various super disintegrating agents on the aceclofenac fast dissolving .tablets, Research Journal of Pharmaceutical, Biological and Chemical Sciences, 2011; 2:99-105.
37. Fini A., Bergamante V., Ceschel GC., Ronchi C., Moraes CA, Fast dispersible/slow releasing ibuprofen tablets, European Journal of Pharmaceutics and Biopharmaceutics, 2007; 69:335-341.
38. Fukami J., Yonemochi E., Yoshihashi Y., Terada K, Evaluation of rapidly disintegrating tablets containing glycine and carboxymethylcellulose, International Journal of Pharmaceutics, 2006; 310:101-109.