Original Article

Natural Superdisintegrant: A Key Ingredient for Orodispersible Dosage Form

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GRAPHICAL ABSTRACT

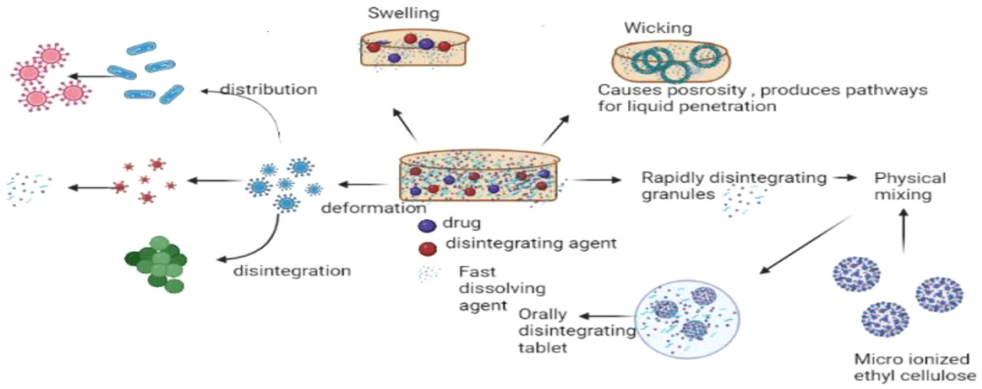

Fig. Graphical representation of the superdisintegrants and its role in oro dispersible dosage form

Abstract

Background: Orally disintegrating tablets have been shown to have better patient compliance and drug solubility than conventional tablets in numerous studies that examined them in vitro and in vivo. However, there are several requirements for the preparation of tablets as orodispersible forms using the pharmaceutical active components. This dosage type can be prepared in a variety of methods, and each manner has advantages and disadvantages. Because of their increased compliance, bioavailability, simplicity of administration, and superior palatability, orodispersible

Objective: Tablets are pharmacological formulations that are used to achieve rapid therapeutic effect. These medications are typically advised for elderly and paediatric patients due to its various benefits, this dosage form is an effective means to deliver the active medication ingredients.

Method: The inclusion criteria for the qualitative literature review are met by Pub Med, Scopus, Web of Science, Google Scholar, Google Books, and Science Direct.

Conclusion: In this review, many types of orodispersible tablets are commercially accessible. Some active medicinal components must be taste masked before into orally disintegrating tablets. Due to this, a certain patient population—including dyslexic, bedridden, psychic, elderly, and paediatric patients—has been drawn to the market by different dose forms. Numerous techniques have recently been developed to improve the fragile dosage forms' capacity to dissolve without losing their integrity.

KEYWORDS: oral disintegration, paediatric, bioavailability, dyslexic, psychic

1 INTRODUCTION

In recent years, oro-dispersible dosage forms have been a prominent new trend in innovative medication delivery technologies. Super-disintegrants are used to increase the effectiveness of solid dosage forms. This is achieved by speeding up drug breakdown by lowering the disintegration time. [1] Disintegrant's are chemicals or mixtures of chemicals that are added to a medicine formulation to help break down or disintegrate the contents of solid dosage forms like tablets and capsules into tiny pieces that dissolve more quickly than they would otherwise.

Superdisintegrants, a new class of agents, have just been created. Effective mouth-dissolving tablets have been produced using superdisintegrants, which can be classed as synthetic, semi-synthetic, natural, or co-processed blends. [2-3] These dosage forms get around the drawbacks of conventional dosage form. Superdisintegrants are generally employed in the solid dose form at modest concentrations (1–10% of the dosage unit's total weight). [4]

Chemicals called super disintegrants aid in accelerating the disintegration process, facilitating the easier release of the active ingredients when the tablet is submerged in a liquid. The majority of dosage forms are acceptable when taken orally, which accounts for between 50 and 60 percent of all dosage forms. [5-6] As long as the diluent or carrier doesn't considerably slow down the rate of drug release and/or absorption, it is permissible from a pharmacological standpoint to be utilised to facilitate quick release. Mouth dissolving, oro-dispersible, or quick dissolving tablets are a type of solid dosage form that dissolves into the saliva in a matter of seconds when placed on the tongue. In the late 1970s, fast-acting dosage distribution systems for paediatric and geriatric patients were created as an alternative to conventional dose forms.[7] The US Food and Drug Administration (FDA) defines a fast-dissolving tablet (FDT) as "a solid dosage form containing an active ingredient or therapeutic ingredient that disintegrates or dissolves rapidly within seconds when deposited upon the tongue."

These modified materials outperform unmodified materials in all respects, including disintegration effectiveness, concentration demand, stability, and others. The majority of dosage forms are designed to be ingested, dissolve, and release their medications quickly in the mouth or gastrointestinal tract, despite growing interest in controlled-release drug delivery methods. [8] Superdisintegrants are simply substances that are added to the tablet granulation to make the crushed tablet shatter or disintegrate when it is exposed to water. Super-disintegrant's accelerate medication release and activity by speeding up the disintegration process, which also accelerates dissolution. Superdisintegrants are novel materials that have recently been created to enhance disintegration processes. The design characteristic of a fast-disintegrating tablet may be obtained by using the proper production technology and excipient selection in the formulation. [9-10]

1.1. Importance of natural superdisintegrants: [11-12]

1. natural superdisintegrant are chosen over synthetic supersdisintegrant because they are relatively cheaper, Non-irritating and non-toxic in nature, Cost effectiveness, Eco friendliness, Compatible due to natural origin.
2. Remarkable tendency on wetting causing rapid disintegration
3. No lump formation on disintegration
4. Compatible with commonly used therapeutical agents and excipient.
5. Work equally effective in hydrophilic and hydrophobic formulations.
6. Provides good mechanical strength to the tablet facilitating easy packing and transportation.

1.2 TYPE OF SUPERDISINTEGRANT:

A. Natural superdisintegrant

B. Synthetic superdisintegrant[13-14]

Table no. 1: List of natural superdisintegrants along with their source of mechanism of action.

s.no	Superdisintegrants name	Source	Mechanism	Reference
1	Mucilage of Lepidus sativum	Mucilage was obtain from the seeds of Lepidus sativum	Swelling	[15]
2	Isapghula husk (Plantago Ovata)0	From the seed of Plantago ovata	Swelling	[16]
3	Hibiscus rosa	sinesis linn Mucilage of hisbiscus rosa sinesis	Swelling	[17]
4	Xanthum gum	Derived from Xanthomonas compestris	Swelling	[18]
5	Agar & treated agar	Dried gelatinous substance obtain from gelidium Amansii and several other species of red algae	High strength gelling property	[19]
6	Guar gum	Isolated from endosperm seed of the guar gum, Cyamopsis	tetragonloba.	[20]

Table no. 2: List of synthetic superdisintegrants along with their source & mechanism of action.

s.no	Superdisintgrants Name	Nature	Mechanism	Properties	References
1	Sodium starch	Modified starch	Abosorb water quickly	Swells in dimension and high level acts as sustained release matrix	[21]
2	Crospovidone	Cross-linked	Combination of swelling and wickin	Water insoluble, spongy in nature	[22]
3	Croscarmellose Sodium	Modified cellulose	Swelling and wicking Within 10 seconds, swells up to 48 folds	Swells in 2 dimension	[23]
4	Croslinked Alginic acid	-	Rapid swelling or wicking	Promotes disintegration in both dry and wet granulation Promotes disintegration in both dry and wet granulation	[24]
5	Ion exchange resins	Cross-linked poly acrylic	Swelling	Has high water uptake capacity and high purity	[25]

				pharmaceutical grade weak acid cation resin supplied in dry form.	

2 NATURAL SUPERDISINTEGRANT BASED ORODISPERSIBLE DOSAGE FORM:

It is essential that the solid dosage forms (tablets, capsules) enter the solution phase as soon as they come in touch with stomach fluid for a quicker commencement of action. But not all medications and formulas as such make this feasible.[26] Superdisintegrants are needed to speed up the disintegration of drug substances since not all drug compounds can dissolve from their formulations as quickly as they should. Faster pharmacological action is necessary for many illnesses or pathological symptoms (such as inflammation, discomfort, and fever), and superdisintegrant play a significant role in achieving this. [27] Faster acting formulations are necessary for diseases including asthma, allergy disorders, bronchitis, motion sickness (kinetosis), angina pectoris, hypertension, hypoglycaemia, etc. that call for immediate pharmacological action. Superdisintegrant play a vital role in these solid dose formulations. [28-30], which have shown enormous potential in biological and medical applications in various type of drug delivery, which is shown in Table no.3

Table 3,list of natural superdisintegrants used in different dosage forms

s. no.	Author	Dosage form	Drug/superdisintegrant	Result	Reference
1.	Vidyadhara Suryadevara *et al.*	orodispersible tablet	Irbesartan/jackfruit seed starch	It was observed that Starch derived from the jackfruit have potential application as tablet disintegrant. In recent studies, researchers have found that the starch extracted from jackfruit had the swelling ability and water uptake profile. It was observed that as the proportion of superdisintegrant is increased in the tablet, the dissolution rate and drug release from the tablets were found to be rapid.	[31]
2.	*Swapna Mane *et al.*	orally disinitegrating tablet	Atenolol/Miriabilis Jalapa starch	The present study conclusively indicates that application of Miriabilis jalapa Starch as a superdisintegrants is promising as fast disintegrating tablets with an In vitro dispersion time of 25±1.0secs, wetting time of 47±0.8 secs and water absorption ratio of 95.52±0.16% and In-vitro fast dissolution profile of 97.92% within 10 minutes.	[32]
3.	Yasser Shahzad ; *et al.*	orodispersible film	Citalopram/okra gum	Okra biopolymer has demonstrated potential application of okra gum as a polymer of choice for making oro dispersible films in combination with HPMC. This study demonstrated for the first time that a flexible and mechanically strong ODF with a fast disintegration time could be formulated using okra and HPMC.	[33]
4.	Gailute Draksiene ; *et.al*	orodispersible tablet	Meloxicam/psyllium husk	This study explains that the application of psyllium husk as a superdisintegrant significantly enhanced the dissolution rate of meloxicam orodispersible tablet. The formulation containing psyllium husk powder showed the lowest wetting time, the highest water absorption ratio, and the lowest disintegration time.	[34]

3 MECHANISMS OF ACTION AND ENABLING FACTORS OF DISINTEGRATION:

Oro dispersible dosage forms are designed to remain as inert as possible in the dry state and to disintegrate rapidly into small particles when exposed to fluids.[35] Consequently, the exposure of the dosage form to water or the disintegration medium is what triggers disintegration. The disintegrants present within the tablets interact with water inducing conformational changes that lead to tablet disintegration. Native starch and microcrystalline cellulose are excipients which are traditionally considered to have disintegration properties.[36]Modern disintegrants which are active at lower concentrations in the formulation compared to the conventional disintegrants are called superdisintegrants. The most used superdisintegrant are natural superdisintegrant in present time. [37]The steps involved in the mechanisms of oro-dispersible dosage forms are: Swelling , Wicking (porosity and capillary action) Heat of wetting ,Chemical reaction, Combination action (swelling and wicking), Deformation recovery, Enzymatic reaction ,Particle repulsive force.

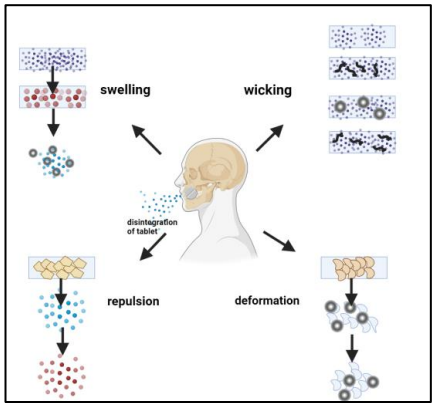

Fig 1., diagram showing the different mechanism of action of natural superdisintegration.[36]

3.1 Mechanism of action:

The 2 main mechanisms of tablet disintegration are swelling and shape-recovery.

Swelling: This mechanism of disintegration relies on the water penetration into the tablet (i.e. wicking), followed by the hydration of the superdisintegrant present within the matrix. The swelling of the hydrated polymer particles appears macroscopically as a three- dimensional (i.e. omni-directional) volumetric expansion of the tablet. [38]. Upon initial swelling, the disintegrant will fill the pore volume within the tablets. Then, the continued swelling generates the force necessary to break the bonds inside the tablet. As bonds break, fragments become detached from the tablet core. Swelling disintegrant should absorb water without gelling. This is because gelling might increase the viscosity within the tablet slowing further wicking and swelling. Moreover, a highly viscous gel might form a plug which acts as a binder, maintaining the matrix integrity and opposing disintegration. To minimise gelling and preserve good swelling ability, modern disintegrants are used.[39]

Shape-recovery: The phases of wicking (the breaking of bonds and the detachment of particles) occur identically as with swelling, However, the volumetric expansion of the disintegrant exposed to fluids occurs only in the axial direction opposite to tablet compression (1D, unidirectional, volumetric expansion) in shape-recovery.[40] Shape-recovery thus depends on the tendency of the disintegrant particles to regain their pre- compression shape when exposed to fluids. It can be considered as a "spring- like mechanism", whereby the disintegrant becomes like a deformed spring due to the compression and then releases the stored energy only when in contact with water.[41] It is intuitive to understand that the disintegration by shape-recovery is generally more efficient when greater pressure is applied during compression, i.e. when the spring is more loaded. For instance, the disintegration time of dicalcium phosphate (DCP) tablets containing 2% XPVP, a shape-recovery disintegrant, increases at decreasing compression forces and tensile strength values of the tablets. At a low compression force of 40 MPa, the tablets could not disintegrate at all.

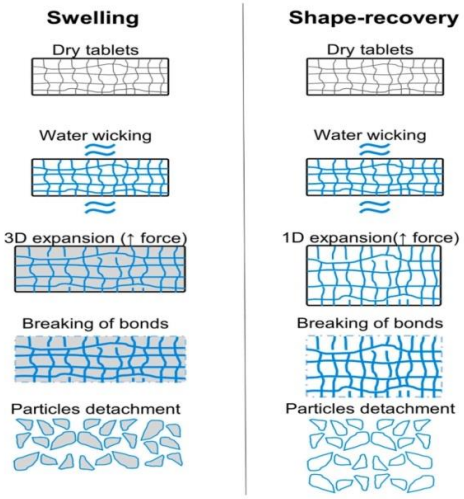

Fig.2., Mechanism of tablet disintegration. The wicking is ideallydepicted as single, rapid and discrete event for reasons of simplicity

3.2 Enabling factors:

Dissolution: Dissolution of soluble ingredients can affect both wicking and disintegration, particularly in tablets containing high concentrations of soluble ingredients. Initially, the liquid surrounding the tablet needs to penetrate through the pores by capillary action, then the dissolution of the soluble ingredients begins as the pore walls become wetted. The wicking and consequent dissolution occur initially near the tablet surface. As the soluble materials dissolve near the surface, the pores become larger, gradually, and new pores continue to form. The increased porosity can favour disintegration by promoting further liquid penetration (i.e. wicking). In a recent study, Maclean et al. showed that the

disintegration of MCC/mannitol-based tablets was much more rapid than that of MCC/lactose-based tablets. Interestingly, the two soluble diluents have similar solubilities, yet mannitol has higher intrinsic dissolution rate, compared to lactose. The authors concluded that in formulations containing a large portion of soluble components, the intrinsic-dissolution rate governs the rate of liquid penetration and, in turn, the disintegration time [42] Overall, dissolution of soluble ingredients can influence liquid penetration and thus passively affect the disintegration action generated by the swelling/ shape-recovery disintegrants. Nevertheless, soluble ingredients in the tablet can act as a double-edge sword. In fact, although they dissolve, they can overall retard tablet disintegration by subtracting water molecules otherwise available for the action of the disintegrant, thus retarding wicking and disintegration. This explains why tablets made of insoluble hydrophilic fillers (e.g. DCP) often disintegrate much more rapidly than tablets made of soluble fillers (e.g. lactose)[43]

Wicking: Wicking is the penetration of liquid by capillary action between the pores of a tablet. Although wicking has been regarded for long as a disintegration mechanism[44]., circumstantial evidence suggests that wicking is not a disintegration mechanism. Otherwise any tablet that imbibes water could disintegrate. Wicking is rather the essential pre-requisite for the subsequent swelling or shape-recovery of the superdisintegrant (45). In a work still unpublished, we found that pure DCP tablets, although highly hydrophilic and easily wetted(46did not disintegrate within the 90 min of the disintegration test. On the contrary, DCP tablets containing superdisintegrant could disintegrate in <20 s. Thus, wicking alone (as in pure DCP tablets) cannot induce disintegration in absence of swelling and/or shape-recovery forces. Yet, as superdisintegrants are designed to have rapid swelling and/or shape- recovery, the rate-limit step of disintegration is often the previous wicking of water into the tablet

In absence of wicking, such as in the case of non-wettable or hydrophobic materials, water would not be able to wet and penetrate the pores, leaving the disintegrant dry and thus disintegration would not occur. (47). On the contrary, the disintegrant particles in highly hydrophilic formulations are wetted nearly simultaneously all throughout the tablet (fast wicking) and then they exercise the swelling/shape-recovery force all at once against the tablet matrix. Once exposed to water these tablets burst open within few seconds, as a result of the rapid tablet wicking and then swelling/shape-recovery all throughout the tablet. If wicking is slow, water penetrates first the pores near the surface of the tablet and thus swelling/shape-recovery and disintegration begin at the surface, while the core remains dry at the same time. As the water-front moves inward by wicking, more disintegrant particles expand causing breaking up of bonds between particles. Thus, the disintegration proceeds slowly from the tablet surface to the core.[48]

4 METHOD OF PREPARATION OF NATURAL SUPERDISINTEGRANT BASED ORODISPERS IBLE DOSAGE FORM:

4.1 ORODISPERSIBLE TABLE

4.1.1Freeze drying:

In Freeze drying method, active substances and suitable excipient are suspended or dissolved to form a stable suspension/solution. The obtained mixture is equally distributed into blisters and frozen at -20ºC. Afterwards, the lyophilization procedure is applied under the recommended pressure and temperature conditions (0.44 mbar and−55°C) to obtain freeze dried ODTs. In this method, the critical materials are antifoaming such as simethicone, and matrix forming agents such as gelatin and sodium alginate. According to the properties of the matrix forming excipient, the disintegration, and thus dissolution properties of the ODTs might vary. This method is appropriate for heat sensitive drugs, and low dose drug since it is dissolved /dispersed in the mixture. Although, the hardness and friability of ODTs prepared by FD method are less than that of the ODTs prepared by DC method, they are produced in the final package and enough tablet strength can be achieved. Moreover, ODTs prepared by FD method show faster disintegration and increased dissolution rate than the ODTs prepared by DC method [49, 50]Gulsun et al. developed terbutaline sulfate-containing ODTs using DC and FD methods, and obtained that the disintegration times of ODTs prepared by DC and FD methods were approximately 3 min and 11s, as respectively.shown in table no.4

Table 4.,list of superdisintegrants used in the different dosage forms in freeze drying process

S.no	Author	Method	Drug/superdisintegrant	Dosage form	Result	Reference
1.	Kampanart Huanbutta *et al.*	Freeze drying method	Diclofenac sodium/tamarind seed gum	Orodispersible tablet	The present freeze-drying technique is suitable for the development of ODTs using crude and modified tamarind seed gum. the dissolution test showed that modified tamarind seed gum enhances dissolution rates of ODTs. The formulation F8m was prepared with optimal physical characteristics using carboxymethylated gum and mannitol and had a disintegration time of less than 1.5min and the best dissolution profile. However, the taste of ODTs containing mannitol requires further improvement to increase patient	[51

					compliance.	
2.	Rupalben K. Jani1*, *et al.*	Direct compression method	Tropisetron hydrochloride/cassia tora	Orodispersible tablet	The disintegration time for all formulation was considered to be within the acceptable limit. It is observed that when Cassia tora powder was used as super disintegrant the tablet disintegrated rapidly within a short time at lower concentration when compared with other tablets prepared using croscarmellose sodium, Crospovidone, Banana powder, and Sodium starch glycolate.It was concluded that the development of Orodispersible tablet of tropisetron HCl containing Cassia tora powder as superdisintegrant, was most promising and optimum formulation.	[52]

4.2 ORODISPERSIBLE FILM:

4.2.1 Solvent casting method:

Drug containing FDF were fabricated by the solvent casting method. The optimized amount of HPMC was dissolved in 5ml of water and stirrer continuously for 1 hour, optimized amount of Plasticizer were dissolved in 95% ethanol and then added to the polymeric solution, the optimized amount of drug was dissolved in 2ml of water and kept on sonication for proper dispersion. Polymeric solution was stirred for 30 min using magnetic stirrer and was kept in undisturbed condition till the entrapped air bubbles were removed. The aqueous solution was casted in a glass moulds having 2.5 x 2.5 cm*12 films area and was dried at controlled room temperature (25°-30°C, 45%RH) as well as at increased temperature (microwave oven). The film took approximately 48 hr to dry at controlled room temperature.shown in Table no.5

Table 5, list of drug/superdisintegrants used in the solvent casting method

s. no.	Author	Method	Drug/superdisintegrant	Dosage form	Result	Reference
1.	Nining *et al.*	Solvent casting method	Dextromethorphan hydrobromide/citrus maxima	Oral film	In the present study the The pectin from Citrus maxima has been successfully extracted to produce high purity and include the type of HMP. Orodispersible film DH has been made and has met compendial standard parameters. Adding pectin as a superdisintegrant can accelerate disintegration time, increase elongation percent, and decrease tensile strength of dextromethorphan hydrob	[53]
2.	Kamlesh J. Wadher *et al.*	Solvent casting method	Monteleukast sodium/cress-seed mucilage	Oral film	The Fast dissolving films of montelukast sodium were prepared by solvent casting technique using film forming polymer Cress seed mucilage and HPMC . The film prepared with Cress seed mucilage found to be more ductile than film prepared with HPMC.	[54]

Table no.6 showing Comparative study of natural and synthetic superdisintegrant:

S.no	Author	Title	Conclusion	Reference
1	Gailute	Psyllium (Plantago Ovata	Comparative evaluation studies proved that natural	[55]

	Draksiene	Forsk) Husk Powder as a Natural Superdisintegrant for Orodispersible Formulations: A Study on Meloxicam	superdisintegrant like Plantago ovate is superior to synthetic superdisintegrants in the formulations of FDT of meloxicam	
2	M. Uday Kumar *et al.*	Design and evaluation of fast dissolving tablets containing diclofenac sodium using fenugreek gum as a natural superdisintegrant	In this study the investigator showed the comparision between natural and synthetic superdisintegrant. The different formulations of diclofenac sodium FDTs were prepared by direct compression method using fenugreek gum as a natural superdisintegrants, and were compared with various standard synthetic superdisintegrants like SSG, croscarmellose sodium. Hence, it can be concluded that the natural superdisintegrant acts as a good superdisintegrating agent as compared to synthetic.	[56]
3	SHEEBA F. R.*et al.*	comparative study on effect of natural and synthetic superdisintegrants in the formulation of rizatriptan benzoate oral dispersible tablet	From the present study, it can be concluded that a combination of natural and synthetic super disintegrates like karaya gum and crospovidone showed better disintegrating property than the most widely used synthetic super disintegrant like sodium starch glycolate and in the formulations of ODTs. These super disintegrating agents are natural in origin and are preferred over synthetic substances because they are comparatively cheaper, abundantly available, non-irritating, nontoxic in nature and biodegradable.	[57]
4	SATYAJITH PANDA *et al.*	Formulation and evaluation of orodispersible tablet of diclofenac sodium by using superdisintegrant from natural origin.	The formulation of ODTs was made by diclofenac sodium using natural super disintegrant (Cajanus cajan). It has good swelling property. The formulation F5(15%) natural super disintegrant showed a rapid disintegration, dissolution time, in vitro dispersion time and water absorption ratio as compared with the formulation prepared using a synthetic super disintegrant at the same concentration level. Hence, batch prepared with natural superdisintegrant was considered the optimized formulation.	[58]

Table no. 7 latest patent published on superdisintegrant:

S no.	Inventor	Date of Patent	Patent no.	Title	Reference
1	Hare Krishna roy, dr. S Balaiah , dr. T vinay kumar*et al.*	11/06/19	201941023079	Formulation and establishment of co-processed raw banana fruit and Crospovidone as superdisintegrant in dosage form preperation	[59]
2.	R . Naresh babu , Naresh Botcha et al.	04/04/2014	4093/CHE/2012	Starch tartrate as novel superdisintegrant in formulation and evaluation of fast disintegrating telmisartan tablet	[60]
3.	N. H. Aloorkar ,M. S. Bhatia *et al.*	20/9/2010	2610/MUM/20010	Aminoalkanoylated cellulose as a superdisintegrant	[61]
4.	Mangesh ramesh bhalekar , swapnil subhash desale, aswini raghavendra madgulkar *et al.*	03/11/2009	2545/MUM/2009	Cellulose PEG conjugate as ssuperdisintegrant and process of its preparation	[62]
5.	John . N. staniforth *et al.*	05/06/2002	IN/PCT/2002/00577/DEL	Pharmaceutical superdisintegrant	[63]

Table No.8 Pharmaceutical Application Of Natural Superdisintegrant:

S.no.	superdisintegrant	Application	Reference
1	Fenugreek mucilage	It is utilized as Gelling agent, disintegrant, tablet binder	[64] .
2	Ispaghula, isabgol	It is used as Binder, disintegrant, release retardant, emulsifying and suspending agent	(65).
3	Abelmoschus mucilage	It acts as Binder in tablets, sustained release agent, Suspending agent, disintegrating agent	[66] .
4	Hibiscus Rosasinensis Linn	It functions as Suspending agent and disintegrating agent	[67].
5	Jackfruit starch	In various formulation it is employed as a superdisintegrant.	[68]
6	Gum agar	Suspending agent, sustained release agent, disintegrants, bacterial culture media.[12	[69]
7	Gellan gum	Disintegrating agent, ophthalmic drug delivery, beads, floating in situ gel. [13-16]	[70]
8.	Mimosa pudica	Binder, disintegrants agent.[18-19	[71]
9.	Guar gum	Disintegrant agent, binder, thicker, laxative	[72]
10.	Leucaena seed gum	Disintegrating agent, suspending agent, emulsifier. [17-45]	[73] ,[74].

5 RECENT TREND AND UPDATE ON NATURAL SUPERDISINTEGRANT:

Different types of recently discovered excipient of superdisintegrant play a vital role in the disintegration mechanism. The advancements in the field of formulation of Fast disintegrating tablets are targeted at improving the dosage form's performance while also reducing the disintegration time.[75] Many superdisintegrants are available in the market, the search for newer disintegrating agents is going. Researchers are experimenting with several multifunctional superdisintegrants such as polyplasdone Superdry, kollidone CL-F, starch 1500, gum karaya, guar gum, fenugreek seed ,locust bean gum ,lallementia reylenne seeds ,aegel marmelos gum ,mango peel pectin hibiscus rosasinensis mucilage ,

Lepidium sativum , dehydrated banana powder etc.[76] Owing to significant applications of gum karaya in drug delivery and other biomedical fields, gum karaya, and its modified materials have good prospects of being patented and suggest a rewarding chance to the researchers. In this section, we have summarized the patented carboxymethyl cellulose or ethylene oxide homopolymer or other hydrophilic vehicles such as ethylene glycol was patented as superior adherent components material in hydrophilic polyethylene glycol liquid system which showed prolonged periods release. The hydrophilicity of these unique combinations enhanced the saliva penetration on the adhesive gum system, resulting in quicker hydration.. In 2003, Zyck et al. has patented the use of gum karaya with other polysaccharides as a binder in the coated chewing gum product with an acid blocker for effective controlled fast release [77, 78]The effective use as a cross-linking agent of gum karaya with or without the combination of other natural polysaccharides was patented [79 ,80]

Guar gum being a natural polymer has shown tremendous promise as a carrier in drug formulations. Other than acting as drug carrier, guar gum and its derivatives themselves possess certain therapeutic properties. Being a water soluble substance it has shown encouraging results in relieving chronic functional bowel ailments[81,82]. Owing to its inherent medicinal properties, a vast area of research is opened up for using guar gum in combination with specific drugs for improved results. Currently limited work has been done towards the use of guar gum in tissue engineering and biomedical fields, which still remains largely untouched. This makes guar gum an ideal candidate as the next generation drug carrier.dehydrated banana powder is prepared from variety of banana called ethan and nenthran it actsa as a binder ,diluents, superdisintegrant Arun N *et al.* Formulated ODT of ondansetron HCL , propanolol, and gabapectin using DBP as superdisintegrant[83,84]

Fenugreek is a leguminous plant that is extensively used in the medicinal, pharmaceutical and nutraceutical fields. The literature review demonstrated that the galactomannan obtained from fenugreek seeds has good potential to act as an emulsifier, stabilizer, and thickener and superdisintegrant. taken all the mentioned features together, it seems that FSG is a gum with medicinal activity, and thus future studies with respect to the use of this gum as a natural additive for treating the diseases. Lepidium sativum also called as asaliyo . mucilage is extracted from seeds of L. Sativum Shah V *et al.* Formulated dispersible tablet of Aceclofenac , M alviya R et al. Formulated quick dissolving tablet utilizing mango peel pectin as superdisintegrant.

The use of superdisintegrants in tablets, capsules mouth dissolving films is increasing day by day. The disintegration time of oral dispersible tablets (ODTs) and quick dispersible tablets, in particular, is optimized. Within a minute, ODTs must dissolve in the presence of saliva.[85] As a result, these formulations improve patient compliance in all age groups, from pediatrics to geriatric. several superdisintegrants and the number of patents are done. It is a combination of data from the National Institute of Standards and Technology (NIC) and the United States Patent and Trademark Office (USPTO).[86]

CONCLUSION:

Now a days orally disintegrating Tablets have a broader market in Pharmaceutical Industry. ODT'S are mostly used for its fast dissolution and thus by fast absorption and at last immediate action which can be only achieved by using superdisintegrants. Superdisintegrants develop the faster drug release rate from the tablets and lower the disintegration time. The use of natural superdisintegrants for disintegration of tablet structure is always an area of active research despite the advent of synthetic superdisintegrants. In recent times natural superdisintegrants continue to gain profound attractiveness as they are readily accessible in nature, relatively inexpensive, products of living organisms, readily undergo in vivo degradation, non-toxic, and capable of chemical modifications. They have an important role to play in the pharmaceutical industry. Therefore, in the years to come, there is going to be continued interest in the natural superdisintegrants to have better materials for pharmaceutical purposes.

Ethical approval and Consent

It is not applicable

Consent for publication

Not applicable.

Competing Interests

Authors have declared that no competing interests exist.

Authors contribution

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