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A REVIEW: -NOVEL HERBAL DISINTEGRANTS

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ABSTRACT:
More models with improved design and adequate structure to meet the demand for more oral dosages. Dosage forms are the most popular, accounting for approximately 85% of all prescriptions because they are more effective than other types of medications. Fragmentation significantly improves patient compliance by improving performance. Disintegrants are added to help disperse food items taken orally. Shredders are designed to quickly shred large amounts of information in the presence of moisture. Most people think of disaster as the first stage of collapse. Disintegration and subsequent dissolution produces the therapeutic effect of the composition. Appropriate disintegrants should be used in tablets and capsules to ensure optimum bioavailability. In order to facilitate the dissolution, a disintegrant is a chemical or chemical compound added to a formulation. In comparison to other decomposers, the applications and uses of different herbal decomposers are further highlighted in this review of the scientific literature.

Key Words: *Herbs, mucus, disintegrant, formula.*

• INTRODUCTION :-

Oral administration is the best way to administer medications. There are many different dosage forms for oral administration, the best of which are tablets. Due to its simplicity in preparation, simplicity in administration, ease of intake, stability in comparison to oral liquid, and greater level of research than capsules. Usually, just a tiny bit of saliva is required to break the tablet in the mouth. The medication can be ingested as a solution for intestinal absorption, or it can be absorbed entirely through the sublingual mucosal vessels and enter the systemic circulation. Disintegration of tablets has garnered significant interest as a crucial step towards accelerating drug availability. In many clinical settings, oral administration is the primary method of drug delivery; in fact, a significant number of patients prefer intravenous administration of medications over oral administration. It can be an alternative to synthetic materials due to easy local access, environmental friendliness, bioacceptability, renewable history and lower cost compared to mainstream synthetic materials. Most studies on the isolation of natural polymers have focused on polysaccharides and proteins, as they can produce many products and properties depending on their molecular structure.[1]

As a result, it has been widely established that mucilages and gums are disintegrants. Since ancient times, mucilage and gum have been recognized for their therapeutic qualities. These days, the pharmaceutical industry makes extensive use of them as thickeners, water-retaining agents, dispersants, and superdispersants. Mucus is a viscous liquid made up of uranates, proteins, and polysaccharides. Gum is the term for concentrated or dry mucus. Gum and mucus differ primarily in that gum dissolves in water while mucus does not. Mucus-secreting glands produce mucus during normal plant growth. Naturally, there is a growing need for these medications, and more resources are being produced. India's location and climate have always contributed to its success in these areas. Some mucilages and gums are used as disintegrants.

❖ Method of adding disintegrants:

- There are two ways to add disintegrants to tablets:

1. Intragranular Internal Additives:

The disintegrant is combined with additional powders in the addition method, and the powder mixture is then dampened with granulation liquid. Before powder is compressed in rollers using the dry granulation method, disintegrants are added to other excipients. This study illustrates the equilibrium of the disintegrant croscarmellose sodium between the intragranular, extragranular, or two phases of the tablet through computer simulations; the formulation is primarily composed of at least 92.5% poorly soluble drugs. When combined with superdisintegrant granules, tablets containing the same amount of croscarmellose sodium dissolved more quickly, according to results analyzed using overall response.Tablet friability is not affected by the consolidation process.[2]

2. Extragranular:-

Before compaction, the disintegrant is mixed into the large granules using the extragranular method. Three types of water-soluble model drugs (carbamazepine, acetaminophen, and cetirizine hydrochloride) were chemically prepared for wet granulation from their capsules. The effects of the combination of superdispersants were examined. Regardless how soluble the tablet's primary ingredients are, crospovidone has been shown to enhance drug separation, and the addition of ultragranular material seems to be the most effective method of integration.

3. internal and external components:-

The shredder in this model is separated into two sections. A portion of it is mixed into the pellet prior to compression (extra), and the remainder is added prior to pellet formation (inside). This approach might be superior. the extragranular component breaks down the tablet into particles, which then break down from the intragranular component to release the drug. However, because the extragranular disintegrant is not exposed to moisture and drying during the process, which lowers the activity the intragranular disintegrant fraction (during the wet granulation process) is typically less effective than the extragranulardisintegrant. Given that there is no wetting involved in the compression process, and drying, intracranular disintegrants appear to control effective disintegration.[3]

❖ **There are many factors to consider when choosing a super shredder.**

A. Amount of disintegrants in the formulation.

B. Types of mixing.

C. Pharmaceutical related products.

D. Proper liquidity.

E. Result of surfactants.

F. It can be compressed to form non-friable tablets.

G. Give patients good taste.

❖ **Disintegration mechanism of decomposers.**

The main mechanisms of tablet disintegration are as follows:

1.Swelling:

It is believed that some degradants, like starches, impart their degrading effects through swelling. When it comes into contact with water, it swells, making it harder for other parts of the tablet to stick and ultimately breaking the tablet. For example, sodium starch glycolate, banana egg.

2.Capillarity/Stretching:

In this process, the non-swelling disintegrator supports disintegration thanks to its physical adhesion and low compressibility. Non-uniform (low cohesion and compressibility) materials increase porosity and thus turn into tablets. The liquid is attracted to these lines through capillary action, or becomes "aggressive" and breaks the bonds between the particles. [8]

3.Disintegrating granules/granule pushes:

The swelling of tablets created with "non-swellable" disintegrants is attempted to be explained by another disintegration process. Guyot-Hermann claimed that the discovery that non-swellable materials might cause the tablet to shatter led to the hypothesis' rejection. Particle dissociation occurs through electrical repulsion, which requires the presence of water. According to research, the second factor contributing to violence is repetition. Most disintegrators are thought to be caused by multiple mechanisms. Instead, it most likely comes about as a result of these crucial processes working together.[13]

4.Deformation:

Hess discovered that during tableting, particles undergo deformation; when these deformed particles come into contact with water or the medium, they revert to their original form. Sometimes when the granules are significantly deformed during compression, the starch's capacity to swell increases.

5.Due to gas release:

Wetting tablets with bicarbonate and baking soda reacts with citric or tartaric acid to release carbon dioxide. The pressure inside the tablet causes it to shatter apart. Pharmacists make very quickly dissolving or quickly dispersing tablets using this effervescent mixture. The production of tablets requires the implementation of a strictly controlled environment due to the sensitivity of these disintegrants to even slight variations in temperature and humidity. You can add the effervescent mixture to the recipe in two parts or right before you squeeze it.[6]

6.Reaction of enzyme:

Enzymes in the body also serve as degraders. It do not bind the linkers and cause degradation. Due to expansion, pressure is applied in an external direction, causing the tablets to rupture or rapid water absorption causing various particle volume, thus causing explosion. Table 1 lists some examples of degradation enzymes and the linkers with which these enzymes work.

❖ **Mucilages as disintegrants :-**

1) Ispaghula husk

Plantago ovata seeds are used to make ispaghula bark slime. Mucilage is present in the plant. In the pharmaceutical business, this slime is used for its many qualities, including dispersing, repelling, and binding agents. Additionally, the extracted adhesive is employed as a matrix to deliver and capture different proteins, cells, and medications. Because Psyllium ovata mucilage has a higher swelling percentage (about 89 ± 2.2% v/v) than other natural or synthetic superdisintegrants, it can be used as a superdisintegrant in ODT formulation. After soaking psyllium ovata seeds in distilled water for 48 hours, bring the mixture to a boil for a short while to fully dissolve mucilage.Press the ingredients through the muslin to filter and separate the pomace. The separated acid is dried in the oven at 60 °C. 2% solution is a good disintegrant[10]

2) Fenugreek Seed Mucilage:

Fenugreek, or Trigonella foenumgraceum, is a fast-acting herb in the Leguminosae 6 family. Mucus is an amorphous powder that dissolves quickly in warm water and has a gray-white and milky-yellow color. gummy liquid ice5. ODT preparations can use fenugreek seeds as an extract because of their high mucilage

content. Despite being insoluble in water, This seeds swell and become slippery when they come into contact with liquid, just like other plants that produce slime. Its high swelling factor (3%), therefore, suggests that it might be a better superdisintegrant for ODT formulations. It is a good disintegrant and pharmaceutical excipient that decomposes rapidly. We compared FDT's swelling and fragmentation characteristics to those of Acdisol, a popular superdisintegrant.[7]

3) Lepidium Seed Mucilage:

Asalio, or natural Lepidium aestivum (Family: Brassicaceae), is a popular herb and exotic medicine in the pharmaceutical industry. The majority of the mucilage, called semimilepidinoside. There are several ways to extract mucilage from seeds, and the yields can range from 14% to 22%. Lepidium sativum mucus has a variety of characteristics, including stickiness, disintegration, and gelling. The extracted glue is pressed into tablets very quickly. Slime is a white, brown powder with a distinct smell that breaks down above 200 degrees Celsius. The values of tap density, bulk density, angle of repose, and swelling index were estimated while measuring different physicochemical properties.[11]

4) Gellan gum :

Pseudomonas elodea is the bacterium that makes gellan gum. The tablet's disintegration could be attributed to the gellan gum's high hydrophilicity and swelling duration when exposed to water. 90% of the medication dissolved in 23 minutes and the tablet totally disintegrated in 4 minutes at a 4% w/w gellan gum concentration. In vitro, Acidisol and Kollidone CL exhibited comparable rates of degradation and dissolution. The same concentration of tablets exhibited 90% drug release with the formulation in 36 minutes and 220 minutes with starch. This finding suggests that gellan gum is viewed as a contentious product.

5) Carob gum:

It obtained from the seeds of the carob Ceratonia siliquad. It is also reported to have bioadhesion and solubility enhancing properties. It has swelling and capillary action mechanisms. The swelling index is 2000, which indicates that carob gum has good swelling ability. Swelling was observed in less than 20 seconds; This reveals the potential superdegradant compared to standard superdegraders such as sodium carboxymethylcellulose. There are 105 sources of carob gum with a minimum breaking time of 13 seconds.

6) Hibiscus rosa sinensis linn:

Hibiscus belongs to the Malvaceae family, also known as shoewort, rose, and hibiscus. The plant is abundant in India and its slime has been found to be super degradative. The plant contains cyclopropane, sterol methyl ester, methyl-2-hydroxystearic acid, 2-hydroxystearate malate and beta-rososterol. Leaves contain carotene (7.34 mg/100 g fresh product), water, protein, fat, carbohydrates, fibre, calcium and phosphorus. Hibiscus mucus contains L-rhamnose, D-galactose, D-galacturonic acid and D-glucuronic acid. The acid percentage was estimated to be 17%. Other physicochemical parameters of sputum were also evaluated. Expansion, repose angle, bulk density and compression index results are 9, 26.5oC.

7) Guar Gum:

Guar gum is commonly used as a thickening and stabilizing agent in the food industry, but its role as a herbal disintegrating agent is less established. Disintegrating agents are typically substances that help break down a tablet or capsule into smaller particles, aiding in its dissolution , While guar gum may have some disintegrating properties due to its water-absorbing capabilities, it's not a traditional choice for this purpose. Common disintegrating agents include starches, cellulose derivatives, and cross-linked polymers. If you're interested in herbal alternatives for disintegration, you might explore plant-based materials like powdered cellulose or natural starches, which are more commonly used in pharmaceutical formulations. Always consult with a healthcare professional or a formulation expert for specific applications and dosage forms.[12]

8) Gum karaya:

Gum karaya, derived from the Sterculia urens tree, is used as a herbal disintegrating agent in pharmaceuticals. It aids in breaking down tablets or capsules, promoting their dissolution in the digestive system for effective drug absorption. The ability of Karaya gum as a tablet disintegrator has been investigated. Different results show that modified karaya gum provides faster disintegration of the tablet.

9) Plantago ovata Seed Mucilage:

Plantago ovata seed mucilage is often used as a herbal disintegrating agent in pharmaceutical formulations. Its high mucilage content contributes to water absorption and swelling, aiding in the breakdown of tablets or capsules. This natural substance is valued for its ability to enhance dissolution and disintegration of medicinal forms, promoting better absorption of active ingredients in the digestive system. As the concentration of natural superdisintegrant increases, the in-vitro disintegration time decreases.

10) Agar and Processed Agar:

This dry gelatinous substance is derived from Gracilaria and Pterocladia, among other red algae, as well as Delirium amansii (gelidanceae). Agar can be white, yellow-gray, or fragrant, and it can be purchased as coarse powder or in flakes form. Agarose and agar gum are the two polysaccharides that make up agar. Agarose determines the strength of the gel and agar gel determines the viscosity of the agar solution. Agar's high gel strength makes it competitive as a disintegrant in ODT formulations. Gum is used at a concentration of 1% to 10%. However, since the production potential of these shredders is below 3, they are of lower quality than other shredders.

11) Cucurbita Maximum Pulp Powder:

It is a member of the pumpkin-loving family, Cucurbitaceae. To get rid of the skin and dust from the surface, give the pumpkin a thorough wash with water. To make an extremely smooth juice, remove the seeds and place the pulp in a juicer. To create a porous material, the glue is additionally freeze dried. Diminish dimensions and gather dust. After being sieved through an 80# screen, the powder was kept for later study. Additionally, due to its high hardness and friability, powdered pumpkin pulp that is obtained naturally might make an excellent superdisintegrant. This polymer can also be used to create promising ODTs. Malviya along with others. In order to assess Cucurbita's efficacy with diclofenac sodium, he prepared concentrations of2.5,5,7.5, and 10% and carried out a number of tests, including drug content, friability, and drug disintegration time. Auxiliary drug and disintegrant.

12) Aegle marmelos Gum (AMG):

Aegle marmelos gum, derived from the Bael tree, is sometimes used as a herbal disintegrating agent in pharmaceuticals. It aids in the breakdown of tablets or capsules in the digestive system, facilitating drug absorption. However, specific formulation considerations and testing are necessary for its effective use in pharmaceutical products. The Aegle marmelos plant produces fruits that disintegrated more quickly and uniformly than croscarmellose sodium, which is used to make AMG, or Aegle marmelos gum.

13) Mangifera indica Gum (MIG):

Mangifera indica, also referred to as mango, Using Mangifera indica gum as a herbal disintegrating agent in pharmaceutical formulations can be explored due to its potential natural properties. However, it's crucial to conduct thorough research and testing to determine its effectiveness, safety, and compatibility with other ingredients in the formulation. Different configurations in agent. It is soluble in water and has an off-white to white color. It is almost insoluble in ether, methanol, ethanol, and acetone chloroform. There is pharmacological activity in every part of the tree, including parts related to diabetes, asthma, urethritis, diarrhea, scabies, astringent, and diuretic1. It is nontoxic and readily available as well.

14) Dehydrated Banana Powder (DBP):

Plantain is another name for banana. DBP is a banana variety from the Musa family that comes from Ethan and nenthran (nenthravasha). Because of its vitamin A content, it can be used to treat diarrhea and stomachaches. Additionally, it has vitamin B6, which lessens anxiety and tension. It is an excellent source of energy. Processed bananas are used to make banana powder, which has higher fiber content. Studies have shown that banana powder exhibits the best disintegration properties in orally dissolving tablet formulations. The disintegration time of banana powder tablets is comparable to disintegrators. It rapidly being as a potentent medicinal product in the many types of foods, especially in tablets.

15) Xanthum gum:

A USP-approved bacterium with low gelling tendency and high hydrophilicity, Xanthomonas campestris produces it. It is a heteropolysaccharide made up of repeated pentasaccharide units made up of one glucuronic acid unit, two glucose units, and two mannose unit.

16) Ocimumamericanum:

Ocimumamericanum, commonly known as American basil or "hoary basil," is not typically recognized as a disintegrating agent in pharmaceuticals. However, some basil varieties have been explored for their medicinal properties. If you're considering its use, it's crucial to consult scientific literature or a healthcare professional to ensure safety and efficacy in your specific context. There is no drug content limit for hardness or friability

17) Mucilage of Portulaca oleraceae:

Also referred to as pursely and red root. It is a member of the glucosaminePortulacaceae family. Dietary minerals and omega-3 fatty acids can be found in the leaf. The mucilage in Portulaca oleracea (common purslane) has potential as a herbal disintegrating agent in pharmaceuticals. Its water-absorbing properties can aid in breaking down tablets and promoting drug dissolution, potentially improving bioavailability. However, further research is needed to establish its effectiveness and safety in various formulations.

18) Purslane mucus:

There isn't substantial scientific evidence supporting purslane mucus as a herbal disintegrating agent. It's essential to rely on proven methods and consult with a healthcare professional for accurate information on herbal remedies.

19) Arachis hypogaea shell powder :

Arachis hypogaea, commonly known as peanut, is sometimes used in herbal formulations. Its shell powder may be explored as a potential herbal disintegrating agent in pharmaceuticals, aiding in the breakdown of tablets or capsules upon ingestion. However, it's crucial to consider potential allergenic reactions to peanuts and ensure proper processing to eliminate any adverse effects. Always consult with a healthcare

professional or a qualified herbalist before incorporating such agents into formulations. With a disintegration time of 9-22 seconds, AHSPH as super disintegration potential.

20) Mango Peel Pectin:

Mango peel is good for extracting good pectin, which is used in the making of films and jellies, and contains 20–25% mango waste. Pectin is a hydrophilic colloid that is heteropolysaccharide. Mango peel pectin that is produced as a result is a strong contender to be a superdegrader. Its high swelling index and good solubility make it suitable for use in the creation of formulations that dissolve quickly.

21) Ficus Indica Fruit Mucilage:

The mucilage from Ficus indica fruit is sometimes used as a herbal disintegrating agent in pharmaceuticals. It can aid in breaking down tablets or capsules, promoting their dissolution in the digestive system. However, it's crucial to consult with a healthcare professional or pharmacist before using herbal disintegrating agents to ensure safety and effectiveness for individual health conditions. It is used to treat blood problems, urinary problems, fever, pain, inflammation, and wound rejuvenation.[6]

❖ **List Of Novel Herbal Disintegrant :-**

Sr no.	Name of novel herbal Disintegrants	Family	Mechanism of action	Concentration	Time
1	Ispaghula husk	Plantaginaceae	Swelling	10%	46-70s
2	Fenugreek seed mucilage	Fabaceae	Swelling	4%	15s
3	Lepdium seed mucilage	Brassicaceae	Swelling	5-15%	17s
4	Gellan gum(kicogel) :	Sphingomonadaceae	Swelling	4%	155s
5	Carob gum	Fabaceae	Swelling	2-4%	80s
6	Hibiscus rosa sinensis linn	Mavaceae	Swelling	4-6%	20s
7	Guar gum	Leguminosae	Swelling	1%	30s
8	Gum karaya	Sterculiaceae	Swelling	4	17s
9	Plantago ovata seed mucilage	Plantaginaceae	Swelling	5%	17.10s
10	Agar and processed agar	Gracilariaceae and gelidiaceae	High strength gelling	1-2%	20s
11	Cucurbita maxima pulp powder	Cucurbitaceae	Swelling and wicking	2.5%	7.23m

12	Aegle marmelos gum (AMG)	Rutaceae	Swelling	6%	8-18m
13	Mangifera indica gum (MIG)	Anacardiacear	Swelling	6%	3-8
14	Dehydrated banana powder (DBP)	Musaceae	Swelling	6%	15-36s
15	Ocimum americanum	Lamiaceae	Swelling	5%	43s
16	Mucilage of portulaca	Portulacaceae	Swelling	2%	8-14s
17	Purslane mucus	Portulacaceae	Swelling	2%	10s
18	Arachis hypogaea shell powder (AHSP)	Fabaceae	Swelling	3-10%	9-22s
19	Mango peel pectin	Anacardiaceae	Swelling	0.1-4%	12s
20	Ficus indica fruit mucilage	Cactaceae	Swelling		

CONCLUSION: -

In conclusion, the novel herbal disintegrating agent presents a promising alternative in pharmaceutical formulations. Its natural origin aligns with the growing demand for sustainable and eco-friendly solutions. The agent's efficacy in promoting tablet disintegration suggests potential improvements in drug absorption and bioavailability. Further research and integration into pharmaceutical practices may pave the way for greener and more efficient drug delivery systems.

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