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A Review on Herbal or Natural Excipient.

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ABSTRACT:-
Herbal or natural excipients have a considerable benefit over their synthetic analogues due to the fact that they are non-toxic, affordable, and easily accessible. The pharmaceutical business is becoming more and more driven to use these herbal excipients, which are potent polymers, as more information about them becomes available. This is due of their all-natural makeup. Many of the requirements for pharmaceutical excipients are met by the plant-derived gums and mucilages generated from natural sources, including tragacanth, carrageenan, thaumatin, lard, storax, and agar. These can be preferred for formulation development over their synthetic counterparts since they are more stable and have less regulatory problems. The objective of this research is to provide information on the potential of natural excipients, which can function as a diluent, binder, disintegrant, and lubricant in a since they are biocompatible and able to offer extra nutrients to the created dosage form, they can be used in a number of formulations.

Key words:- Herbal excipient, Natural polymer, Diluent, Gum, Binder

INTRODUCTION:-

✓ **Defination:-**

Any ingredient other than the active ingredient(s) that is/are purposefully added to the formulation of a dosage form is known as an excipient (derived from the Latin words excipere to take out, receive). [1]

A material that is employed as a vehicle for administering a medication, i.e., with just the purpose of providing inert support for the active principle or principles, is referred to as an excipient. [2]

Natural polysaccharide polymers are specifically used in pharmaceutical formulations to support, protect, or enhance stability, bioavailability, or patient acceptability, aid in product identification, or support or enhance any other aspect of the overall safety, effectiveness, or delivery of the drug during storage or use. [3]

From an inert and inexpensive vehicle to an important component of the formulation, the traditional definition of excipients—any component other than the active ingredient—has experienced a significant transformation. The physical structure of active pharmacological substances is being improved, according to the pharmaceutical industry (APIs). An overview of natural excipients utilised in both traditional dosage forms and cutting-edge drug delivery systems is provided in this article. [4,5]

Starch, agar, alginates, carrageenan, guar gum, xanthan gum, gelatin, pectin, acacia, tragacanth, and cellulose are just a few examples of the plant-based pharmaceutical excipients that are used in the pharmaceutical industry as binding, disintegrating, sustaining, protective, colloidal, thickening, gelling, and coating agents. [6] The fact that herbal or natural excipients are non-toxic, inexpensive, and readily available gives them a significant advantage over their synthetic analogues. The pharmaceutical industry is becoming more inclined toward using these herbal excipients, which are mainly polymers of natural origin, in formulation development as awareness of these excipients grows. Additionally, they are simple to alter to suit particular requirements, making them an effective and affordable method of delivering active pharmacological ingredients in

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formulations. therefore the current study the potential of natural excipients, which can be suggested for use as a diluent, binder, disintegrant, as well as lubricant in many types of formulations because they are biocompatible and capable of providing extra nourishment to the created dosage form. [9]

Because plant resources are renewable and may be grown or harvested in a sustainable way, they can provide a steady supply of raw materials. Waste from the food sector can be used as the starting point for the extraction of herbal excipients. The need for herbal material as excipients is rising for these additional reasons. [9]

Plant-based drugs do, however, also come with a number of potential drawbacks, such as the need to synthesis them in small amounts from structurally complicated mixes that can vary depending on the location of the plants as well as other factors like the time of year. As a result, the separation and purification process could be time-consuming and costly. The importance of intellectual property rights is another issue that has grown. [7]

❖ **Pharmaceutical herbal excipients:-**

A pharmaceutical excipient is a non-active component utilised in the formulation of a pharmaceutical substance along with a therapeutically active chemical. These have an increasing performance and functional impact on the drug's quality and effectiveness. Altering active substances, excipients, and procedures are obvious parts of changing a product. [8]Nonactive components that are combined with therapeutically active compound(s) to create medications are known as pharmaceutical excipients. Ingredients that aren't active substances are referred to as excipients. Excipients have a major and growing impact on the functionality and efficacy of the therapeutic product. The obvious contributors to product variability include active compound, excipient, and process variability. [8]

❖ **CLASSIFICATION OF EXCIPIENTS**:-

Excipients are frequently categorised in accordance with how they are used and perform in pharmaceutical products: • Diluents and binders.
• Disintegrants, Glidants, and Lubricants.
• Buffing agents for coatings and film formation.
• Plasticizers and dyes
• Removing agents antioxidants and preservatives.
• Taste-improving substances, sweeteners, and flavourings.
• Dispersing agents and printing inks Gums.[7,8]

✓ **Classification is based on source:-**

- Natural dyes made from plant materials such berries, flowers, bark, leaves, and seeds (e.g. Catechu, Indigofera, Myrobalan and Pomegranate).
- Cochineal and lac, which are insect-derived natural colours.
- Natural dyes derived from mineral sources include clay, ochre, and malachite. Natural dyes derived from animal sources include mollusk, murex snail, cuttlefish, and shellfish.[9]
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❖ **Advantages of herbal excipient:-**

➢ Biodegradable: All living things make naturally occurring polymers. They don't appear to have any negative consequences on people or the environment.
➢ Biocompatible and non-toxic: These plant ingredients are almost all carbohydrates, which are repeating monosaccharide units in nature. They are therefore not poisonous.[10]
➢ These natural and herbal excipients are all naturally occurring carbohydrates. Natural excipients are therefore non-toxic substances.
➢ Natural excipients are less expensive and need less manufacture than synthetic excipients.
➢ Natural excipients are created from a natural source; as a result, they have no negative or side effects on people.[11,12]
➢ Increased public acceptance as well as patient toleration
➢ Natural materials have a lower risk of side effects and negative impacts than manufactured ones.
➢ Examples include PMMA and povidone. Easy availability - Due to their use in numerous industries, they are produced in various countries.[10]

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Figure 1: Advantagesof herbal excipients for pharmaceutical dosage forms.

❖ **Disadvantages of Herbal Excipients:-**

- Natural excipients are exposed to the outside environment during manufacture, which creates numerous opportunities for microbial contamination.
- Production of natural excipients is influenced by geographic location, climate, and environmental factors. As a result, varied conditions result in different amounts of various natural excipients and constituent percentages.
- Reduced viscosity after storage- Normally, the viscosity of formulations containing gums and mucilages increases when they come into contact with water. Given the complexity of gums and mucins (which range from monosaccharides to polysaccharides and their derivatives), it has been discovered that their viscosity decreases over time.
- The production rate of natural excipients is also influenced by a number of immovable factors, which results in a slower production rate for natural excipients.[10,13]
- Herbal excipients may be contaminated with heavy metals. [11,12]

Figure 2: Disadvantages of herbal excipients for pharmaceutical dosage forms.

❖ **Name of excipient their sources And uses:**

Sr.No.	Name of Excipient	Source	Category/Uses
1.	Agar	Gelidiumamansii (Gelidaceae)	Laxative, Suspending agent, emulsifying agent, gelling agent in suppositories, surgical lubricant, tablet disintegrates, medium for bacterial culture.[14]
2	Gum Ghatti	Anogeissuslatifolia (Combretaceae)	Binder, emulsifier, suspending agent.[15]
3	Tragacanth	Astragalusgummifer (Leguminosae)	Thickening agent, demulcent, Suspending agent, emulsifying agent, emollient in cosmetics and

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			sustained release agent [16]
4	Albizia gum	Albiziazygia (Leguminoseae)	Binder agent.
5	Aloe mucilage	Aloe species (Liliaceae)	Gelling agent, sustained release agent.[17]
6	Bavchi mucilage	Ocimumcanum (Gigarginaceae)	Suspending agent, emulsifying agent.[18]
7	Gum acacia	Acacia arabica (Combretaceae)	Suspending agent, emulsifying agent, binder in tablets, demulcent and emollient in cosmetics [19]
8	Tamarind seed	Tamarindusindica (Leguminoseae)	Binding agent, emulsifier,

❖ **PHARMACEUTICAL APPLICATION OF HERBAL EXCIPIENTS:**

✓ **Applications in the food industry-**

There are several uses for gums and mucins in the food sector. Guar and locust bean gum, stabilisers for ice cream, meat products, and instant pudding (carrageenanas), dairy, confectionery, and meat products (agar), confections, beverages, backing goods, and sauces are only a few of the uses for various gums (gum arabic, tragacanth, pectins, alginates and xanthan gum).

✓ **Pharmaceutical applications:**

Gums and mucilages are used in many different ways in pharmacy. They have demulcent qualities that are used in medicine to quell coughs. They can be used as bulk laxatives and are components of dental and other adhesives. These hydrophilic polymers can be used as microcapsule coating agents, tablet binders, disintegrants, emulsifiers, suspending agents, gelling agents, stabilising agents, thickening agents, film forming agents in transdermal and periodontal films, buccal tablets, as well as sustaining agents in matrix tablets and microcapsules, including those used for protein delivery.

✓ **Industrial applications:**

Acacia, tragacanth, and karaya gums are used in cosmetics, while tamarind gum, starch, dextrin, cellulose, pectins, and cellulose gum are used in textiles. Acacia gum and tragacanth are used in adhesives, while gum arabic, tragacanth, and locust bean gum are used in lithography (tamarind, and cellulose).

1) Tamarind Gum:

✓ **Chemical Composition:**

A neutral xyloglucan (XG) called tamarind seed polysaccharide (TSP), also referred to as tamarind gum, is taken out of the tamarind seed kernels. It has a backbone made of -(1,4)-d-glucan and a - (1,6) branching of -(1,2)-d-galactose partially substituting -d-xylose.[26]

The tamarind tree, Tamarindusindica, one of the 21 evergreen families, produces xyloglucan in the endosperm of its seeds. The seeds are used to make tamarind gum, also known as tamarind kernel powder (TKP). The size range of the produced microspheres was 230-460 m. Another study looked into the Diclofenac sodium matrix tablets with TSP. The medication release from the tablets made using the wet granulation process was assessed.[20, 21]

Advantages :

1) Helps in promoting digestion.
2) May prevent infections.
3) Helps manage diabetes.
4) Heart-friendly.

Disadvantages :

1) It can cause ringworm, itching, swelling, dizziness, fainting, vomiting, and shortness of breath.
2) If eat tamarind in excessive quantity, the enamel of your teeth is likely to get corroded by its acid component.
3) It ultimately results in slow blood flow or sometimes even complete blockage of blood vessels.
4) Produces Laxative Effects.

2) Guar gum:

✓ **Chemical Composition :**

Chemically, guar gum is an exo-polysaccharide composed of the sugars galactose and mannose.[24] The backbone is a linear chain of β 1,4-linked mannose residues to which galactose residues are 1,6-linked at every second mannose, forming short side-branches.

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Guar gum has the ability to withstand temperatures of 80 °C (176 °F) for five minutes.[25]

Guar gum is a naturally occurring galactomannan polysaccharide that is obtained from the seeds of Cyamopsistetragonolobus (Family Leguminosae). It consists of a linear chain of D-mannopyranose molecules connected by (1-4) linkages with 1:2 ratio D-galactopyranosyl units. [22]

Guar gum is a unique food additive used in the food industry to stabilise meals and provide fibre in a variety of food products. Because it is a cheap and natural ingredient, it is well-liked by both manufacturers and consumers. Because it alters the behaviour of the water that is present as a common component in many foods, it is employed as an additive in a number of foods.

Uses :

- ✓ **Constipation:** Some people's constipation appears to be relieved by guar gum taken orally.
- ✓ **Diarrhea:** Critical care patients receiving tube feeding formula may experience fewer episodes of diarrhoea and less watery stools if guar gum is added (Benefiber , Novartis Nutrition). In children who already have diarrhoea, this guar gum product also seems to shorten episodes of diarrhoea. Guar gum does not, however, appear to help adults with cholera diarrhoea.
- ✓ **High triglycerides (hypercholesterolemia):** Guar gum appears help decrease cholesterol in those with high cholesterol levels. When combined with tiny amounts of insoluble fibre, guar gum and pectin also lower total and "bad" low-density lipoprotein (LDL) cholesterol. However, they have no effect on "good" HDL cholesterol or other blood fats known as triglycerides.

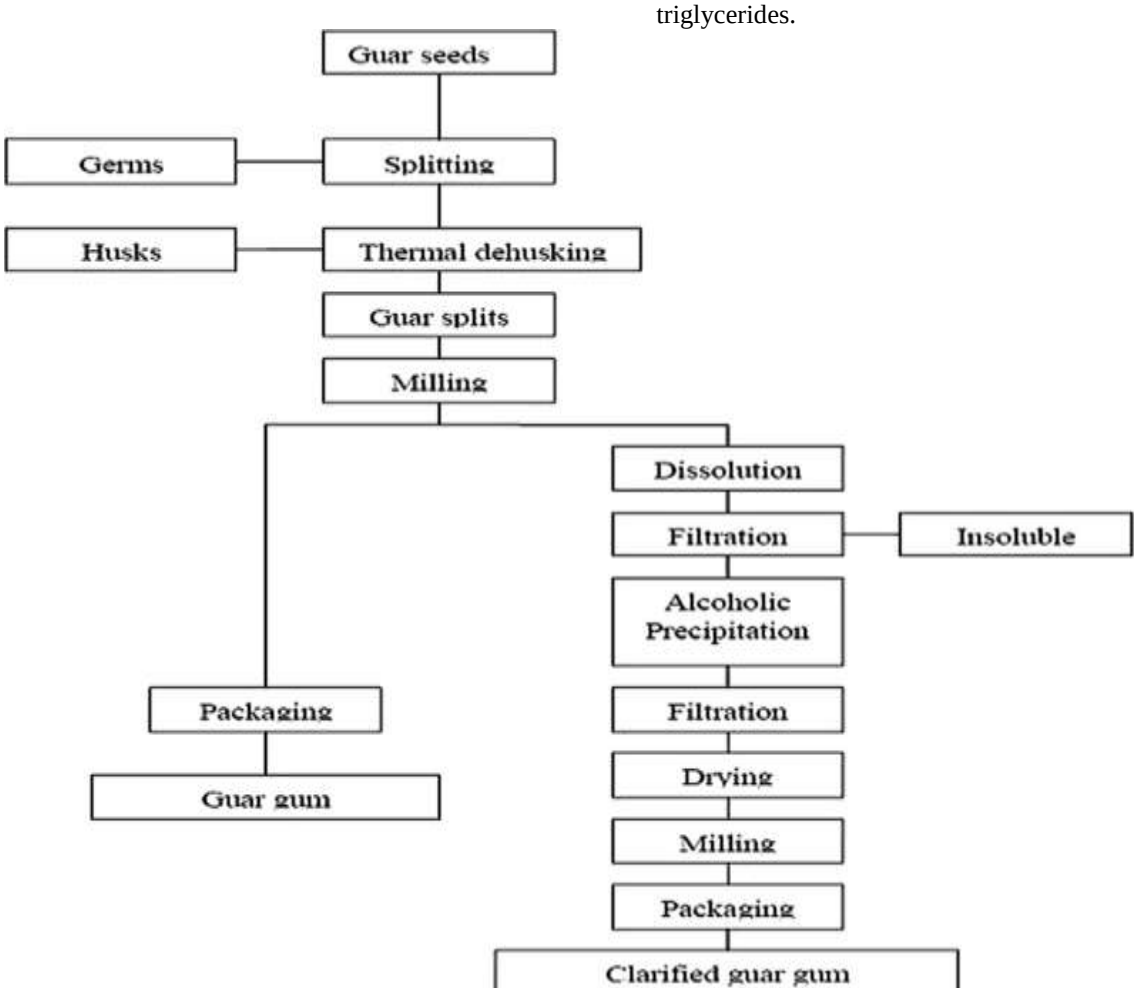

Figure 3: Processing

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Food	Dose level	Function
Chapati	0.75%	Softness
Bread	0.5%	Softness, loaf volume
Fried Products	0.5–1.0%	Oil uptake reduction
Yoghurt	2.0%	Texture improver
Cake	0.15%	Fat replacer, Firmness
Sausage	0.13–0.32%	Softness
Pasta	1.5%	Texture improver
Ice cream	0.5%	Smaller ice crystals
Baked goods	1.0%	Dough improver

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