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A Review on Herbal Excipient

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ABSTRACT :-

Natural or herbal excipients have many advantages over their synthetic analogues since they are non-toxic, inexpensive, and widely available. The effectiveness of the excipients contributes to the quality of the medications. The plant obtained gums, mucilages, and excipients from natural sources such as carrageenan, thaumatin, lard, storax, agar, gum acacia, and tragacanth. Additionally, they are simple to modify to meet particular needs, making them an effective means of delivering the active pharmaceutical chemicals used in the formulation while also being economical.The goal of the current study is to shed light on the potential of natural excipients, which can act as a diluent, binder, disintegrant, and lubricant in a variety of formulations since they are biocompatible and able to provide additional nutrition to the produced dosage form. An overview of natural excipients utilised in both traditional dosage forms and cutting-edge drug delivery systems is provided in this article.

Keywords :- Herbal excipients; natural pharmaceutical aids; natural polymers; herbal binders.

Introduction

The Latin word excipients, which means to receive, gather, or take out, is whence the word excipient was originated. The active pharmaceutical ingredient (API), manufacturing procedures, and excipients employed all affect formulation quality. These excipients significantly improve the performance of the API and uphold the product's efficacy and safety [1].

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. These are other factors contributing to the rise in demand for herbal materials as excipients [2].

According to WHO excipient is defined as "The Substance other than active ingredients which have been appropriately evaluated for safety and or included in a drug delivery system to

- Aid in processing of drug delivery system during its manufacture.
- Protect, support and enhance stability, bioavailability or patient acceptability.
- Assist in product identification.

Enhance any other attributes of the overall safety and effectiveness of the drug delivery system during storage or use.

In the past, excipient was mainly employed to make up the bulk of the formulation since it included a strong medication that could not be taken on its own and to ensure that the medication was uniformly distributed in the dosage form. A large variety of excipients are employed in dosage forms, and they are attached in various concentrations and correspond to various administration routes, formulation states, and excipient strengths.Excipients are used as a stabilising agent for API in the formulation, which conforms the active compound are active & stable significantly till the self-life of the product to challenge with other similarities by masking unpleasant task and authorise to guarantee, that the required amount of the active ingredient reached the right place to the body at the estimated time [3, 4].

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. Other factors like these also contribute to the rise in demand for herbal materials as excipients [4].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 a further concern that has grown [5].

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 methods are obvious parts of changing the product [5].Many excipients used in pharmaceuticals come from plants, including agar, alginate, starch, carrageenan, guar gum, gelatin, pectin, acacia, tragacanth, and cellulose, which are used as binding agents, disintegrants, protectives, thickeners, bases for suppositories, gelling agents, stabilisers, and coating agents.

ADVANTAGE OF HERBAL EXCIPIENTS

• Biodegradable - All living things make naturally occurring polymers. They don't appear to have any negative consequences on people or the environment.
Nearly all of these plant components are carbohydrates in origin and made up of repeating monosaccharide units, making them biocompatible and non-toxic. They are therefore not poisonous.
• Economical - They are less expensive and produce at a lower cost than synthetic materials.
• Safe and without side effects - Because they come from a natural source, they are both safe and free of adverse reactions.
• Easy accessibility - Because they are used in so many different industries, they are produced in many nations [6].

DISADVANTAGES OF HERBAL EXCIPIENTS

• Microbial contamination - Because they are exposed to the outside environment during producing, there is a possibility of microbial contamination.
• Variation - Unlike natural polymer manufacture, which depends on the environment and a number of physical parameters, synthetic polymer manufacturing is a regulated process with fixed constituent quantities.

• The unregulated rate of hydration—The proportion of chemical elements existing in a given substance may change due to differences in the collection of natural materials at various times, as well as differences in geography, species, and climate conditions.
Slow Process - Because the environment and many other factors affect how quickly things are produced, this cannot be modified. Consequently, the rate of creation of natural polymers is low.[6,7]

Ideal Properties of Excipients :-

• They have practical applications.
• They should not be harmful or irritating in any way.
• They ought to be of a non-volatile type.
• They shouldn't be impacted by hydrolysis, light, or temperature.
• They must to be reasonably priced and accessible.
• They shouldn't have a distinctive colour, smell, or flavour.
They should be compatible with the active ingredient in the preparation and should not interfere with its action. They should have good lipid and water solubility.
They ought to be inert pharmacologically [8].

Classification of herbal excipient :-

Classification according to their application and function in the drug

- Binder
- Diluents
- Lubricants
- Colorants
- Disintegrants
- Polishing film-forming & coating agent
- Plasticizers
- Colouring agent
- Suspending agent, preservatives, antioxidants etc.

Classification based on sources of excipients:

- **Products from animal sources:**e.g. Beeswax, Cochineal, Gelatine, Honey, Spermaceti, Lanolin etc..
- **Products from vegetable sources:**e.g. Kokum Butter, Pectin, Starch, Peppermint oil, Cardamon, Vanilla etc.
- **Products from mineral sources**: e.g. Bentonite, Kieselghur, Kaolin, Paraffins, Talc, fullers earth etc.
- **Synthetic products:** PEGs, Polysorbates, Povidone[9].

Classification according to application of excipients

Table-2 Classification of Excipients According to their Application[9]

S.No	Category	Examples
1.	Fillers	Plant cellulose, Gelatin, lactose, Sucrose, Glucose.
2.	Binders	Acacia, Alginic acid, Corn Starch.
3.	Disintegrating agents	Silicone, Guar gum, Agar.
4.	Coating agents	Gelatin, Shellac, Natural Polymers.
5.	Lubricants	Castor oil, Mineral oil, Paraffin oil.
6.	Antioxidents	Ascorbic acid, Potassium metabisulphite, Sodium metabisulphite, Gallic acid.
7.	Colouring agents	Annatto, Carotene, Chlorophyll, Cochineal, Curcumin.
8.	Flavouring agents	Strawberry, Raspberry, Lemon, Orange, Peppermint.
9.	Solvent	Purified water, Oils.
10.	Chelating agents	Onions, Garlic, Chlorella, Brazil nuts.
11.	Buffering agents	Lemon
12.	Surface active agents	Waxes, Saponins.
13.	Viscosity builder or emulsifiers.	Gelatin, Mucilage of Aloe, Gums.

PHARMACEUTICAL APPLICATION OF HERBAL EXCIPIENTS

Tamarind Gum-

The endosperm of the seed of the tamarind tree, Tamarindus indica, one of the 21 evergreen families, is where tamarind xyloglucan is found. 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 drug release characteristics of the tablets made using the wet granulation process were assessed [10,11].

Guar gum-

The endosperm of the seed of the legume plant Cyamopsis tetragonolobus is where guar gum is derived from. When the thin covering of fibrous material that makes up the husk is taken off and separated from the endosperm halves by polishing, refined guar splits are produced. Strong acids promote hydrolysis and viscosity loss, and alkalis in high concentrations also frequently tend to do the same. Most hydrocarbon solvents cannot dissolve it [12].

Locust bean gum-

Carob gum, sometimes referred to as locust bean gum (LBG), is made from the refined endosperm of seeds from the Ceratonia siliqua L. carob tree. It is a tree in the family of legumes that is evergreen. By harvesting and processing the endosperm from carob tree seed, carob bean gum can be made [13].

Honey locust gum-

It is known botanically as Gleditsia triacanthids, and belongs to the order Leguminosea (suborder Mimosa). The gum is obtained from the seeds [14,15].

Khaya gum-

Khaya gum is a polysaccharide obtained from the tree Khaya grandifoliola's incised trunk (family Meliaceous). The gum's availability naturally, low cost, and lack of toxicity have also encouraged interest in growing the gum for pharmacological purposes. In the formulation of 61 controlled release tablets, additional research has demonstrated its potential as a directly compressible matrix system [16].

Aloe mucilage-

Aloe barbadensis Miller leaves are used to make it. In addition to the various carbohydrates, the aloe parenchyma tissue or pulp has been discovered to

contain proteins, lipids, amino acids, vitamins, enzymes, inorganic chemicals, and tiny organic molecules. Numerous researchers have determined that pectic material is the major polysaccharide of the gel, along with partly acetylated mannan (also known as acemannan) [17].

Hakea Gum-

Exudates from the dried Hakea gibbosa plant of the Proteaceae family. Acidic gums contain arabinogalactans (type A). Molar proportions (%) of the components of sugar The ratio of galactose, arabinose, mannose, xylose, and glucuronic acid is 12:43:32:5:8 [18].

Pectin-

Non-starch, linear polysaccharides called pectin are taken out of plant cell walls [35]. To increase the stability of folic acid, microcapsules containing it were created in the food sector using alginate and mixtures of alginate and pectin polymers. In comparison to capsules prepared with alginate alone, those made with a mixed alginate and pectin polymer matrix enhanced the folic acid encapsulation effectiveness and decreased leakage from the capsules; they also demonstrated higher folic acid retention after freeze drying and storage [19].

Alginates-

Natural polysaccharide polymers called alginates were found in brown seaweed (Phaeophycean). Alginate can be transformed into its salts, of which sodium alginate is the most widely utilised type right now. Alginates have a number of uses in drug delivery, including the delivery of biomolecules in tissue engineering applications, matrix type alginate gel beads, liposomes, and modifying gastrointestinal transit time [20].

CONCLUSION :-

The use of herbal excipients is preferred since they not only fulfil their function in formulation but also provide health benefits by doing away with the issue of synthetic chemicals. More study should be done on herbal materials to develop non-toxic, biocompatible, patient-acceptable, economical, and environmentally friendly excipients that can be used in pharmaceutical preparations. In matrix type controlled release dosage forms like microparticles, beads, tablets, and cross-linked hydrogels, some polysaccharides derived from plants, such as carrageenan, alginate, konjac glucomannan, gum Arabic, guar gum, and locust bean gum, have demonstrated excellent potential as carrier materials.

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