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Pharmaceutical Sciences **Review Article……!!!**

PHARMACEUTICAL APPLICATIONS OF NATURAL GUMS AS A EXCIPIENT USED IN SOLID DOSAGE FORM

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ABSTRACT

The prospective use of herbal gum polysaccharides in various component of food, water, energy ,biotechnology, surroundings and pharmaceutical industry, have got a extraordinary deal of attention. Recently natural gums have gained huge attention because of their avaibility, low -cost, structural range and outstanding properties as green bio primarily based renewable material. Natural gums are available as natural polysaccharides from diverse tree genera possessing remarkable residences. Including their renewable, biocompatible, biodegradable and non-poisonous nature and their potential to undergo smooth chemical modification. Gums are used for novel drug delivery system to fulfil the challenges of bulk property of drug which directly or indirectly effect the unique function of drug.

INTRODUCTION:

Gums are pharmaceutical substance that are used in dosage form to help get them suitable dosage form and overall manufacturing process to enhance delivery of drug. Natural Gums are inert, non-toxic, biocompatible, low cost and they are amply available in nature. Gums are polysaccharides and are produced when the plant is growing under unfavourable conditions or when injured. Pharmaceutically important gums are Moringa oleiferium, Gum acacia, Tragacanth, Gum karaya, Gum ghati or Guar gum these are used as tablet binding agent, suspending agent, emulsifiying agent, stabilizers, thickening agent. The polysaccharides gums represent one of the maximum plentiful raw material. The researchers have specially studied the polysaccharide gum because of their sustainable, biodegradable and bio secure characteristics. The term gum is used to describe group of polysaccharides that come from huge industrial packages because of their potential either to form the gel or make the viscous solution or stabilize the emulsion structure and formation of solid dosage form. Water-soluble gums are also recognised as hydrocolloid and are used for numerous packages as nutritional fibre, texture modifier, coating dealers and packaging films from various component of plants,e.g- (plant walls, tree exudates, seeds, tuber/roots, seaweeds). a range of fruits also acknowledged to contain first-rate quantity of miscellaneous compounds with appreciate to the extent of structural and non-structural carbohydrates, depending on the fruits, its ripening period and storage time. There are numerous examples mango, papaya, guava, and banana. A great variety of the leguminous and convolvulus plant seeds are the treasured sources of seed gums.

2. Gums are divided into 3 vital brackets:

I. Natural Gums - These are obtained from natural sources, such as Tree seeds. Ex- Gum acacia, Guar gum.

II. Modified gums - These are obtained from naturally occurring material and chemically modified natural gum. Ex- Cellulose, Starch.

III. Synthetic gums - These are entirely blend chemical product. Ex- Polyvinyl, Pyrolidone.

3. List of natural gums and their uses :-

S. no.	Gum	Botanical name	Family	Uses	Geographical Sources	References
1.	Agar gum	Gelidium amansii	Gelidaceae	Used in preparation of jellies	Japan, Australia, USA, India	23
2.	Asafoetida	Ferula foetida regel	Umbelliferae	Used as powerful nervine stimulant	Western Afghanistan	
3.	Acacia gum	Acacia Senegal	Leguminosae	Used as pigment binder and adhesive in painting	Sudan, Central Africa, India	15
4.	Bhara gum	Terminalia billerica	Combretaceae	Used in medicinal purpose	India	16
5.	Copal gum	Bursera Bippinnata	Burseraceae	Used in printing inks paints and inks	East Africa, South America	17
6.	Cashew gum	Anacaedium occidentale	Anacardiaceae	Used in jelling agent in canned food		18,19

7.	Chicle gum	Manikara zapata	Apocynaceae	Used in chewing gum	Some region of South America	20
8.	Carob gum	Ceratonia Siliqua linn	Leguminosae	Used in food industry	Mid East region	20
9.	Cumbi gum	Gardenia Gummifer	Rubiaceae	Used in insectisides		20
10.	Dammar gum	Shorea Wiener	Dipterocarpaceae	Used in food and glazy agent	India and East Asia	21
11.	Guar gum	Cyamompsis Tetraganolobus	Leguminoseae	Used in constipation	India,Pakistan, North-Western country	22
12.	Ghatti gum	Anogeissus Latifolia	Combretacaceae	Used in non-pertolium waxes	India and Srilanka	23
13.	Guggul gum	Commiphora Weightli	Burseraceae	Used as anti-inflamatory agent	India and Srilanka	23
14.	Honey Loctus gum	Geleditsia Tricanthus	Leguminosae	Used as insectisides	Europe and Southern England	24
15.	Mango gum	Magnifera Indica	Anacardiaceae	Used to treat Laxative	India	25
16.	Moringa Oleifera	Moringa Oleifera	Moringaceae	Used in herbal	India, Africa Central and	26,27

				medicine	South America	
17.	Hibusscus Esculentus (okra) gum	Abelmoschvs Esculentus	Malvaceus	Used in food Industry and health Care	South Asian region,West Africa	28,29
18.	Neem Gum	Azadirachita Indica	Anacardiaceae	Used in insects repellent	India	30
19..	Tragaca-nth gum	A.Gummifer Labill	Leguminosae	Used as confectionery	India, Pakistan and Africa	23
20.	Xanthan gum	Xanthamonas Lempestris	Cabbage	Used in food industry	India, USA and Canada	31
21	Khaya gum	Khaya Grandifolia	meliaceae	Used as insecticide	Europe and Southern England	32
22	Loctus bean gum	Ceratonia siliqua linn	Leguminosae	Used in food industry	Europe and Africa	23
23	Muccuna gum	Mucuna flagillepes	Papillionaceae	Used in herbelism and food crop	Africa and South America	33
24	Myyrh	Commiphora mol mol	Burseraceae	Used in uterine	Africa and Arabia	23

				stimulant		
25	Odina gum	Odina wodier	Anacardiaceae	Used as anti inflamatory	India	34

4. PHARMACEUTICAL APPLICATION OF GUMS OBTAINED FROM NATURAL SOURCES :

4.1. ACACIA GUM : –

Acacia is also known as gum Sudani and gum Arabics. Over 900 species of acacia tree are found on earth most of them produce gums, Acacia Nilotica (Babul Tree) is one of the major gum-yielding Acacia species found in the Indian subcontinent. It is soluble in water and insoluble in ethanol. It is the gum which found in dry monsoon forest of India. It is an evergreen tree with short trunk. Gum is collected from wild grown plants, made free to bark and foreign organic matter, dried in sun which also result in partial bleaching of gum. It consists of arabin, which is complex mixture of calcium, magnesium, and potassium salts of Arabic acid. Arabic acid on hydrolysis gives L-arabinose, L-rhaminose, D-galactose and D-glucuronic acid. It also contains an enzyme oxidase and peroxidise.

Colour – Cream brown to red in colour

Odour – Odourless

Taste – Bland and mucilaginous

Size and Shape – Irregular brown tears of varying size

- It is used as suspending agent , emulsifiying agent , the binder in tablets, demulcent and emollient in cosmetics.[35]

4.2. GUAR GUM :-

Guar gum is also called Guaran, is a galactomannan polysaccharide extracted from Guar beans. It is insoluble in hydrocarbons, fats, Alcohols, Esters and Ketones. It is only soluble in water. Guar gum is industrially manufactured from the white wall developed seeds. The seeds are separated into husk and cotyledons containing embroyo. The husk contains fibrous matter and the gum is located into endosperms.

Colour – Colourless or pale yellow

Odour – Characteristics odour

- It acts as binder, disintegrants, thickening agent, emulsifier and laxative.[36,37]

4.3. GUGGUL GUM :-

Guggul is oleo- gum- resin acquired from deep cut at the lower part of stem bark. Guggul gum is one of the noted drug or gums for Ayurveda, Unani, and Allopathic medicine. Guggul plant can be propagated both by seeds and stem cuttings. It is soluble mostly in organic solvent. Guggul plant can be propagated both by seeds and stem cuttings. Seeds are the natural mode of propagation. In the arid or semi arid zones, sloppy well drained highly degraded lands are preferred for this purpose. The seeds are collected from matured red berries in July-September when the viability more. The plants are raised through nursery beds and transplanted after six months.

Colour – Brown to pale yellow
Odour – Aromatic and blasmic
Taste – Characteristics bitter
Shape - Rounded or irregular

- It is used as anti-inflammatory, anti-rheumatic and hypo-cholesteremic.[23]

4.4. KARAYA GUM :-

It is also known as Sterculia gum. It is dried gummy exudates obtained from the tree Sterculia Urens or other species of Sterculia. It is found in the form of irregular tears or vermiform pieces from white to brown in colour. It is insoluble in water, but partially soluble in colloidal solution and the powdered gum is getting swells in water. The tree have a girth of 1 meter are selected and blaze are made. The number of blazes per tree should not exceed two. Immediately after tapping, the exudates zone out. It is maximum during first 24 hours. It consists of about 8.0% of acetyl group and more than 37% of uronic acid residues. On acid hydrolysis it gives D- galactose, L- rhamnose, D- galacturonic acid, aldobiuronic acid and an acid trisaccharide.

Colour – White to brown in colour
Odour – Acetous odour
Taste – Blend mucilaginous taste

- It is used as bulk laxative.
- It is used as emulsifiying agent, thickening agent and stabilizing agent.[38]

4.5. LOCTUS BEAN GUM :-

Loctus Bean Gum is also known as Arbon, Carob gum, and Ceratonia. Carob gum is get from endosperm seed of carob gum. It is translucent white in colour it is insoluble in alcohol, but is partially

soluble in water at room temperature the solution of gum is pseudo plastic . The viscosity of Loctus Bean Gum decreases when ph increases. Carob is an evergreen tree growing to a height of about 10 metres and has luxuriant perennial foliage. The tree grows on rocky soil and has very long roots that penetrate up to 18-25 m and survive in an area where there is very little rain fall.

Colour- Translucent-white

Odour- Odourless

Taste- Mucilaginous taste

- It is used as stabiliser, thickner and binding in cosmetics.
- It is used as substitute for star

4.6. MYRRH GUM :-

Myrrh is an oleo-gum-resin obtained from commiphora molmol engler and from other commiphora species. The quality of this plant contain oleo- resinous canals. It excude yellow coloured resin. The fractured surface of the drug is somewhat granular. It is brittle and shows translucent surface. Whitish spots on broken pieces are also seen. One of the characteristics of the family Burseraceae is that the plants possess oleo-resinous canals in their conducting tissues. The plants are small shrubs or trees about 3 m in height. The plants exude yellowish-coloured resin when the incisions are made in the bark of the tree. It gradually hardness and becomes dark or reddish-brown in colour. This coagulated mass is collected in goat skins by the native tribals and sent to the market.

Colour - Reddish brown

Odour - Aromatic

Taste - Agreeable

- It is used as stimulant and an antiseptic.[23]
- It is used in mouth washes and gargles.[23]

4.7. MORINGA OLEIFERA :-

It is obtained from the stem of the tree moringa oleifera. At the start the gum is white in colour after that it comes into reddish brown or reddish black when it directly comes in contact with air and sunlight. It is easily soluble in water. It is highly viscous solution and swells when it comes directly contact with water.

- **Colour - Brown when expose to sunlight**
- **Odour - Characteristics**
- **Taste - Mucilagenous taste**

- It is used as binders and jelling agent.[39]

4.8. TRAGACANTH GUM :-

It is dried gummy particle come out by making a cut on stem and branches of Astragalus gummifer - labill. The mode of formation of tragacanth gum is entirely different from that of acacia gum. It takes place immediately after the injury. Most of the shrubs from which tragacanth is collected grow at an altitude of 1000-3000 m the shrubs are thorny. The mode of formation of tragacanth is entirely different from that of acacia, the gum exuding out immediately after an injury. Most of the drug comes from Persian source only. Tragacanth gum is formed as a result of transformation of the cells of pith and medullary rays into gummy substance. Incisions are more on various parts of the stem and fluid which oozes out and is collected after drying. Tragacanth is found in irregular flattened flakes with ribbon like appearance depending upon the incisions made on the plant. It is collected from April to November every year.

Colour - The flakes are white or pale yellowish-white

Odour - Odourless

Taste - Mucilagenous

- It is used as demulcent and as an emollient in cosmetics.[40]
- Tragacanth gum is used as thickening, suspending and emulsifying agent.[40]

5. ADVANTAGES OF NATURAL GUMS :

- **Biodegradable and less side effect :-** Biodegradable polymer which are widely used in nature and are produced by means of all dwelling organism. They represent truly sustainable sources and have not any adverse impact on people or environmental health.
- **Biocompatible and non-toxic :-** Natural gums are carbohydrates normally composed of repeating sugar (monosaccharides) units. Hence they are non-toxic and biocompatible.
- **Edible and Eco-friendly :-** Collection of gums from edible sources. Polysaccharides gums are obtained from diverse resources and are found in various seasons in massive amount and easy manufacturing method is involved.
- **Local availability and low cost :-** It is constantly less price utilize natural sources. The production price moreover a good deal lower contrasted with that for the artificial material. In many countries government promote the production of natural gums as a result of huge application in an assortment of industries.

6. DISADVANTAGES :

- **Microbial contamination :-** The equilibrium content of moisture present in the gum is typically 10% chemically they are carbohydrates at some stage in the production they may be exposed to the external environment. So there is a hazard of microbial contamination. Though this may be averted by appropriate dealing with the usage of additives.
- **Uncontrolled rate of hydration :-** Difference with in the collection of natural material at various time period as well as difference in region species and climate condition and the %age of chemical constituent found in given material might also vary.
- **Alteration viscosity on storage :-** when gum are getting touch with water they may be rise in the viscosity of the formulation. Because of complex nature (monosaccharides to polysaccharides and their derivatives) it has been found that after storage there is reduction in viscosity.
- **Environmental and potential antigenicity :-** Synthetic manufacturing is a precise method with constant quantities of constitute, even as the manufacturing of gums is reliant on environment and seasonal factor.

6. CONCLUSION:

Natural gums have several advantages over artificial resources. Natural gums used as pharmaceutical excipient is attractive because they are low in cost, rich in environment, non-toxic and capable of chemical modification, doubtlessly they are biodegradable and biocompatible. applications of gums has been well established in the field of pharmaceuticals. So there is a need to expand other natural materials well as enhancing existing natural material for the novel drug delivery system, biotechnology and other drug delivery system. Therefore in the future years there may be continued interest in natural gum and their modification geared towards the improvement of better substance for drug delivery.

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