



COSMETICS APPLICATIONS OF NATURAL GUMS AND MUCILAGES - A REVIEW

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Abstract: Nature has furnished us a wide array of substances to assist improve and uphold the fitness of all dwelling things either without delay or circuitously. Gums and mucilages are the foremost commonly to be had plant ingredients with an amazing variety of applications in beauty and pharmaceutical industries. These natural substances have advantages over synthetic ones when you consider that they're chemically inert, nontoxic, much less costly, biodegradable and extensively available. They're being used way to their abundance in nature, safety and economic system. Latest fashion in the direction of the utilization of plant based and herbal products demands the alternative of artificial components with natural ones. On this evaluate, we describe the cosmetics programs of diverse herbal gums, mucilages and their changed forms for the improvement of diverse pores and skin care and hair care arrangements.

key phrases: Gums and Mucilages , Natural.

I. INTRODUCTION

A huge quantity of plant-based excipients are available nowadays. Ability to deliver an awesome variety of cloth supported their homes and relative molecular mass, natural Gums and Mucilages have become a thrust location in majority of investigations in cosmetics[1]. Gums are a gaggle of plant merchandise, shaped typically way to the disintegration of plant cellulose. This procedure is thought as “gummosis”. Gums are produced through contributors of an outsized quantity of families however exploitation is confined to of economic more than one tree species Leguminosae, Sterculiaceae and Combretaceae families. A polysaccharide substance extracted as a viscous or gelatinous answer from plant roots, seeds, and many others. Mucilages are usually ordinary products of metabolism (physiological products), formed within the cellular (intracellular formation). Mucilage form slimy loads. they want been utilized as viscosity enhancers, stabilizers, disintegrants, solubilisers, emulsifiers, suspending sellers, gelling dealers, bioadhesives, binders, flocculating dealers, swelling sellers in numerous pores and skin care and hair care merchandise[1]. Demand for these materials is increasing and new resources are being developed. India, because of its geographical and environmental role, has traditionally been an honest source for such products among the Asian nations[2]. It must be mentioned that quite a few ‘vintage’ materials are nonetheless famous nowadays after almost a century of efforts to trade them. It is typical to strike a balance among economics and performance within the face of monetary realities. Recent trend in the direction of the utilization of plant primarily based and herbal merchandise needs the alternative of synthetic components with herbal ones.

II. Gums are grouped into two essential classes are as follows :

1. According to the source

A. Natural Gums: They may be obtained in a natural country inclusive of the tree exudates, extracted from seeds of a few legumes or seaweed hydrocolloids.

(a) Marine foundation/algae (seaweed) gums: Agar, carrageenans, alginic acid and laminarin.

(b) Plant Source

(i) Shrubs/Tree exudates: Gum arabic, gum ghatti, gum karaya, gum tragacanth and khaya and albizia gums.

(ii) Seed gums: Guar gum, locust bean gum, starch, amylose, and cellulose.

(iii) Extracts: Pectin, larch gum.

(iv) Tuber and roots: Potato starch.

(c) Animal origin: Chitin and chitosan, chondroitin sulfate, and hyaluronic acid.

(d) Microbial foundation (bacterial and fungal): Xanthan, dextran, curdian, pullulan, zanflo, emulsan, Baker's yeast glycan, schizophyllan, lentinan, krestin, and scleroglucan.

B. Modified Gums: They are chemically changed natural gums or derivative of naturally happening substances which include cellulose or starch. Ex: Carboxy methylcellulose.

C. Synthetic Gums: They're completely synthesized chemical merchandise. Ex: polyvinyl pyrrolidone, polyethylene oxide[2,3].

2. According to the charge

A. Non-ionic seed gums: Guar, locust bean, tamarind, xanthan, amylose, arabinans, cellulose, galactomannans.

B. Anionic gums: Arabic, karaya, tragacanth, gellan, agar, algin, carrageenans, pectic acid.

3. Semi-synthetic:

A. Starch derivatives: Heta starch, starch acetate, starch phosphates.

B. Cellulose derivatives: Carboxy methyl cellulose(CMC), hydroxy ethylcellulose, hydroxypropylmethylcellulose (HPMC), methylcellulose (MC), microcrystalline cellulose (MCC).

4. In keeping with shape

A. Linear: Algins, amylose, cellulose, pectins.

B. Branched:

a. Quick branches—Xanthan, xylan, galactomanan.

b. Department-on-branch—Amylopectin, gum arabic, tragacanth[4].

III. Advantages of herbal gums and mucilages:

The merits of herbal gums and mucilages are indexed under:

- Local availability in marketplace/medicinal lawn.
- Low-priced, dependable, biocompatible and biodegradable.
- Environmental pleasant processing as they do not want harmful solvents for his or her processing.

IV. Disadvantages of herbal gums and mucilages:

The demerits of herbal gums and mucilages are as follows:

- Reduced viscosity on storage due to the complicated nature of gums and mucilage.
- Batch to batch variation as they harvested in extraordinary seasons.
- Microbial infection as they hold a small quantity of moisture.
- As they accrued at distinctive instances/place/species/climate conditions the share of chemical elements found in a given material may also range. There's a want to broaden appropriate monographs on to be had gums and mucilages[5].

Table1: Some reported natural gums and their uses

Common name	Botanical name	Family	Cosmetics uses
Abelmoschus gum	<i>Abelmoschus esculentus</i>	<i>Malvaceae</i>	Suspending, binding agent
Acacia gum	<i>Acacia senegal/ Acacia arabica</i>	<i>Leguminosae</i>	Stabilizer and thickener, demulcent and emollient in cosmetic,
Aegle gum	<i>Aegle marmelos</i>	<i>Rutaceae</i>	Binding agent
Agar gum	<i>Gelidium amansii</i>	<i>Gelidaceae</i>	Good emulsifier
Albizia gum	<i>Albizia zygia</i>	<i>Leguminosae</i>	Binding agent, emulsifier
Almond gum	<i>Prunus amygdalus</i>	<i>Rosaceae</i>	Emulsifier, thickener, glazing agent and stabilizer
Asafoetida	<i>Ferula foetida regel</i>	<i>Umbelliferae</i>	Used in perfumery
Bhara gum	<i>Terminalia bellerica roxb</i>	<i>Combretaceae</i>	Emulsifying agent
Bengal kino (butea gum)	<i>Butea monosperma</i>	<i>Leguminosae</i>	Astringent effect
Cassia tora	<i>Cassia tora Linn</i>	<i>Leguminosae</i>	Binding agent
Cashew gum	<i>Anacardium occidentale</i>	<i>Anacardiaceae</i>	Thickening agent, gelling agent, suspending agent
Carob gum	<i>Ceratonia siliqua Linn.</i>	<i>Leguminosae</i>	Adhesive or binder a stabilizer for liquids
Carragennan	<i>Chondrus crypsus</i>	<i>Gigarginaceae</i>	Has water-binding properties that help it hold-in moisture.
Cordio gum	<i>Cordio oblique</i>	<i>Boraginaceae</i>	Binding agent
Copal gum	<i>Bursera bipinnata</i>	<i>Burseraceae</i>	Adhesive for masks ,

			analgesic properties and may be found in some kinds of toothpaste and mouthwashes
Cumbi gum	<i>Gardenia gummifer</i>	<i>Rubiaceae</i>	Anti-inflammatory in toothpaste
Damar gum	<i>Shorea wiener</i>	<i>Dipterocarpaceae</i>	Glazing agent
Ferula gum	<i>Ferula gummosa</i>	<i>Apiaceae</i> (or) <i>Umbelliferae</i>	Used in perfumery
Gamboge	<i>Garcinia henburii</i>	<i>Guttiferae</i>	Colouring agent
Gellan gum	<i>Pseudomonas eloder</i>	-	Gelling agent, suspending agent
Ghatti gum	<i>Anogeissus latifolia</i>	<i>Combretaceae</i>	Binder, emulsifier, and suspending compound
Grewia gum	<i>Grewia mollis</i>	<i>Liliaceae</i>	Binding, bioadhesive, suspending agent
Guar gum	<i>Cyamopsis tetraganobus</i>	<i>Leguminosae</i>	Emulsifier, thickener, increase viscosity
Guggal gum	<i>Commiphora weightii</i>	<i>Burseraceae</i>	Used as anti-inflammatory, used in essence sticks
Hakea gum	<i>Hakea gibbosa</i>	<i>Proteaceae</i>	Emulsifier
Hupu gum (gum kondagogu)	<i>Cochlospermum gossypium</i>	<i>Cochlospermaceae</i>	Thickener, binder, emulsifier and stabilizer
Katira gum	<i>C. religiosum</i>	<i>Bixaceae</i>	Gelling agent
Khaya gum	<i>Khaya grandifolia</i>	<i>Meliaceae</i>	Binding agent
Kino gum	<i>Pterocarpus marsupium</i>	<i>Fabaceae</i>	Astringent agent, used in tanning and dyes
Konjac glucomannan	<i>Amorphophallus konjac</i>	<i>Araceae</i>	Gelling agent
Lemon-scented gum	<i>Corymbia citriodora</i>	<i>Myrtaceae</i>	Used in perfumery
Leucaena seed gum	<i>Leucaena leucocephata</i>	-	Binding, suspending and emulsifying agent
Malva nut gum	<i>Scaphium scaphigerum</i>	<i>Sterculiaceae</i>	Stabilizer and thickening agent.
Mango gum	<i>Magnifera indica</i>	<i>Anacardiaceae</i>	Binding agent
Mastic gum	<i>Pistacia lentiscus</i>	<i>Anacardiaceae</i>	Protect dental health
Moi gum	<i>Lannea coromandelica</i>	<i>Anacardiaceae</i>	Relieves toothache
Moringa oleifera gum	<i>Moringa oleifera</i>	<i>Moringaceae</i>	Binding agent
Mucuna gum	<i>Mucuna flagillepes</i>	<i>Papillionaceae</i>	Suspending agent, stabilizing agent, good binder
Myrrh gum	<i>Commiphora mol mol</i>	<i>Burseraceae</i>	Fragrant material in perfumes and astringent
Neem gum	<i>Azadiracta indica</i>	<i>Meliaceae</i>	Binding, suspending agent .
Odina gum	<i>Odina wodier</i>	<i>Anacardiaceae</i>	Emulsifying agent
Okra gum	<i>Abelmoschus esculentus</i>	<i>Malvaceae</i>	Suspending agent
Olibanum gum	<i>Boswellia serrate</i>	<i>Burseraceae</i>	Aroma therapy, perfumes, stabilizers, skin-care products, extracts, & incense sticks
Opopanax	<i>Opopanax chironium</i>	<i>Umbelliferare</i>	Used in perfumery
Prunus gum	<i>Prunus domestica</i>	<i>Rosaceae</i>	Viscosity controller and thickening agent

Red gum (eucalyptus Kino)	<i>Eucalyptus rostrata</i>	<i>Myrtaceae</i>	Astringent
Rosin gum	<i>Pine pix styvestris</i>	-	Glazing agent , use in soap making
Salai gum	<i>Boswellia serrata roxb</i>	<i>Burseraceae</i>	Used in perfumery
Sesbania gum	<i>Sesbania grandiflora</i>	<i>Leguminosae</i>	Gelling agent
Tara gum	<i>Caesalpinia spinosa</i>	<i>Leguminosae</i>	Thickener
Tragacanth gum	<i>A. gummifer labill</i>	<i>Leguminosae</i>	Thickener and suspending agent , viscosity and film forming properties.
Tamarind gum	<i>Tamarindus indica</i>	<i>Fabaceae</i>	Binding agent, emulsifier, suspending agent
Terminalia gum	<i>Terminalia randii</i>	<i>Combretaceae</i>	Binding agent
Welan gum	<i>Alcaligenes species</i>	<i>Alcaligenaceae</i>	Thickening agent
Xantham gum	<i>Xanthomonas lempstris</i>	-	Binder, emulsion stabilizer, emulsifying surfactant, as well as an aqueous viscosity increasing agent.

Table 2: Some reported natural mucilages and their uses

Common name	Botanical name	Family	Cosmetics uses
Aloe mucilage	<i>Aloe species</i>	<i>Asphodelaceae</i>	Gelling compound, solubility inancer.
Asario mucilage	<i>Lepidum sativum</i>	<i>Brassicaceae</i>	Suspending and emulsifying compound
Banana peel mucilage	<i>Musa paradisiaca</i>	<i>Musaceae</i>	Binding and suspending agent. Active in hair care prerpations
Bavchi mucilage	<i>Ocimum canum</i>	<i>Lamiaceae</i>	Suspending and emulsifying compound
Bidi leaf mucilage	<i>Bauhinia racemosa</i>	<i>Fabaceae</i>	Binder
Broom creeper mucilage	<i>Cocculus hirsute</i>	<i>Menispermaceae</i>	Cooling and soothing action
Cactus mucilage	<i>Opuntiaficus indica</i>	<i>Cactaceae</i>	Emulsifier
Cassia tora mucilage	<i>Cassia tora</i>	<i>Caesalpinaceae</i>	Suspending agent
Chia seed mucilage	<i>Salvia hispanica L.</i>	<i>Lamiaceae</i>	Thickening agent
Chinee apple mucilage	<i>Zizyphus mauritiana</i>	<i>Rhamnaceae</i>	Soothing effect
Chinese yam	<i>Dioscorea polystachya</i>	<i>Dioscoreaceae</i>	Binding ability.
Cocculus mucilage.	<i>Cocculus hirsute</i>	<i>Menispermaceae</i>	Gelling agent
Cordia mucilage	<i>Cordia obliqua</i>	<i>Boraginaceae</i>	Binding and emulsifying properties
Date palm mucilage	<i>Phoenix dactylifera</i>	<i>Palmaceae</i>	Binding ability.
Dendrophthoe mucilage	<i>Dendrophthoe falcate</i>	<i>Loranthaceae</i>	Binding ability.
Fenugreek mucilage	<i>Trigonella foenum-graecum</i>	<i>Fabaceae</i>	Gelling agent

Flax seeds	<i>Linum usitatissimum</i>	<i>Linaceae</i>	Gel strengthner
Greater plantain	<i>Plantago major</i>	<i>Plantaginaceae.</i>	Soothing action emollient action
Golden shower mucilage	<i>Cassia fistula</i>	<i>Caesalpiniaceae</i>	Viscosity and binding
Hibiscus mucilage	<i>Hibiscus esculentus</i>	<i>Malvaceae</i>	Emulsifier and suspending compound
Humble plant mucilage	<i>Mimosa pudica</i>	<i>Mimosaceae</i>	Gelling , binding agent
Irish moss	<i>Chondrus crispus</i>	<i>Gigartinaceae</i>	Skin softener
Ispagol mucilage	<i>Plantago psyllium</i>	<i>Plantaginaceae</i>	Binder, emulsifying and suspending compound
Jute mallow	<i>Corchorus olitorius</i>	<i>Malvaceae</i>	Viscosity modifier
Malabar spinach	<i>Basella alba</i>	<i>Basellaceae</i>	Thickening agent
Marshmallow	<i>Althaea officinalis</i>	<i>Malvaceae</i>	Emollient
Mimosa mucilage	<i>Mimosa pudica</i>	<i>Mimosaceae</i>	Binding agent
Mullein mucilage	<i>Verbascum thapsus</i>	<i>scrophulariaceae</i>	Demulcent and emollient
Mutamba seed mucilage	<i>Guazuma ulmifolia Lam.</i>	<i>Malvaceae</i>	Emulsifying agent
Naga mucilage	<i>Brachystegia eurycoma</i>	<i>Leguminosae</i> <i>Caesalpiniodeae</i>	Binding agent
Ocimum seed mucilage	<i>Oscimum basilicum Linn</i>	<i>Lamiaceae</i>	Gelling agent
Okra mucilage	<i>Abelmoschus esculentus</i>	<i>Malvaceae</i>	Binding agent
Phoenix mucilage	<i>Phoenix dactylifera</i>	<i>Palmaceae</i>	Improve binding ability
Red cassia mucilage	<i>Cassia roxburghii</i>	<i>Fabaceae</i>	Stabilizer and thickener
Slippery elm	<i>Ulmus rubra</i>	<i>Ulmaceae</i>	Gelling , soothing agent
Senna tora mucilage	<i>Cassia tora</i>	<i>Caesalpiniaceae</i>	Binding agent

Table 3: Characterization of gums and mucilages[6]

Test	Observation	Inference
Molisch's test: 100 mg of dried gum/mucilage powder + Molisch's reagent+ concentration H ₂ SO ₄ on the side of the test tube	Violet color observed at the junction of the two layers	Carbohydrate are present
Ruthenium test: Take a small quantity of dried mucilage/ gum powder, mount it on a slide with ruthenium red solution, and observe it under microscope	Pink color observed	Mucilage present
Enzyme test: Dissolve dried mucilage/gum powder in 20 ml distilled water, add 0.5 ml of benzidine in alcohol	No blue color produced	Enzyme absent
Iodine test: 10 mg of mucilage/gum powder add 1 ml 0.2 N iodine solution	No color observed in solution	Polysaccharide present

V. REASONS FOR DEVELOPMENT OF NATURAL EXCIPIENTS :

Artificial gums used in cosmetics industries possess drawbacks of poisonous consequences. Natural gums are presently being imported with the aid of India from other nations along with Sudan (56 %), Chad (29 %) and Nigeria (10 %). To avoid drawbacks of artificial gums and reduce import expenses, alternative natural gums are to be explored. Gums achieved from flowers were used in India as excipients in beauty, meals and pharmaceutical industries. India is the hub of medicinal plant life and those are not commercially exploited a lot. Indian industries rely upon the imported gums. Considering common gum could be involved in collecting the gums the society could be benefited[6].

VI. CONCLUSION:

Finding natural gums and mucilage to use in regular beauty formulations continues to be a mission. The picks are constrained and the ensuing product aesthetics are not almost as properly as what synthetic formulations have to present. Herbal gums and mucilages are without difficulty available with cheap price and having a number of boon for studies. There is big scope for research on more recent herbal gums and mucilages received from flowers and can be in addition exploited in destiny as a novel natural polymer for improvement of different beauty merchandise in cosmetics industry.

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REFERENCES

1. PRIYA S. P., NATURAL EXCIPIENTS: USES OF PHARMACEUTICAL FORMULATIONS, VOL.6 2014; No.1, PP 21-28.
2. PRITAM D.C., HARSHAL A. P., RECENTLY INVESTIGATED NATURAL GUMS AND MUCILAGES AS PHARMACEUTICAL EXCIPIENTS: AN OVERVIEW, VOL. 2014;
3. SRINIVAS L. AND DEEPTHI S., A REVIEW ON NATURAL GUMS AND THEIR USE AS PHARMACEUTICAL EXCIPIENTS, ISSN(ONLINE):0975-8232
4. DEV S., AMIT S., HERBAL GUMS AND MUCILAGE AS EXCIPIENTS FOR PHARMACEUTICAL PRODUCTS, RESEARCH JOURNAL OF PHARMACOGNOSY AND PHYTOCHEMISTRY. 8(3): JULY – SEPTEMBER, 2016, PP 145-152
5. RAGHU U., HINDUSTAN A. A., ETAL, A QUICK REFERENCE TO PLANT GUMS AND MUCILAGES USED AS A TABLET BINDER, VOL. 9 No. 12 DEC 2018, ISSN : 0975-9492, PP 207-210
6. KOPPARAM M., ETAL, PHARMACEUTICAL APPLICATIONS OF NATURAL GUMS, MUCILAGES AND PECTINS - A REVIEW, VOL. 2 (3) JUL-SEP 2013, ISSN: 2277-5005, PP 1233-1239
7. ROHIT R. B., RIYAZ A. M. O., ETAL ; NATURAL GUMS AND MUCILAGES : A REVIEW ON MULTIFACETED EXCIPIENTS IN PHARMACEUTICAL SCIENCES AND RESEARCH, 2014-15, 6(4), ISSN: 0975-4873, PP 901-912
8. MISHRA M., SINGH A., ETAL, RECENTLY INVESTIGATED POLYMERIC NATURAL GUMS AND MUCILAGES FOR VARIOUS DRUG DELIVERY SYSTEM, E-ISSN: 2581-9615, PP 50-72
9. Nandkishore T., Usha J., etal, Guar gum as a promising starting material for diverse applications: A review, International Journal of Biological Macromolecules Volume 88, July 2016, pp 361-372
10. Vipul D. ; Pharmaceutical applications of various natural gums, mucilages and their modified forms; Carbohydrate Polymers Vol. 92, Issue 2, 15 February 2013, pp 1685-1699
11. Deogade Umeshkumar M., Deshmukh Vilas N., Natural Gums And Mucilage's In NDDS: Applications And Recent Approaches, Int. J. Pharm. Tech. Res. 2012, 2, pp 799-814.
12. Dharmendra S., Surendra J. K., Sujata M., S. Shweta, Natural Excipients- A Review, Int. J. Pharmaceutical & Biological Archives, 2012, 3, pp 1028-1034.
13. Sakarkar Dinesh M., Natural Gums and Mucilage's in NDDS: Applications and Recent approaches, Int. J. Pharm. Tech. Res. 2012, 2, pp 800.
14. Description of Peach gum by Nantong Pharmaceuticals Pvt Ltd, www.nantongpharm.org Gangurde AB: To evaluate gum of Azadirachta indica (Neem) as a binder for Pharmaceutical dosage forms, IJPER. October-December 2008; pp 344.
15. Panda DS et al: To find out the potential of gum from Moringa Oleifera to act as a binder and release retardant in tablet formulations. Research Paper, 2008; 70, pp 614-618.

16. Gustavo A.P., Eric K. S.,etal, Mutamba seed mucilage as a novel emulsifier: Stabilization mechanisms, kinetic stability and volatile compounds retention , Food Hydrocolloids Volume 97, December 2019, pp 105- 190
17. Reetika S., Davide B. ,Chapter 21 - Analysis of gums and mucilages, Recent Advances in Natural Products Analysis , 2020, pp 663-67
18. Panda D, Swain S, Gupta R. Preparation and evaluation of gels from gum moringa olifera. Indian journal of pharmaceutical sciencesb,2006; pp 777-780
19. Mishra A, Clark JH and Pal S: Modification of Okra mucilage with acrylamide: synthesis, characterization and swelling behavior. Carbohydrate Polymers 2008; 72: pp 608-615
20. Sreenivasa Rao B, Prasanna RY and Mary S: Design and studies of gum karaya matrix tablet. International Journal of Pharmaceutical Excipients 2000; 2: pp 239-242.
21. Oluwatoyin AO: Assessment of Albiziazygia gum as a binding agent in tablet formulations. Acta Pharmaceutica 2005; 55: pp 263–276

