NON MEDICINAL USES OF VARIOUS GUMS AND RESINS

Dr. Atram Seema Ulhas*
Assistant Professor Department of Dravyaguna R.A. Poddar Govt Ayurvedic College Worli, Mumbai- 400018, Maharashtra, India.

ABSTRACT
India is one of the biggest producers of gums and resins. The gum plays essential role in day to day life of human being. They are good as a food and be used as a pharmaceutical, dental, printing, textile and technical application. Most of the gum has medicinal property. As new research work is going on and new technology evolve there is decline use of gums and resins. They are replaced by synthetic alternative which are superior in quality, economical cheap and easily available. But there uses are limited. In many countries gums and resins are consumed by human which are proves to be beneficial in many health disorder. The article represent non medicinal uses of gums and resins.

KEYWORDS: Gums; resins; Non pharmaceutical uses.

INTRODUCTION
Gums and resins are low volume high value products. Commercially important gum and resins of are collected from forest. Which are use in food, medicine and in varnish or as protective coating. Resins and gums have medicinal property. They are metabolic by products of plant tissue. Often as a result of disease or injury to bark or wood of certain plant. Most of the gums are used as a pharmaceutical agent or in confectionery industry to prepare various food article. Resin and gums, commonly used in everyday life are having ample importance as non wood forest products. India is rich centre of plant biodiversity having more than 45,000 plant species including about 120 gum and resin yielding plants. India is traditionally largest producer of guar gum and karaya gum. Use of these gums and resins for domestic consumption. Resins and gums are sale to earn living good is common in tribal people in India.
Most of the gum and resins are used as a medicine can be traced back towards the time of Acharya Charaka author of Charak samhita granth.\textsuperscript{[1]} also mention about resins and gums as a medicine. In present day the use of natural gums are numerous and they are employed by a large number of manufacturing industries including food and pharmaceutical industries. Some of the plant based gum and resins of commercially importance are discuss over here. Present article is a compilation of commercial use of different gums we collected from various plant.

**MATERIAL AND METHOD**

Literature searches were performed using pub med and embase database. Searches term contained a botanical name of plant, the gum or resins part used in various field other than medicinal. The plant gum database search were conducted independently for authentic information. The reference list of review article were manually searched. A standard format has been adapted. the plant source botanical name and market name of resins has been described. Information regarding the industrial uses of gum has been selected. Very few information has been described.

Different kind of gums and resins are used in industries. The types are given below:

**Natural gums**

Gums are obtained from plants they are polysaccharides of natural origin. Properties are as follows

1. Either soluble in water or absorbs water and swell up to form a gel or jelly when place in water.
2. Insoluble in oil or organic solvent such as hydrocarbon ether and alcohol.
3. Complex in nature.
4. On hydrolysis yields simple sugar such as arabinose, galactose, mannose and glucromic acid.

Some gum are produce by exudation usually from the stem or root of a tree. seed gums are isolated from endosperm portion of seeds. Exudation is a pathological response to injury to plants.
Latex
Are usually obtained by cutting the plant to make it bleed. Latex yielding plant occurs in fewer family which produce gum resins; Apocynaceae, Euphorbiaceae, Sapotaceae. It's fluid milky white in color, which consists of tiny droplet of organic matter suspended or dispersed in an aqueous medium. The solid latex can be coagulated to form solid mass by boiling latex. The principle components of coagulum are cis or trans polyisoprenes and resinous material. If the poly-isoprenes is mainly cis, it confers elasticity to the solid and makes it rubber like; if it's mainly trans the solid is non elastic and gutta like.

Balasam
A resin or oleoresin exudates characterized by a high content of benzoin or cinnamic acid and their esters. They have balsamic odor.

Oleoresin
They have high content of volatile oil available in softer than one which has little or no oil.

Resins
Resins are distributed in plant kingdom but a few families are notable in accounting for a large proportion of the resins of commerce. e.g. Burseraceae, Leguminosae, Pinaceae. Resins can be obtained in almost any organ or tissue of plant; most resins of commerce are obtained an exudates by tapping. Oil soluble resins are soluble in oil and hydrocarbon type solvent. Spirit soluble resins are soluble in alcohol and other solvent. A solid or semisolid material known as terpene are insoluble in water soluble in certain organic solvent.

Resinoid
A viscous liquid, semisolid or solid prepared from a natural resins by extraction with a hydrocarbon type solvent. They contain any volatile oil originally present in resins and used for fragrance purpose.

The gum which described in Ayurvedic text as medicine those are only selected to describe in detail. Some of them as follows.

1. Gum Condagu : Cochlospermum gossypium. L.N: Bixaceae
It is extracted from tree Cochlospermum gossypium. Nature wise similar to gum karaya in its property. It does not have independent identity as an article of commerce and its cheaper than Sterculia gum. It's used in treatment of diarrhea, cough and dysentery. Also uses in various
eatable and employed in calico printing, leather dressing, polish paper. The gum is sweet, thermogenic anodyne and sedative. It is used in cigar and ice cream industry as an emulsifying agent. It serve as a good substitute for gum tragacanth. It can be used as inert natural pharmaceutical excipient able to perform versatile function in the development of controlled drug delivery system. As used a gelling agent in plant tissue culture method of propagation. A polymer agent for bioremediation of heavy metals ion from waste effluents.[2]

2. Cashew gum: *Anacardium Occidentalis*. Family: Anacardiaceae
Cashew gum is the exudates from the stem and bark of *Anacardium Occidentalis*. Cashew gum has been studied wildly for various pharmaceutical application. As it is inexpensive, non toxic, biodegradable and posses appropriate physicochemical characteristics. As cashew gum shares similar characteristics as gum arebic. It has been suggested for use as an agglutinant for capsule and pills in place of gum arebic in pharmaceutical and cosmetic industry. Cashew gum modified by carboxymethylation with monochloroacetic acid as etherifying agent used in controlled drug delivery. The gum was employed as binder in lactose based tablet formulation containing tartrazine dye. Where it shows good friability and hardness property. It has been used as a binder in paracetamol tablet where it imparted better mechanical properties to the tablet than povidon or gelatine. Therefore used as a binder in production of conventional release tablet.[3]

3. Dammar: *Shorea robusta*. Family: Diptocarpaceae
Dammar is designated a group of a resins obtain from Asian tree. These are solid resins, generally less hard and durable than copals. Ammars are used in the manufacture of paper or a wood varnishes and lacquers some inferior quality paints and varnishes for caulking boats. The second important ingredient in many type of cellular lacquers. importing gloss and adhesive qualities and preventing after yellowing. Sal dammar is widely used as a incense especially as an ingredient of damgri which is burnt in religious ceremonies and cremation rites, that emits. Copious white fumes. It is also used for hurdling softer waxes foruss in the manufacturing of shoe polishes carbon paper typewriter ribbon. Plastering medium for walls and roofs and as a cementing material for plywood asbestos sheets etc. The resins used in indigenous system of medicine as an astringent and detersgents. It's given in diarrhea and dysentery. A little is used in foodsasaclouding or glazing agent. It's used in a inks, polishes, water resistant coating and injection moulding material. A little is used in food as a clouding or glazing agent. They use for caulking boats and basket.[4]
4. Saral: Pinus roxburghii

Rosin also known as colophony, it is the solid form of resin obtain from pines and some other plants, mostly conifers. Pine yields oleoresin which forms the raw material for the rosin and turpentine oil industry in India. The maximum flow of resin is from top of the incision, where both the horizontal and vertical ducts are cut. On the exposure to air, the volatile oil in the oleoresin (turpentine oil). Gradually evaporates leaving clear, hard, glossy substance called rosin, which forms a protective coating over the incision.

Resin is used in making cements, varnishes, paints, sealing wax, adhesive, inks and some soaps. It is used as a dressing for machine, belts and bows of violins and cellos. Used in preparation of certain metals for soldering. Rosin gives stiff coated to certain kinds of a paper. This is needed for printing and writing. In pharmacy, rosin is used in some ointments, plaster and similar preparations. Athletes rub it on their hands or the sole of their shoes to prevent slipping. It is also extensively used for its friction increasing capacity in stringed instruments. The tin lead solder commonly used in electronic has about 1% rosin as a flux. It's also used in manufacturing if linoleum, sealing wax, oil, cloth, special flooring compounds and covering, lubricating compounds and disinfectants.\[5\]


Salai gum or indium oilbanum is the gum resin obtain from the species of Boswellia of Boswellia Serrata. The gum is collected in semisolid state. The crude gum resin is allowed to remain in a bamboo basket for up to one month during which the fluid portion locally known as a Ras, flows out. These Ras can be used in paints and varnishes. The gum oleoresin consists of oils, gum and terpenoids. The terpenoids portion contain boswellic acid they have been shown to be the active constituent in Boswellia. Salai resin is traditionally used as incense because of its very unique fragrance. It is widely used in Ayurvedic formulation for treating asthma and arthritis. Boswellia has been shown to be effective and in many cases it's good anti-inflammatory drug. It's also used for lightening fires.\[6\]

6. Gum camphora: Cinnamomum camphora. Family: Lauraceae

Gum camphora is used as a culinary spice, a components of increased and as a medicine. Camphor is use as a insect repellent and a flee killing substance. Camphor is use to make mothballs. Camphor crystals are used to prevent damage to insect collection by other small insect. Some folk remedies state camphor will deter snakes and other reptile due to its strong odor. It's kept in cloth used on special occasion and festivals. it's also use in cupboards
corner as cockroach repellent. Solid camphor release fumes that forms a rust preventive coating and is therefore stored in tool chest to prevent tool against rust.\[7\]

7. Gum arebica: Acacia Senegal. Family: Fabaceae

Gum arebica is used as a thickening agent, stabilizing, emulsifying and suspending agent in food and drink industries; as tablet binding agent, cream and lotion suspending and emulsifying agent in pharmaceuticals. As a film forming and stabilizing agent in printing and textile industry. It is also used in ceramic, paints, inks, textiles and adhesive. Its mainly use in confectionery industry to prevent crystallization of sugar. In chewing gum as a coating agent and as a pigment stabilized. Due to its stability in acidic condition and its high solubility. Gum Acacia is well suited for use in citrus and cola flavor oil emulsion. It's an effective encapsulation agent because of its high water solubility. Low viscosity and emulsification properties hence its used in souls and dessert mixes. It's still used as a suspending agent, emulsifier, adhesive and binder in tablet form. And in demulcent syrups; in cosmetics, gum Arabic functions as a stabilizer in lotions and protective cream, where it increase viscosity, imparts spreading properties and provide protective coating and smooth feels. It's used as an adhesive agent in blusher, foam stabilizer in liquid soap. In textile industry, it is used as a sizing and finishing agent. It's thickening agent in printing paste for the coloration knitted cellulose fabrics. other applications are ink and pigment manufacturing, ceramics and polishes. Also use to thick the dye baths that use in printing and dying of fibers, fabrics and carpet. In diabetes and diabetic product its used because of its low level of metabolism.\[8\]


Boswellia serrata belong to tropical tree. It is one of most important multipurpose tree in Asia and Africa frankinense has been used for rituals. Incense has been associated with religious ceremonies. It had an ancient use in cosmetics. Frankincense is employed by perfumes as an absolute oil or resinoid. Both solvent extract can be used as fixative in perfumes. Oils are obtained from the crude resin by steam distillation and are then normally used for flavoring and fragrance application. The oil from frankincense can take up to six hours to evaporates, making it an important ingredient in many perfumes. Frankincense is also used in fabrication of varnishes, adhesive, fumigation powder and pastilles. It gives flavors in food industry including bakery, milk product, different alcoholic and soft drinks. The distinctive flavor also makes it highly valuable for chewing gum industries. Incense also
used as an ingredient for lotion. Soaps and ointment formulation as additional to wound plaster, tooth paste, and mouth wash.\textsuperscript{[9]}


Gum guggul or Indian myrrh is the yellowish gum resin produced by the stem of the guggul tree. (Commiphora spp.) The dried gum resins has a bitter aromatic taste and balasmic odor. It's used as a incense, to make a layers, varnishes and ointment as a fixative in perfumes and in medicine. These Are phyto toxically safe raw material in industries like pharmaceutical and food industry. They are used in folk medicine, flavoring beverages and liquors, cosmetics, detergents, creams, perfumery, paints, adhesive, dye manufacturing. Myrrh product had wide range of other industrial uses in area such as food industry, food, beverages, candies, chewing gum, confectionery, gelatin, nut product, pudding and canned vegetables. Typical application include adhesive thickness, thickeners, stabilizer, flavoring, fixative and emulsifying agent in food product. Calcification in beverages and release agent for rubber product.\textsuperscript{[10]}

\textbf{10. Asafoetida: Ferula narthex}

It's the oleoresin exaudare obtained from species. It has strong characteristic odour. Due to presence of sulphur compound its used in spice blends and as a flavouring for meat sauce, pickles, curry and other food product.

\textbf{11. Tamarind: Tamarindus indica.}

It's obtained from endosperm of seed of tamarind tree and has application in paper, textile industry, food etc. In food industry its used as an emulsifier and stabilizer. It spread daily in water and turn up in gluey fluid when heated up in acidic form and thermal resistant solution. The gum powder use in ketchup, sauce, baked food, meat products, instant noodles and ice cream. One of the souring agent in Indian curries is tamarind pulp. As an additive and excellent thickening agent used in manufacturing of canned oet food processed for cat and dogs. The powder idls rich in nutrition and contain fiber which improve digestion in pets. The gum powder used for sizing and thickening in textile. Due to its brilliant property as a soil stabilizer tamarind gum is widely use in mining. Specific area of application in mining are oil delivery and gas industries. Tamarind gum powder has nutritional properties which makes its applicable in different type of industries. These extensive range of industries include food industry, textile industry, mining industry, pharmaceutical industry, tobacco industry, explosive and others.\textsuperscript{[11]}
12. **Gum tragacanth : Astragalus spp**
It is dried exudare produced by tapping root and balances of species Astragalus. Chemically it is a complex mixture of acidic polysaccharides the gum swells rapidly in water to form highly viscous solution or semigel which act as stabilising agent. It was widely used in salad dressing and sauce, savoury spreads, milk shakes, ice cream, confectionary and bakery products. It function as thickener, stabilizer or emulsifier. It stabilizr under acidic condition. Its used as a binder, suspender or emulsifier in tablet, ointments, lubricating jellies or oral suspension and particularly in dermatological creams and lotion. It's also used in toothpaste, hair lotion and other personal care product. Tragacanth has food additive number E413.\[12\]

13. **Dragons blood: Daemocarpus dracco**
Dragons blood resins obtained from Daemocarpus is present as a brittle layer on the surface of immatirecfruit. It's use in coloured varnishes, lacquers, wood strains. It's largely used in violin varnish. \[13\]

14. **Benzoin: Styrex benzoin**
Benzoin is a balasam obtained from trees of styrax. It's used to produce the expensive and delicate perfumes. It's also traded as an incence. It's used quite widely in pharmaceutical preparation as an ingredient of inhalation for treatment of catarrh and in topical preparation for its antiseptic and protective property.\[14\]

15. **Gum ghatti : Dhav**
Gum ghatti is the dried exaudate of Anogeissus latifolia. From Combrataceae family. The trees are not usually tapped for gum. The gum oozes out naturally from the bark through injuries and wound mostly in summer and is collected manually. Gum ghattibus particularly soluble in water and forms a colourless mucilage. The emulsifing property of gym ghatti are excellent and consider to be better than Gum arebic. It is approved for food use and is in the GRAS list under the food, Drug and cosmetic act U.S.A its a non toxic and is not metabolize in human.

It's used as an emulsifier and stabilizer in beverages and butter containing table syrups. As a flavour fixative for specific. In preparation of powdered, stable, oil soluble vitamins. As a binder in long fibered lightweight papers. As an emulsifier of petroleum and non petroleum waxes to form liquid and wax paste emulsions. In combination with polyacrmalide to aid in the polymerisation and formation of uniform and descrete prills of cross linked polystyrene
can use as a drilling, mid conditioner and acidizing if oil wells. It's used in powdered explosive to improve resistant to water damage. \[^{[15]}\]

**16. Guar gum: Cluster bean**

It is the gum derived from seeds of guar plant Cyamposis teragonoloba from family Fabaceae. Guar is being grown in India since ancient time. The tender green guar is an important source of nutrition to animal and human, is consumed as a green vegetable and cattle feed.

Guar gum powder and its derivatives are stable in dry form. It has a long storage life in its dry form. It has long storage life in its dry form provide that it is warehouse property. The properties of guar gum remained unchanged for 12-18 months. When expose to humid condition. It absorb moisture which result in microbial contamination. Hence it should packed in moisture proof container. And store it in cool and dry place away from heat and sunlight. It is advised to consume gum within a reasonable time period once the bag is opened. The shelf life can be extended by adding suitable preservatives.

In several food and beverages guar gum is used as a additive in order to change its viscosity or as a fiber source. PHag is produced by the partial enzymatic hydrolysis of guaran. Which is heat stable, will not gel at high temperature. It has 75% dietary fiber. And has minimal affect on taste and texture in food and beverage items. It to send in foods for particulate suspension, emulsification, antistaling, ice crystal control, reduced fat backed food. Derivatives of guar gum that has been further reacted is also used in industrial application. Such as paper and textile industry, ore flotation, the manufacturing if explosive and hydraulic fracking of oil and gas formation. Guar make a gel complex with metal like Aluminium, Zirconium, Boron etc. \[^{[16]}\]

**17. Gum karaya**

It's also known as Indian tragacanth the dried exaudate obtained from trees of sterculia urens. Also known as Gulu or Katilo guand. In the dry form gum karaya loses viscosity in storage under high heat and humidity. To minimise this storage under colder temperatures is advised. To prevent loss of viscosity property one can add preservatives like benzoate, sorbet, phenols and related compound. Gum karaya is approved for food use and is in the GRAS list under food and drug act. It's used as bulk laxative. Can be use as a adhesive in dental products or adhesive for ostomy ring. It is used as a stabilizer for dairy products and frozen desserts. Its stability in acid media makes it suitable for addition to salad deessing, sauce, cheese spread.
and other product. It's used as in stabilizing packaged whipped cream products, merinque toppings and aerated dairy food. It is also used to improve the spreadability characteristics of cheese spread. It is used as a binder for making low calorie dough. The gum is used in group meat products as it provide good water holding and binding properties to yield finished products.bm the paper industry. It is used in the manufacture of long fibered, light weight papers. It is used in textile printing operations as a thinking agent for the dye in direct color printing on the cotton fabric.[17]

**DISCUSSION**

As most plant products are contain medicinal properties as well as good physical or chemical property which can be used in various field. This gum provide a valuable sources of income for many poor labourer in developing country. Many people living depends on the collection of gums, resins and latex as mean of cash income. The non pharmaceutical uses of the gum has been discussed in this article. They are good for food, pharmaceutical and technical applications. In the food industry, advantage has been taken of their thickening, stabilizing, emulsifying and suspending properties and they are employed in various products including food and drinks. The resins gum are also used in pharma industry as binding agent in tablet, as a suspending and emulsifying agent in cream and lotion; they are also used in dental, medical, printing and textile field.

**CONCLUSION**

Gums and resins in modern times used as embarking chemicals in various field such as incense, medicines, cosmetics, in paints, for waterproofing and caulking ships etc. They are in demand at international market from centuries. Most of the non wood products are exported to foreign countries where they are processed and value added. The local use of gums and resin is less than 5% mostly by the pharmaceutical industry. It's also used in food items and various kind of health drinks are prepared. Some gums and resins are used in a pharma industries or confectionery. Though it provide the commercial value. It's used as a medicine also hence by looking at growth chart, the sector should organize well for future purpose. As the greater expose lies ahead in the form of returns.

**REFERENCES**

1. Sharma PV, Agnivesh, Charak samhita, chaukhamba orientalis,1994, Delhi, (English translation)
4. FAO (1992) Dammar gum; published in FAO food and nutrition paper 31/2, 1984; 475) inbocoppendium of food additive species.
7. The housekeeper's almanac, no. 134, network Elton, 1840.
9. Copen J. 1995, flavors and fragrance of plant origin, food and agriculture organization of the unit for nation. (Ffo), Rome, Italy. 65p.
11. Was.altrafinegums.com