



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(5): 172-181
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www.thepharmajournal.com
Received: 14-03-2021
Accepted: 23-04-2021

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Sources of plant based gums and their utilization in herbal drink: A Review

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DOI: <https://doi.org/10.22271/tpi.2021.v10.i5c.6194>

Abstract

Nowadays plant gums are being used extensively in the industries such as food industry, pharmaceuticals, cosmetics and many others. The gums are used mostly as binding media, sizing agent, stabilizers and also due to their unique functionalities they are used as food additives. Gums are known for their multifarious uses in food industries like bakery, meat, fruit and vegetable. Those obtained from different sources exhibit differences in their chemistry. All have a rich nutritional profile and require different methods for extraction/purification. Gums are having significant importance in food processing industry. Gums are known for their multifarious uses in food industries like bakery, meat, fruit and vegetable. Those obtained from different sources exhibit differences in their chemistry. Thus in this review we are going to discuss about sources of Gums, methods of extraction and their utilization in the development of herbal drink. This is done by the addition of well-known traditional herbs having nutritional potential into the herbal drink to enhance its properties. Elephant apple is a tropical tree distributed among south East Asia, Malaysia, and North Australia. Their extracts have certain properties like anti-microbial and anti-inflammatory. The gum from this fruit will be extracted by using solvent extraction method and the properties will be noted down.

Keywords: Gums, polysaccharides, herbs, extraction, sensory

Introduction

Gums are the complex polysaccharides obtained from the multiple sources, e.g. endosperm of plant seeds (guar gum), plant exudates (e.g. tragacanth), plant based exudates (e.g. gum Arabic, karaya gum (KG), and tragacanth), sea weed derivatives (e.g. agar), bacteria (e.g. xanthan gum), and animal sources (chitin and chondroitin sulphate) (Laaman, 2011) ^[1]. Plant gums are used in the food industry as emulsifying agents and stabilizers. These are primarily used as adhesives, in the Paint and Candy industry and as drugs (Andreotti *et al*, 2008) ^[2]. The gums as well as other saccharides materials such as starch and honey are preferred to be used for binding purpose. Due to wide application of sugar derivatives in different areas, many of them are commercially synthesized. Gums are synthetically produced and are widely used in food industries as well as in pharmaceutical industries. Gums and Mucilage have been kept under the single category, having two sub-divisions on the basis of 'tackiness' and 'sliminess'. 'Gum Arabica' increases the Bifidobacterium Count where it is fermented in large intestine (Cherbut *et al*, 2003) ^[3]. Depending on Their structure, polysaccharides can have wide variety of functions in nature (Amin *et al*, 2007) ^[4]. Due to varied properties, these are also used in making Sauces, ketchups, fruit drinks and other beverages. When Moisture found in various food commodities gets combined with gum polysaccharides, it leads to hydrophilicity. Their application is increased in the products where free water is not suitable for binding. There is wide variety of uses of plant gums in the food industry. Plant gums are also used for the baking Purposes such as to soften the dough and for improving the texture of cakes (Kohajdova *et al*, 2009) ^[5]. Other applications for plant gums are-chewing gums, for baking of products, stabilizing agents etc. (Cerqueira *et al*, 2011) ^[6]. Plant gums have been decided in two categories- Exudate gums and Non-exudate gums. These gums produced due to mechanical injury or microbial attacks are called Exudate gums. On the other hand, Non-exudate Gums can be procured from plant tissues with the help of suitable extraction process (Fathi *et al*, 2016) ^[7]. Gums such as Gums Arabic (GA) and Maltodextrin (MD) are used for herbal and plant related Products in the form of microencapsulation agents (Rajabi *et al*, 2015) ^[8]. For the purpose of thickening of aqueous medium, the locust bean gum is added. Nowadays, for the purpose of Preservation of vegetables for a prolonged period of time, the

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Gaur Gum semi based Coatings are used in order to Prevent spoilage. Quality of the product is effectively assured, with the help of these gums. Water-soluble/dispersible polysaccharides, called as hydrocolloids or gums, are known as viscosity builders and/or gelling agents in aqueous systems (Garti *et al*, 2001) ^[9]. They create a structure that can be viewed as a continuum. Gums initially form the viscosity which, in next step converts into gel. By incorporating air into this structure it will generate a foam and, by the application of drying on gel or foam, a film is formed (Hegenthart, 2001) ^[10]. In continuous phase, hydrocolloids increase their viscosities. In interphase layer they increase the elasticity to prevent the bubble from merging. This will form an elastic barrier between the bubbles and thereby protecting them from collapse (Fennema *et al*, 1993) ^[11]. Studies have shown that plant gums are commonly used in various sectors of food industry. Taking into account the various functionalities in plant gums in different foods, it's important to analyze some of the essential properties of these polysaccharides from food technological point of view. The areas that have been addressed are the sources, types, extraction, composition, properties and health benefits of plant gums from different sources.

Sources of gums

Peach

Peach belongs to genus Prunes and family Rosaceae and includes other fruit-bearing trees along with peach (*P. persica*), damson (*P. insititia*), egg plum (*P. domestica*), cherry (*P. cerasus* and *P. virginiana*), and almond (*P. amygdalus*). Upon infecting with the disease, mechanical injury, and microbial attack these species produce abundant of gum exudates by a process called gummosis. Trunk gummosis is mostly seen in fully grown peach trees and the reason behind is fungal infection due to the continuous pruning. These gums belong to the arabino galactan group (Stephen, 1983) ^[12]. Jones (1950) ^[13]. First studied the detailed study of the polysaccharides obtained from the trunk of *P. persica*.

Sugar beet

Beta vulgaris pulp is one of the valuable food waste collected as a result of sugar production. The carbohydrates content present in dry matter is approx. 75% (w/w) approximately. Glucose, arabinose and galacturonic acid are the major carbohydrates present in the pulp. Around 18-23% (w/w) of dry matter content left after extraction of sugars from sugar beet pectin (Kühnel *et al*, 2011) ^[14]. According to (Michel *et al*, 1985) ^[15] pectin accounts for 10-30% of dry mass of sugar beet but it is found that actual pectin percent is just 0.1 - 0.3% of dry weight. Due to the carbohydrate structure, sugar beet pulp pectin acquires hydrophilic properties and emulsions formed by the pectin are stabilized by an increase in viscosity and steric effects (Nakauma *et al*, 2008) ^[16]. In addition, sugar

beet pulp pectin extract contains protein in the range of 2-10% depending on the conditions of extraction. (Kirby *et al*, 2006) ^[17].

Opuntia ficus

Opuntia ficus indica is a plant that is widely spread in semi-dry countries such as Mexico, Morocco, Tunisia, Eritrea, Ethiopia, Argentina, Peru, Bolivia, Brazil, the United States, Spain, Italy, Israel, Iran, and South Africa (Saéñz *et al*, 2009) ^[18]. This plant belongs to the Cactaceae family (Nharingo *et al*, 2016) ^[19]. From a health point of view, a considerable amount of fibers with health effects such as weight control, blood cholesterol, and diabetes control have been detected in this plant (Uebelhack *et al*, 2014) ^[20]. The characterization of the gum obtained from various sections of *O. ficus indica* plant has been studied by many researchers (Matsuhira *et al*, 2006) ^[21].

Durian seed

Durian (*Durio zibethinus* Murr.) is a seasonal fruit grown in South East Asia. Durian is normally eaten fresh. Only one-third of durian is edible, whereas the seeds (20–25%) and the shell are usually thrown away (Amiza *et al*, 2004) ^[22]. study had shown that durian seed flour could be incorporated into various food products including cake, cookies, soup, tempura, etc. either as a substitute for wheat flour or as thickening agent (Amiza *et al*, 2004) ^[22]. The process development of value-added products (e.g. seed gum and dietary fibre) from durian seed would be a critical part of the durian biorefinery. The wasted durian seed represents a significant potential for the development of value added products. Aqueous extraction is one of the most common techniques applied for the extraction of the seed mucilaginous material (Amin *et al*, 2007) ^[23].

Prunus

The genus Prunus belongs to the family of Rosaceae, producing exudates through a process called gummosis. As a mechanical injury to the branch or infection response to the whole plant gums are released. The two major Polysaccharides present in the gums are arabinose and galactose; both are present at different ratios (Malsawmtluangi *et al*, 2014) ^[24]. P. Domestic gum is used in Syria in the confectionery industry. Gum is also used in India with conjugation with other gums such as Arabic gum, gatti and tragacanth (Nussinovitch *et al*, 2009) ^[25]. The most widely planted apricot plant is *Prunus armeniaca*, also known as the Ansu apricot, belongs to genus Prunus and is widely distributed in China, the Himalaya region and other parts of temperate Asia. In general their chemical properties will decide their functional and physical characteristics (Avachat *et al*, 2011) ^[26]. Table 1 gives a brief description of the sources of different exudates, their extraction method and yield respectively.

Table 1: Various sources of gums and pectin and their extraction method.

S. No	Source	Extraction method	Yield	Reference
1.	<i>Hordeum vulgare vulgare</i> L.	Hot water extraction	83.1%	Ahmad <i>et al</i> , 2009 ^[27] .
2.	<i>Durio zibethinus</i>	Solvent extraction method	18%	Amin <i>et al</i> , 2007 ^[28] .
3.	<i>Opuntia ficus indica</i>	microwave assisted extraction	88.85 ± 5.2%	Salehi <i>et al</i> , 2018 ^[29] .
4.	<i>Prunus armeniaca</i>	water-alcohol solution	73.26%	Shamsara <i>et al</i> , 2015 ^[30] .
5.	<i>Prunus persica</i>	Water extractable	88.34%	Qian <i>et al</i> , 2011 ^[31] .
6.	Locust bean	Cold water extraction	61.7%	Gaisford <i>et al</i> , 1986 ^[32] .
7.	<i>Beta vulgaris</i>	HHP Assisted Extraction	12.23 ± 0.13%	Kaya, 2020 ^[33] .
8.	<i>Citrullus lanatus</i> (Watermelon rind)	Conventional acid extraction	Fresh watermelon rind- 19.3% Lyophilized watermelon rind- 17.4-20.2%	Petkowicz <i>et al</i> , 2017 ^[34] .

9.	<i>Abelmoschus esculentus</i>	Water based extraction	11.44%	Farooq <i>et al</i> , 2013 ^[35] .
10.	<i>Prunus amygdalus</i>	H2O2 and NaOH Extraction	58.2%	Bouaziz <i>et al</i> , 2014 ^[36] .

Industrial application of gums

Gum polysaccharides are derived from renewable sources. They are economical, non-hazardous, abundant in nature and ecologically-friendly. Gums may be classified as microbial, plant exudate and seed gums. Natural gums are hydrophilic compounds that are capable of increasing the viscosity of aqueous solutions even in small concentrations. They have been used in food, bio products, cosmetic and pharmaceutical formulations as emulsifiers and thickeners to control texture, microstructure, as well as to improve the viscosity and stability of the final product (Zare *et al*, 2019) ^[37]. Because of their unique structure and functionality, gum carbohydrates of natural origin find multiple applications in the biomedical arena, compared with synthetic compounds (Padil *et al*, 2018) ^[38]. Gums and their bio composites are preferred for sustained drug delivery because they are safe, edible and more susceptible to biodegradation (Aguero *et al*, 2017) ^[39]. Table 2 present the main bioactive functions of plant gum polysaccharides and their potential pathways found in the body.

Various types of gums used in food industries

Arabic gum

Arabic (acacia) gum is a consumable, sticky tree exudate gum. The two major sources of the gum are *Acacia Senegal* and *Acacia Seyal*. Arabica gum is rich in non-viscous soluble fibers. This gum is having branched-chain complex polysaccharide structure and Ph is merely neutral or slightly acidic. Upon hydrolysis it produces four different kinds of sugars: D-galactose, L-rhamnose, L-arabinose and D-glucuronic acid (Sanchez *et al*, 2018) ^[40]. In pharmaceutical inventions this gum is largely used as a suspension and emulsifying agent and in oral and tropical it is often mixed with tragacanth gum. In the pharmaceutical industry it is also used as a tablet binder (Aguero *et al*, 2017) ^[39].

Tragacanth gum

Tragacanth gum is a plant based exudate derived from the stems and branches of *Astragalus gossypinus* and *Astragalus microcephalus* and is heteropolysaccharide by nature. Seasonal variations and geographical location decide the chemical composition of the gum, such as its structure residues example xylose, arabinose, galactose, glucose, fructose, rhamnose and galacturonic acid. Because of its thermal stability, emulsification property, outstanding solubility and rheological behavior Tragacanth gum has been used as an emulsifier and natural thickener in cosmetics, food, medicines and adhesives (Zare *et al*, 2019) ^[37].

Chewing gum

The taste of chewing gum is enhanced by the mean of Encapsulation with sugar and artificial sweeteners such as aspartame is known to be very famous. Upon chewing these sweeteners are released in the mouth, which later get mixed with the saliva present in the mouth. Several researches have been conducted to find out the link between sugar-containing chewing gum and dental caries, also its usefulness in the recovery of postoperative ileus (Noble *et al*, 2009) ^[41]. The latter it disrupt the normal coordinated propulsive motor activity of the gastrointestinal tract by causing the hindrance in oral intake refers to obstipation. This condition may arise

after abdominal surgery, mostly those surgeries that involve the colon. Also many studies have proposed the anti-cariogenic effect of the sugar free chewing gum (Gul *et al*, 2018) ^[42].

Ghatti gum

Ghatti gum is a plant based exudate and the source of gum is *Anogeissus latifolia* tree, which consists mainly of 85.97% polysaccharide, 7.7% moisture, 4.1% protein and 2.1% ash. Ghatti gum presents as a calcium-magnesium salt and it contains D-xylose, D-mannose, L-arabinose, D-galactose and D-glucuronic acid and less than 1% 6-deoxyhexose. Depending upon its viscosity and solubility Ghatti gum is available in different types and is of pale yellow to brown powder. This kind of gum is mostly used as a thickening, emulsifying, binding and stabilizing agent in food industries and also in biotechnology industries (Padil *et al.*, 2016) ^[43].

Karaya gum

Karaya gum is a plant based exudate obtained from the different part of the tree *Sterculia urens* and other species of *Sterculia*. It is a high molecular weight partially-acetylated polysaccharide having branched structure (B16-106 Da). This gum consist of two different types of sugars one is Neutral sugars which is about 60% (galactose and rhamnose) and another type is acidic sugars which is around 40% (galacturonic and glucuronic acids). Karaya gum can be used as a food stabilizer, huge quantity forming laxative to cure digestive problems, binding agent in meat, thickening agent in textile printing and in tooth powder Because of its high viscosity and suspension properties (Medina *et al*, 2013) ^[44].

Guar gum

Guar gum is a gum obtained from the ground endosperms of *Cyamopsis tetragonolobus* (Leguminosae family). It is a hydrocolloidal polysaccharide having large molecular weight, consisting of galactan and mannan units coupled with glycosidic linkages (Seaman *et al*, 1980) ^[45]. When derived from aqueous medium it is used to form films. The properties of the film largely depend on the form of material used. Under high stress condition guar gum films do not stretch as they possess great tensile strength. In textile printing applications guar gum and its derivatives are used to give modification in rheology also used as thickening agent in dyes (Maier *et al*, 1993) ^[46]. In number of food products guar gum is used to providing economic thickening as well as the desirable advertisement connotation of a "natural" ingredient. It is found that small amount of hydroxypropyl guar gum can be used in latex paints for stabilization and for rheology control (Fath *et al*, 1972) ^[47].

Locust bean gum

Locust bean gum also known as carob gum is the refined endosperm of the seed of the carob tree, belongs to leguminosae family, taxonomically classified as *Ceretonia siliqua L* (Maier *et al*, 1993) ^[46]. Studies have shown that it is polysaccharide by nature and has high molecular weight consist of 300,000-360,000 units (Dea *et al*, 1975) ^[48]. Locust bean gum play wide role in industries like in paper manufacturing, in textile industry etc.; the key current use in food in the U.S. In milk and frozen desserts around 80-85

percent of the locust bean gum is added to them. It is primarily used as stabilizer in ice cream due to its unusual expanding and water holding capacity, and is widely used in combination with many other gums such as guar gum (Maier *et al*, 1993) [46]. Locust bean gum has been used in ice cream and in other related products as it offers outstanding heat-shock tolerance, smooth meltdown, and attractive crispy texture. The average amount for the use of locust bean gum is in between 0.05%-0.25% (Glicksman *et al*, 1983) [49].

Xanthan gum

Xanthan gum is an extracellular polysaccharide having high molecular formed by the fermentation of *Xanthomonas campestris* gram negative bacterium (Cottrell *et al*, 1980) [50]. Xanthan gum is a cold water soluble gum and has high pseudo plastic flow as demonstrated by many solutions. Over a wide range of pH and temperature the viscosity of the gum shows outstanding stability and also shows that polysaccharide is resistant to enzymatic breakdown (Harding *et al*, 1995) [51]. Xanthan gum is added in many of the food products such as biscuits and bread mixes, in cake batter as it

provides smoothness to cake, and in muffins for incorporation and retention of air. Xanthan gum is added in refrigerated dough, reduced calorie baked goods and gluten-free breads as to enhance the volume, texture and moisture preservation. Xanthan gum coatings provide the outstanding long-term stability and comparatively constant viscosity over a broad range of temperatures (Sworn *et al*, 2009) [52].

Other plant exudates

There are other exudates of the plants which are not commonly recognized as the members of above mentioned gum these are Mastic and storax gums. An ever-green shrub named *Pistacia lentiscus* releases resin containing gum known as mastic gum upon injury. The major components present in the gum are triterpenes of euphane, oleanane and lupine (Jin *et al*, 2017; Xynos *et al*, 2018) [53, 54]. Another oleoresinous substance named Storax gum is extracted from the trunk of *Liquidambar orientalis* is generally mixed with perfumes, used to cure skin related diseases and because of its having disinfectant properties it is also used to treat cough, cold and other breathing illnesses (Otsel *et al*, 2019) [55].

Table 2: Reported health benefits of plant gums

Health claim	Plant gum	Proposed mechanism	References
Regulating satiety	Guar gum	Slows gastric emptying owing to high viscosity of the meals, reduces appetite and desire for eating	Butt <i>et al</i> , 2007 [56].
Regulating colon function	Acacia gum, karaya gum, guar gum, tragacanth gum	Acts as dietary fibre is fermented by colon microflora to short chain fatty acids. Increases stool wet weight, is fermented by colon microflora to short chain fatty acids. Act as probiotic.	Annisson <i>et al</i> , 1994. [57] Caballero <i>et al</i> , 2003. [58] Gibson & Roberfroid 1995 [59].
Promoting cardiac health	Acacia gum	Regulates the systolic and diastolic blood pressure in patients with chronic renal failure.	Ali <i>et al</i> , 2007 [60]. Stamler <i>et al</i> , 1993. [61]
Reducing blood cholesterol	Acacia gum	Inhibits lipolysis due to strong interaction of its protein moiety with the lipid/water droplet interface, blocking lipase activity.	Pasquier <i>et al</i> , 1996. [62]
Promoting tooth remineralisation	Acacia gum	Contains the minerals like calcium, magnesium and potassium, regulates calcium metabolism in body.	Onishi <i>et al</i> , 2008. [63]
Prevention of renal failure	Acacia gum Artemis sphaerocephala Krasch. (ASK) seed gum	Lowers the levels of urea in body by decreasing the urea nitrogen excretion in urine and increasing its excretion in stools. Reduces the oxidative damage of kidney in the diabetic rats	Ali <i>et al</i> , 2010. [64] Hu <i>et al</i> , 2011. [65]
Prevention of diarrhea and dehydration	Acacia gum	Improves intestinal absorption of water and electrolytes like sodium.	Codipilly & Wapnir., 2004. [66]
Anti-diabetic activity	Guar gum Locust bean gum ASK seed gum	Inhibits the digestion and absorption of carbohydrates in the intestine reducing glucose transmission into the hepatic portal. Guar gum lowers the insulin resistance and improved insulin sensitivity as well as b-cell function. Affects viscosity and food structure, it can alter the rate of carbohydrate degradation during digestion regulating postprandial blood sugar and insulin levels. Increases Superoxide Dismutase activity and reduced the malondialdehyde and hydroxyl levels in the liver and serum of diabetic rats.	Nasry <i>et al</i> , 2013; Roberts 2011. [67, 68] Ferguson & Harris., 2005. [69] Hu <i>et al</i> , 2011. [65]
Antioxidant activity	Acacia, apricot and karaya gum Guar and locust bean gum ASK seed gum Corn fibre gum	Presence of phenolic compounds, free radical scavenging, metal chelation, reducing power Presence of phenolic compounds, free radical scavenging, metal chelation, reducing power Precise mechanism is not known Presence of phenols	Hamdani <i>et al</i> , 2018 [70] Hamdani & Wani., 2017. [71] Hu <i>et al</i> , 2011. [65] Kamboj & Rana., 2018. [72]

Applications of gums in food industry

The discovery of gums has variety of applications in many food industries because of the varied functionalities these confer to completely different food products. Gums have outstanding feature as they can extend both; the organoleptic properties of the food and Nutraceuticals potential of food produces (Hamdani *et al*, 2018)⁷⁰. By the use of gums we can

enhance the rheology (Valdez, 2012)⁷³, taste, texture, mouth feel and, overall quality, stability and acceptability of food products. With such properties, gums have been used as additives in the making of baby foods, salad dressings, sauces and soups, icings, cake mixes, ice creams, coffee whiteners and cured meat foods (Hamdani *et al*, 2017) [71]. Gums have been used as emulsifying, coating, stabilizing, thickening and

bulking agents in many of the food industries like beverage, confectionary and dairy.

In some food formulations, different gums are primarily used as fat replacers to provide safe and reduced-calorie foods with outstanding eating consistency. In addition, within the matrix formed

from gums, the production of processed foods from fish, meat, fruit or vegetables is commonly carried out. The introduction of gums into such restructured meat and fruit products has further increased their demand and application in the food industry to achieve improved texture, slice ability and yield (Williams *et al*, 1998) [74].

In the baking industry, plant gums have been primarily used to create gluten-free bakery products to meet the needs of clinically diagnosed celiac patients as well as individuals who aim to remove protein-containing gluten from their diet because of genetic predisposition (Pellegrini *et al*, 2015) [75]. Celiac disease is a small intestine inflammation-causing autoimmune enteropathic condition (Horstmann *et al*, 2017) [76]. Gluten has been scientifically shown to be linked with villous atrophy of small intestine which hinders the desire to digest nutrients later. In general, the mechanism is followed by biological symptoms such as dermatitis herpetiformis, gluten ataxia, allergies and non-celiac gluten sensitivity (Sapone *et al*, 2012) [77].

Herbal drink

As people are increasingly anxious about their wellbeing and aware of the possible role of death; nutritional supplements in wellbeing, herbs and herbal extracts are becoming more common because of their documented health benefits in particular (Katalinic *et al*, 2006) [78].

For the supplementation of nutraceutical enrichment components such as soluble fibre or herbal extract, beverages are considered an excellent medium (Gordon *et al*, 2003) [79]. HDs apply to drinks, eaten cold or sweet, created from the implantation or decoction of spices, flavors, natural product, or other plant-based products. Herbal teas, organic product juices, imbuements, and decoctions are important for them. Often due to their therapeutic uses, HDs are profoundly respected (Sökand *et al*, 2013) [80]. The best five most utilized species for HDs were *V. jatamansi*, *I. rugosus*, *O. acanthium*, *A. nilotica*, and *V. canescens*. Their high UV might be because of their simple openness, accessibility, wide dissemination in the region, and the solid ethnic culture to utilize these plants for therapeutic purposes. The restorative and financial significance of these species has been featured by numerous past examinations incorporating ethnopharmacology prospections in the Himalayan district. *V. jatamansi* is a notable restorative animal type in Asia (Bhatt *et al*, 2012) [81].

Table 3: Definition of some concepts related to herbal drinks.

Herbal drinks	Definition
Herbal tea (HT)	An herbal drink made of herbs, berries, and delicate plant stems. Light herbal tea is a mixture of therapeutic and medicinal uses.
Herbal infusion (HI)	An herbal tea is blended with a bigger volume of herb from prolonged steeping or boiling process. Herbal infusions are used primarily for medical purposes as well as to deliver the best dosage of vitamins and minerals to the body. Vitamins and volatile ingredients are extracted from the leaves and flowers by the mean of infusion.
Herbal decoction (HD)	An herbal drink made from roots, barks, beans, rhizomes, and trees for the extraction of plant mineral salts and bitter values. In comparison to infusions, decoctions are left on the flame for a long time and are simmered.
Herbal fruit juice (HFJ)	An herbal beverage prepared from the fruits.

Rashid *et al*. Journal of Ethnobiology and Ethnomedicine (2018) 14:16. [82]

Health benefits of commonly used selected herbs

Basil leaves

Basil scientifically known as Genus *Ocimum L.* (Lamiaceae) is widely cultivated in Africa, Asia, South America and the Mediterranean. Basil includes various kinds of herbs and shrubs which are widely used to season the tomato dishes, vegetables, meat, salads, soups, fish and pizza. The essential oils and aromatic extracts from various varieties of basil are widely used to manufacture several components of dental products, pharmaceuticals, cosmetics, and flavoring agents. Basil is considered a holy plant in India and Nepal and is named as Tulsi. It is used in many ayurvedic medicines. In South America, the term altavaca refers to basil used in traditional medicines (Cohen *et al*, 2014) [83]. The leaves and implantations of *O. basilicum* are generally utilized in customary medication. In some Mediterranean regions, for example, Eastern Morocco, they are utilized to diminish plasma lipid content (Zhang *et al*, 2009) [84]. Other detailed therapeutic employments of basil leaves incorporate the treatment of looseness of the bowels, diarrhea, clogging, tooting and worms; (Simon *et al*, 1999) [85] as a pain relieving and insect repellent; to alleviate the indications of bronchitis, influenza, colds, hacks and sinusitis; and as a solution for stiffness, muscle throbs, gout and depletion. The juice communicated from the leaves additionally has various

remedial uses: it diminishes the side effects of cold and hack, and those of croup, when blended in with nectar. It is additionally utilized as a treatment for toothache, ear infection and migraine and can be blended in with camphor to stop nasal discharge. It is said to offer radiance to the eyes, and structures a superb remedy for the fix of ring worms, scorpion sting and snake nibble. Basil seeds saturated with water and eaten are supposed to cool and feeding. The seeds are bitten as a treatment for snake chomp. *O. basilicum* has various valuable impacts on the cardiovascular framework: it might contain polar items with the capacity to bring down plasma lipid focuses, (Harnafia *et al.*, 2009) [86], which could demonstrate successful in the treatment of hyperlipidaemia, atherosclerosis and related infections, which are turning into an expanding wellbeing worry in creating nations (Amrani *et al.*, 2006) [87] demonstrated that *O. basilicum* remove showed significantly more grounded hypolipidaemic movement contrasted with fenofibrate medicines. *O. basilicum* watery concentrate showed a high antioxidant power and was appeared to deliver a β -adrenergic impact in pale skinned person rodents (Muralidharan *et al*, 2004) [88].

Mint leaves

Mint (Genus: *Mentha* spp.) is firmly identified with an assortment of oil yielding plants like sage, marjoram, basil,

lavender, rosemary and thyme. Like them mint is additionally remembered for the family Labiatae (Lamiaceae). What more, included inside the family *Mentha* spp. is over 25 types of mint; generally regular of them are: peppermint, spearmint, wild mint, twisted mint, American mint, bergamot, Korean mint, twisted mint, and so on. These species flourishes in the calm developing zones of Australia, Eurasia and South Africa. (Chauhan *et al.*, 2009) ^[89]. The monetary significance of mint is well apparent from the way that its different mixes and constituents acquired from the parched and new plants and their basic oils shapes part of various things of every day utilize like confectionary, makeup, oral cleanliness items, drugs, pesticides, and as a flavor improving specialist in toothpastes, biting gums and drinks, to give some examples. Decoction arranged by bubbling leaves of mint is compelling in looking for alleviation from gastric distension, tooting, dazedness, pregnancy related regurgitating and as a solution for different substantial irritations including bronchitis (Patel *et al.*, 2008) ^[90]. As a condiment and salad dressing called chutney, Indians grinds mint into a glue alongside onion, garlic, ginger, tomato, crude mango and a variety of flavors including fennel seeds, dark salt, dark pepper and chilies. The poignancy and sweet sharpness of tomatoes in its soup can be praised by including new mint leaves in the hacked structure. During rankling Indian summers, security from heat strokes can be guaranteed by taking an invigorating beverage got by pulverizing sugarcane with mint leaves or by eating yogurt with expansion of powdered dried leaves of mint. In various nations as a tea seasoning specialist, *Mentha spicata* L. (spearmint) leaves are prevalently utilized. (Chauhan *et al.*, 2009) ^[89]. In people medication, mint has the believability of fruitful easing of diseases, for example, parasitosis, cerebral pain, stomach spasms, tooting and heartburn, queasiness and heaving, feminine issues and dysmenorrhea. The spice was discovered to be of an extraordinary restorative advantage when utilized as a checking specialist to influenza and aggravation instigating cycles of the oropharyngeal area, sinus lots and pits and of hepatobiliary and gastrointestinal cause (Fragoso *et al.*, 2008) ^[91]. Peppermint is bound with various dynamic mixes, for example, limonene, menthone, menthofuran and menthol, and on clinical evaluations these constituents were found to have a raised therapeutic worth particularly in the treatment of the gastrointestinal objections. It is fascinating to take note of that individuals are presently becoming acclimated to the reception of peppermint oil or peppermint tea as solution for acid reflux, dyspepsia, tooting and epigastric swelling. (Bupesh *et al.*, 2007) ^[92].

Rosemary

Rosemary the memory spice of the mint family has been utilized by man since old occasions. Records of the utilization of rosemary show up in cuneiform on Sumerian stone tablets of the fifth thousand years Bc. Rosemary (*Rosmarinus offi cinalis* L.) syn. The word rosemary is gotten from the Latin word *rosmarinus* signifying, ocean dew. Rosemary leaves and flowering tops have numerous culinary uses: sheep cook, lamb arrangements, marinades, bouquet garni, heated fish, rice, soups, servings of mixed greens, every so often with egg arrangements, dumplings, apples, summer wine cups and organic product cordials, in vinegar and oil (Bonar, 1994) ^[93]. Rosemary is a best spice with a wide scope of employments in food preparing. In Europe and the USA, rosemary is industrially accessible for use as a cancer prevention agent, however not

actually recorded as characteristic additive or cell reinforcement, particularly in Europe (Heinonen, 2001) ^[94]. Rosemary oil likewise has applications in meat protection. The expansion of rosemary oleoresin to ground chicken had a general beneficial outcome on crude meat appearance during capacity and on the kind of the cooked meat (Koekammerd *et al.*, 2008) ^[95]. In conventional medication, botanists suggest rosemary oil for a wide scope of problems including aspiratory infections. Rosemary oil has been depicted as having the accompanying properties: stomachic, injury mending (poultice), choleric, antidiabetic, diuretic, stimulant and antispasmodic (Erenmemisoglu *et al.*, 1997) ^[96]. Fluid freshened up concentrate of rosemary Herbor and sleek concentrate of blend of spices, for example, rosemary, thyme, sage and oreganum Flavor Cocktail repressed human immunodeficiency infection (HIV) contamination at low fixations However they were cytotoxic. Rosemary is currently picking up significance in malignant growth treatment. Rosemary has been appeared to have potential as a wellspring of anticancer particles and as a therapy to improve the bioavailability of malignant growth drugs (Rasha *et al.*, 2010) ^[97].

Parsley

Parsley (*Petroselinum crispum* L.) develops in Europe and Asia as a wild plant. The new and dried spice is generally utilized as enhancing in various food items by virtue of its amazing sweet-smelling scent (Maroto, 2003) ^[98]. Developed parsley as a zest is created in vegetable nursery. It is a rich wellspring of nutrients C and E, b-carotene, thiamin and natural minerals (Soysal, 2004) ^[99]. In India, parsley is as yet utilized in customary Ayurvedic medication for stomach protests, as a diuretic and as an expectorant. In Europe, parsley has been utilized to treat asthma, hacks, eye objections, jaundice, gout, edema, bladder diseases, feminine issues and plague (Tyler, 1994) ^[100]. Parsley juice can be utilized in treating hives and other sensitivity manifestations; it additionally restrains the discharge of histamine. Parsley has likewise been utilized as a liver tonic and to help in the separating of kidney stones. The parsley root can be utilized as a purgative and furthermore assists with disposing of swelling. It can diminish weight by lessening abundance water gain. The root can be utilized to mitigate fart and colic, because of its carminative activity. Parsley can be utilized as a delicious breath revitalizer attributable to its high chlorophyll content. It likewise speeds the mending of wounds and calms tired and shine lacking eyes. The juice absorbed a cushion can mitigate ear infection and toothache. Parsley can be utilized as a face wash to help spots. Lactating ladies have utilized the leaves of parsley as poultice to assuage bosom delicacy. The powdered seeds of parsley are a people solution for hair development and scalp incitement whenever rubbed into the scalp for three days. It additionally has solid cancer prevention agent properties (Pizzorno *et al.*, 1985) ^[101]. Parsley is accounted for to have diuretic, carminative, emmenagogue, antipyretic, anticancer and cancer prevention agent properties. Further to its antimutagenic and cell reinforcement properties, it has been appeared to show calming, antiviral and laxative impacts (Shukla and Gupta, 2010) ^[102].

Thyme

The sort *Thymus* has a place with the Labiate family (Lamiaceae), sub-family Nepetoideae, clan Mentheae. The dispersion of the class can be portrayed as Eurasian with the

Mediterranean district, particularly the Iberian Peninsula and North-west Africa, being its center (Morales, 2002) ^[103]. Thyme spice or prepared items can be utilized in culinary as well as well as food handling as a different enhancing or in the structure of intensified flavors, zest, basic oil, oleoresins or other item mixes. The rundown of thyme applications incorporates practically all nourishments: refreshments, cheddar, fish, meat, plate of mixed greens dressings, sauces, vegetables, egg dishes, game and poultry, soups and nectar. Typically, inferable from its tangible qualities, thyme isn't appropriate for sweet items. The primary employments of thyme in culinary and food preparing are characterized by the accompanying properties of thyme parts: (I) scent and taste, (ii) cell reinforcement and (iii) antimicrobial exercises. Likewise, new green thyme leaves can be utilized in culinary craftsmanship as a beautiful green spice. It is apparent that food seasoning stays as the principle thyme application zone, while its antimicrobial and cancer prevention agent properties can be considered as the valuable advantages of thyme items, which have been added to the nourishments. Entire dried thyme spice as such can locate various culinary applications; in any case, its immediate use in food handling is fairly restricted. Natural Thyme, thyme concentrates and thyme oil are utilized to treat indications of bronchitis and challenging hack just as catarrh in the upper respiratory tract. (Zarzuolo *et al*, 2002; and references cited therein) ^[104] of both the fundamental oil and the plant separates, the antimicrobial, antioxidative and antispasmodic properties being the most significant ones. Thyme may likewise improve liver working, and go about as a hunger energizer. It will be utilized in treatment of cartilaginous cylinder, bronchial and urinary contaminations. Utilized as a rinse, Thyme is useful in treatment of laryngitis and aggravation. The principle part of the unstable oil of thyme, thymol, is dynamic against enterobacteria and cocci microorganisms. It is utilized for skin issues like slick skin, sciatica, skin break out, dermatitis, skin condition and bug chomps. In fragrance based treatment, the particular sorts, thymol, red thyme oil and linalol kind for its horribly light delicate activity and thuyanol for antiviral properties are utilized. A remedied item, white thyme oil is additionally utilized, and it's milder on the skin. Applied to the skin, thyme diminishes chomps and stings, and mitigates neuralgia and rheumatic a throbbing painfulness. Thymus vulgaris oil is a blend of monoterpenes. The most mixes of this oil are the regular terpenoid thymol and its phenol synthetic compound carvacrol (Amiri, 2012) ^[105] that have antioxidative, antimicrobial, restorative medication, antitussive, antispasmodic, and antibacterial impacts (Höferl *et al.*, 2009) ^[106].

Aloe vera

Aloe vera leaf contains 95% of water, 75 supplements, 200 dynamic mixes, 20 minerals, 18 amino acids, 12 nutrients and 92 proteins. It tends to be utilized as the wellspring of nutrients like A, B1, B2, B6, B12, C, E, Folic corrosive, Niacin and so forth Because of its delicious properties, it is a rich wellspring of supplements and fundamental minerals (Kawaii *et al.*, 2000) ^[107]. The natural exercises of aloe leaf removes are bound to be expected a synergistic activity of the mixes as opposed to a solitary compound (Hamman, 2008) ^[108]. Aloe vera has enhanced the food business by being presented as practical nourishment for the readiness of ordinary items as refreshments, milk or frozen yogurt notwithstanding its utilization as a palatable covering for

organic products (Benítez *et al.*, 2015) ^[109]. The business of the items got from Aloe vera (food items, for example, drinks with aloe, milk, frozen yogurt, food supplements, gel arrangements and treatments and corrective items, for example, creams, cleansers, shampoos, facial cleaners, salves) is financially significant and it is expanding step by step. Subsequently, the improvement of the handling (for example reaping, dealing with, transportation, crushing, warming, parchedness, gel removal, gel extraction, gel adjustment) is imperative to acquire more dynamic and compelling items and to evade changes of arrangement that may change physiological and drug properties of Aloe vera items (Ramachandra *et al*, 2008) ^[110]. Aloe vera gel and entire leaf remove have appeared to improve the bioavailability of nutrients. This opens another utilization of Aloe vera, which can be utilized as excipient of continued delivery tablet plans (Hamman, 2008) ^[108]. It has been broadly utilized observationally for the medicines of numerous issues, for example, consumes and injuries of old civic establishments. Different utilizations incorporate seborrheic dermatitis, warm consumes and burn from the sun, cystic skin inflammation, peptic ulcers, and removal stump ulcers, cuts, colds, tuberculosis, gonorrhea, asthma, looseness of the bowels and migraines. It has been utilized as diuretic and bug repellent (Shelton, 1991) ^[111]. Aloe vera is known as a recuperating plant and has been utilized in a few societies for the treatment of skin wounds (Hashemi *et al*, 2015) ^[112].

Conclusions

Gums are the complex polysaccharides obtained from the multiple sources, e.g. endosperm of plant seeds (guar gum), plant exudates (e.g. tragacanth), plant based exudates (e.g. gum Arabic, karaya gum (KG), and tragacanth), sea weed derivatives (e.g. agar), bacteria (e.g. xanthan gum), and animal sources (chitin and chondroitin sulphate). Gum exudates play major role in different industrial applications, e.g. as emulsifiers in food and cosmetic industry and thickeners to improve the texture, microstructure, they are also have been used to enhance the consistency and viscosity of the final products. The use of doing this work is that the gum from this fruit has many useful properties in the industrial era. As gums have properties such as binding properties, additives, thickeners and stabilizers so it can be used extensively in food products. My idea is to use this gum with the addition of some herbs and use in some drinks to improve its physical and nutritional properties.

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