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Research Article

Development of Herbal Tea Formulation for Functional Health Benefits

Amrute Bhavesh B.*[1], Shirude Amruta A.[2], Hale Onisha R.[3], Kadam Shruti R.[4], Jadhav Supriya G.[5], Khaire Ashwini R.[6], Upasani Chandrashekhar D.[7]

[1,3,4,5,6,7]S. N. J. B's Shriman Sureshdada Jain College of Pharmacy, Neminagar, Chandwad, Nashik.
[2]S. G. S. S's Loknete Dr. J. D. Pawar College of Pharmacy, Manur, Kalwan, Nashik.

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ABSTRACT

Herbal tea, also known as tisane, is a beverage prepared by infusing or decocting various parts of plants such as leaves, seeds, roots, flowers, or fruits excluding the traditional tea plant, Camellia sinensis. Unlike true teas, herbal teas are typically caffeine-free and are valued for their diverse flavors and potential health benefits. They have been integral to traditional medicine systems like Ayurveda and Traditional Chinese Medicine, where they are used to address a range of ailments and promote general well-being. Herbal teas contain a variety of bioactive compounds, including phenolic acids, flavonoids, terpenoids, and saponins, which contribute to their antioxidant, anti-inflammatory, antimicrobial, and immune-boosting properties. Popular herbal teas include chamomile, ginger, peppermint, cinnamon, and ginseng, each offering specific therapeutic effects such as relaxation, digestive support, immune strengthening, and stress relief. The preparation and consumption of herbal teas have become a widespread cultural practice, appreciated not only for their medicinal value but also for their sensory qualities and role in social gatherings. In summary, herbal tea is a versatile and functional beverage with a rich history and a wide range of potential health benefits, making it a popular choice for both traditional healing and modern wellness.

INTRODUCTION

Refreshing and flavorful beverage made from the leaves, seeds, roots, or flowers of various plants. Herbal teas have been cherished for their medicinal properties, culinary value, and calming effects. With over 1,000 known varieties, herbal tea is the second most consumed beverage in the world after water, with an estimated 18–20 billion cups consumed daily. Herbal tea soothes the stomach, lowers blood pressure, and may have anti-cancer properties. It is caffeine-free, tastes delightful, and is easy to drink. Traditional systems of medicine, such as Ayurveda in India

***Corresponding Author:** Amrute Bhavesh B.
Address: *S. N. J. B's Shriman Sureshdada Jain College of Pharmacy, Neminagar, Chandwad, Nashik.*
Email ✉: bhaveshamrute@gmail.com
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and Traditional Chinese Medicine (TCM), utilize herbal teas to promote well-being and address specific health concerns (Balick & Lee, 2002). With the growing interest in natural remedies and holistic health practices, herbal teas have gained worldwide popularity. Their use dates back thousands of years. Ancient civilizations, including the Egyptians, Greeks, and Romans, recognized the therapeutic potential of plants and incorporated herbal teas into their daily lives (Balick & Lee, 2002). In traditional Chinese culture, herbal teas have been used for over 5,000 years to balance the body's energy. The aim of this study is to develop a herbal tea formulation that possesses high nutritive value and evaluate this formulation through nutritional, sensory, and phytochemical analysis. Herbal tea is unique in several ways that distinguish it from traditional teas made from Camellia sinensis:

Diverse Plant Sources: Herbal teas are made from a wide variety of plant parts including dried fruits, flowers, seeds, roots, spices, and herbs, rather than tea leaves. This diversity allows for a broad spectrum of flavors and aromas, from floral and fruity to spicy and earthy.

Caffeine-Free Nature: Most herbal teas are naturally caffeine-free, making them an ideal choice for individuals sensitive to caffeine or those seeking a soothing, non-stimulating beverage, especially in the evening.

Health-Promoting Properties: Many herbal teas contain bioactive compounds such as polyphenol antioxidants, which support cellular health. Specific herbal teas like chamomile, peppermint, ginger, hibiscus, rooibos, and butterfly pea flower have unique therapeutic benefits, including anti-inflammatory, antimicrobial, antioxidant, digestive aid, calming, and cardiovascular support effects.

Cultural and Medicinal Heritage: Herbal teas have a long history of use as natural remedies across various cultures worldwide. For example, chamomile is renowned for its calming and sleep-enhancing qualities, peppermint for digestive relief and mental clarity, and rooibos for heart health and low tannin content.

Visual and Sensory Appeal: Some herbal teas offer unique visual experiences, such as butterfly pea flower tea, which brews into a vibrant blue color that changes to violet with lemon juice, adding an aesthetic and interactive element to tea drinking.

Versatility in Preparation: Herbal teas can be consumed hot or cold and are often blended with other herbs or even true teas to enhance flavor and health benefits, making them highly adaptable to personal taste and health needs. These unique attributes make herbal teas not only a flavorful and aromatic beverage option but also a functional drink with a wide range of health benefits and cultural significance.

Benefits of herbal tea are as follows:

- Give more calm and relaxed state of mind.
- Aiding with stomach and digestive problems.
- Promote energy level.
- Nourishment of nervous system.
- Give strength to immune system.
- Provide antioxidants to the body.
- Relief from stress.

Table 1: Formulation Of Herbal Tea

Sr. No.	Ingredients
1	Shatavari (Asparagus Racemosus)
2	Coriander Leaves (Coriandrum sativum)
3	Chasteberry (Vitex agnus-castus)
4	Cinnamon (Cinnamomum verum)
5	Ashwagandha (Withania somnifera)

6	Fennel (Foeniculum vulgare)
7	Lemongrass (Cymbopogon citratus)
8	Tulsi (Ocimum sanctum)
9	Cardamom (Elettaria cardamomum)
10	Nutmeg (Myristica fragrans)
11	Roselle (Hibiscus sabdariffa)
12	Menthol (Mentha arvensis)
13	Giloy (Tinospora cordifolia)
14	Rosemary (Rosmarinus officinalis)
15	Amla (Emblica officinalis)
16	Turmeric (Curcuma longa)

Flavor Profile and Benefits:

- *Shatavari*:_ Provide a calming and soothing base.
- *Coriander Leaves and Chasteberry*: Add a refreshing, slightly herbal note.
- *Cinnamon, Cardamom, and Nutmeg*: Impart a warming spice to the blend.
- *Ashwagandha*: Contribute adaptogenic properties, helping the body manage stress.
- *Fennel and Lemongrass*: Bring a light, citrusy freshness.
- *Tulsi and Menthol:* Offer respiratory support and a cooling effect.
- *Roselle:* Adds a tangy, fruity note, balancing the warmth of the spices.
- *Giloy, Amla, and Turmeric*: Enhance the immune-boosting properties of the tea.
- *Rosemary:* Introduces a slight pine-like aroma, enhancing mental clarity.

MATERIALS:

Shatavari: -

Synonyms: Asparagus racemosus, Wild asparagus, Satavar (in Ayurveda)

Biological Source: Shatavari is derived from the tuberous roots of the Asparagus racemosus plant.

Family: Asparagaceae

Chemical Constituents:

Saponins, Alkaloids, Flavonoids, Glycosides, Tannins, Vitamins (especially vitamin A and C), Minerals (like calcium and iron) Shatavari (Asparagus racemosus), known as the "Queen of Herbs" in Ayurveda, is a climbing shrub native to tropical regions of India, Sri Lanka, and Nepal. Its name translates to "one with a hundred roots" or "acceptable to many," reflecting its traditional use as a fertility enhancer and female reproductive tonic.

Medicinal Properties

Shatavari is classified as a rasayana (rejuvenative tonic) with cooling (sheeta) and moistening qualities. It balances Vata (air) and Pitta (fire) doshas while reducing excess Kapha (mucus) due to its bitter-sweet taste. Key pharmacological actions include galactagogue (promotes lactation), aphrodisiac, and adaptogenic effects, aiding stress resilience.

Health Benefits

Female Health: Enhances fertility, regulates hormones, and alleviates menopausal symptoms like hot flashes.

Lactation: Widely used to boost breast milk production in nursing mothers.

Digestive Aid: Treats hyperacidity, IBS, and ulcers by soothing gastrointestinal inflammation.

Immunity: Acts as a general tonic to improve vitality and combat chronic fatigue.

Mental Health: Calms anxiety, promotes restful sleep, and stabilizes mood via its adaptogenic properties.

Traditional Uses

In Ayurveda, shatavari is part of the Balya (strength-promoting) and Vayasthapana (anti-aging) herb groups. Its roots are prepared as powders, decoctions, or medicated ghee for conditions like tuberculosis, rheumatism, and reproductive disorders. Modern research notes its potential in managing diabetes, cholesterol, and bacterial infections. Safety Generally well-tolerated, though rare allergic reactions may occur. Consult an Ayurvedic practitioner for personalized dosing.

Key Takeaway

Shatavari is a versatile herb integral to women's health, stress management, and digestive wellness in Ayurveda, backed by both traditional use and emerging scientific evidence.

Coriander Leaves:-

Synonyms: Cilantro,Chinese parsley

Biological Source: Mediterranean region,Africa,Asia

Family: Apiaceae (Umbelliferae)

Chemical Constituents:

Essential oils (including linalool, decanal, and alpha-pinene), Flavonoids (such as quercetin) Phenolic compounds, Vitamins (especially vitamin C and vitamin K), Minerals (like potassium and calcium). Coriander (Coriandrum sativum) is an annual herb belonging to the Apiaceae family, native to the Mediterranean Basin and Middle East regions. It is widely cultivated worldwide for its culinary and medicinal uses. The plant grows 30 to 60 cm tall, with slender hollow stems, feathery bipinnate leaves, and small pink or white flowers arranged in umbels. Its fruit is a small, dry schizocarp that splits into two round seeds about 5 mm in diameter, which have a mild fragrance and a flavor reminiscent of lemon peel and sage. Coriander is unique in that all parts of the plant are edible. The

fresh leaves, known as cilantro in North America, are used as an herb with a fresh, slightly citrus taste, though some people perceive a soapy flavor due to genetic differences. The dried seeds are used as a spice, commonly in curries, sausages, pastries, and liqueurs. The seeds contain 0.1 to 1 percent essential oil, primarily composed of linalool (coriandrol), geraniol, and borneol, which contribute to their aroma and medicinal properties. Historically, coriander has been used since at least 5000 BCE, with records of its use by the Romans to flavor bread. It was also valued in ancient Egyptian, Greek, and Roman cultures for its aromatic and carminative properties. Today, coriander is prominent in Mexican, Indian, Southeast Asian, and Chinese cuisines. Nutritionally, coriander is rich in dietary fiber, manganese, iron, magnesium, vitamins K and C, and protein. It offers various health benefits, including improving digestion, lowering blood sugar, boosting immunity, and promoting heart and kidney health. Its antioxidant, antimicrobial, and anti-inflammatory properties make it useful for treating skin conditions and respiratory ailments. In Ayurveda, coriander is used to detoxify the body, cleanse the liver, and treat infections and metabolic disorders. In summary, coriander is a versatile herb and spice with a long history of culinary and medicinal use, valued for its distinctive flavor, nutritional benefits, and therapeutic properties.

Chasteberry (Vitex agnus-castus):-

Synonyms: Chastetree, Monk's pepper, Vitex

Biological Source: The fruit of the Vitex agnus-castus plant, a flowering shrub native to the Mediterranean region and parts of Asia.

Family: Lamiaceae (mint family)

Chemical Constituents:

Flavonoids (e.g., apigenin, luteolin), Iridoids (e.g., agnuside), Essential oils, Diterpenes, Alkaloids Chasteberry, also known as Vitex agnus-castus, monk's pepper, or vitex, is a shrub native to the Mediterranean and Central Asia. The plant’s fruits (berries), leaves, stems, and flowers are used to create herbal extracts traditionally employed for various gynecological and hormonal issues. Historically, chasteberry was believed to promote chastity, with monks reportedly using it to reduce sexual desire. Today, it is commonly used as a dietary supplement to alleviate symptoms related to premenstrual syndrome (PMS), menstrual irregularities, breast pain associated with the menstrual cycle, infertility, and menopause symptoms. The active compounds in chasteberry include flavonoids (such as vitexin and casticin), iridoids (like agnuside), and diterpenes, which contribute to its hormonal effects. The herb is thought work by balancing hormone levels, particularly by increasing progesterone and reducing prolactin secretion. This hormonal

modulation helps regulate menstrual cycles, reduce PMS symptoms such as irritability, breast tenderness, migraines, and mood swings, and may support fertility by improving luteal phase defects where progesterone production is insufficient. Clinical studies, though often of low to moderate quality, suggest chasteberry can reduce PMS symptoms and breast pain. In Germany, it is even prescribed for menstrual irregularities and PMS. However, more rigorous research is needed to conclusively prove its effectiveness for other conditions like infertility or menopause. Safety-wise, chasteberry may not be suitable for women with hormone-sensitive cancers (breast, uterine, ovarian) and should be avoided during pregnancy and breastfeeding due to potential risks. Side effects are generally mild but can include gastrointestinal discomfort or allergic reactions. In summary, chasteberry is a traditional herbal remedy with some evidence supporting its use for PMS and menstrual-related symptoms, acting mainly through hormonal regulation. However, further high-quality research is necessary to fully validate its broader health claims and safety profile.

Cinnamon:-

Synonyms: Cassia (Cinnamomum cassia), Ceylon cinnamon (Cinnamomum verum)

Biological Source: The inner bark of trees from the Cinnamomum genus, primarily Cinnamomum cassia and Cinnamomum verum.

Family: Lauraceae (laurel family)

Chemical Constituents:

Cinnamaldehyde, Cinnamic acid, Coumarin

Essential oils (e.g., eugenol), Flavonoids

Cinnamon is a spice derived from the inner bark of several tree species in the genus Cinnamomum, primarily Cinnamomum verum (true or Ceylon cinnamon) and various cassia species such as C. cassia, C. burmanni, and C. loureiroi. The cinnamon tree is a bushy evergreen native to Sri Lanka, India's Malabar Coast, and Myanmar, and is also cultivated in other tropical regions. The spice is obtained by harvesting shoots during the wet season, peeling the bark, and drying it into quills or sticks. Cinnamon's characteristic aroma and flavor come mainly from its essential oil, especially cinnamaldehyde, along with eugenol and other compounds. Cassia cinnamon typically has a higher cinnamaldehyde content, giving it a stronger flavor than Ceylon cinnamon. The spice is widely used as a flavoring in sweet and savory dishes, baked goods, beverages, and traditional foods worldwide. Historically, cinnamon was highly prized, even more valuable than gold in ancient Egypt, where it was used for embalming and religious rites. It later became a major commodity in medieval Europe and the Dutch East India Company spice trade. Today, global cinnamon production is led by China, accounting for about 39% of the 238,000+ tonnes produced in 2023. Beyond culinary uses, cinnamon has a long history in traditional medicine. It is known for digestive benefits, antimicrobial, antifungal, antioxidant, anti-inflammatory, and antidiabetic properties. Key active compounds like cinnamaldehyde and eugenol contribute to these

effects. Research suggests cinnamon may help manage type 2 diabetes by improving blood sugar and lipid levels, relieve symptoms of rheumatoid arthritis and menstrual cramps, and potentially protect against neurological disorders such as Alzheimer's and Parkinson's diseases. However, cinnamon contains coumarin, especially in cassia varieties, which can be toxic to the liver in high doses, so consumption should be moderate, especially for people with liver conditions or those pregnant. Overall, cinnamon remains a valuable spice with diverse culinary and medicinal applications.

Ashwagandha:-

Synonyms: Indian ginseng,Winter cherry,Withania somnifera

Biological Source: The root and leaves of the plant Withania somnifera.

Family: Solanaceae(nightshade family).

Chemical Constituents:

Alkaloids (e.g., withanine)

Withanolides, Saponins,Fatty acids, Iron,Various antioxidants Ashwagandha (Withania somnifera), also known as Indian ginseng or winter cherry, is a small evergreen shrub native to India, Southeast Asia, and parts of Africa and Europe. It has been used in Ayurvedic medicine for nearly 3,000 years as a Rasayana—a tonic believed to promote youthfulness, vitality, and longevity by balancing the mind and body. The name "ashwagandha" derives from Sanskrit, where "ashwa" means horse and "gandha" means smell, referring to the root's distinctive horse-like scent and its traditional association with strength and stamina. The root is the primary part used medicinally, containing biologically active compounds called withanolides, which have adaptogenic, anti-inflammatory, neuroprotective, and immunomodulatory properties. Ashwagandha is widely promoted for its potential to reduce stress and anxiety by balancing cortisol, the body's stress hormone, and promoting relaxation. Clinical studies suggest it may improve sleep quality, alleviate insomnia, and reduce symptoms of anxiety and fatigue. It is also used to enhance cognitive function, memory, and attention, likely due to its antioxidant effects in the brain.Beyond mental health, ashwagandha has been explored for benefits in physical performance, fertility, thyroid function, and weight management, though more rigorous human studies are needed to confirm these effects. It is also traditionally used for conditions such as arthritis, bipolar disorder, ADHD, and as a general tonic to improve overall health.Ashwagandha is available in various forms, including powders, capsules, and topical applications. Side effects may include digestive upset, drowsiness, and diarrhea, and it may take weeks or months to notice benefits. In summary, ashwagandha is a traditional herbal adaptogen with promising effects on stress reduction, sleep improvement, and cognitive support, rooted in centuries of Ayurvedic use and increasingly studied in modern research.

Fennel :-

Synonyms: Foeniculum vulgare, Sweet fennel, Finocchio

Biological Source: The seeds and aerial parts (leaves, stems) of the plant Foeniculum vulgare.

Family: Apiaceae (Umbelliferae).

Chemical Constituents:

Essential oils (e.g., anethole, fenchone) ,Flavonoids, Tannins,Dietary fiber,Vitamins (C, E). Fennel (Foeniculum vulgare) is a hardy, perennial herb belonging to the carrot family (Apiaceae), native to the Mediterranean region but now widely cultivated and naturalized across Europe, Asia, and North America. It grows up to about 2 meters (7 feet) tall, featuring hollow, erect stems and finely divided, feathery leaves resembling those of dill but thinner and threadlike. The plant produces yellow flowers arranged in large, flat terminal umbels and bears dry fruits often called seeds, which are aromatic and used as a spice. The aroma and flavor of fennel seeds come from volatile oils such as trans-anethole, estragole (licorice-like), and fenchone (minty, camphor-like), along with other phytochemicals like polyphenols. These seeds are widely used in cooking for their sweet, anise-like taste and are integral to spice blends like Indian garam masala and Chinese five-spice powder. The bulbous variety, known as Florence fennel, is eaten as a vegetable, either raw or roasted, and is popular in Mediterranean cuisine. Historically, fennel was highly valued by ancient Greeks and Romans for medicinal, culinary, and even insect-repellent purposes. It was believed to have health benefits such as improving eyesight and courage, and it features in various traditional remedies and folklore. Emperor Charlemagne mandated its cultivation on imperial farms, and it has been used in herbal medicine for digestive issues like bloating, heartburn, and colic. Nutritionally, fennel seeds are rich in protein, dietary fiber, B vitamins, and minerals such as calcium, iron, magnesium, and manganese. A 100-gram serving of dried seeds provides about 345 kcal, with significant amounts of carbohydrates and fats. Fennel essential oil also exhibits insecticidal properties. In summary, fennel is a versatile herb valued for its culinary uses, nutritional benefits, and traditional medicinal applications, with a long history of cultural significance across many regions of the world.

Lemongrass: -

Synonyms: Cymbopogon citratus (scientific name), Citronella grass,Serai (Malay),Takrai (Thai)

Biological Source: Lemongrass is a tropical and subtropical plant in the Poaceae family. It is primarily sourced from Southeast Asia, particularly in countries like Thailand, India, and

Sri Lanka. The plant is characterized by its tall, thin stalks and a strong citrus scent.

Chemical Composition: Lemongrass contains a variety of essential oils and compounds, including:

Citral (Neral and Geranial): The primary component, responsible for its citrus aroma and flavor. Citral has antimicrobial and anti-inflammatory properties. Limonene: A terpene with a fresh scent, contributing to its flavor profile and possessing antioxidant properties. Myrcene: Offers potential anti-inflammatory and analgesic effects.

Linalool: Known for its calming properties and is used in aromatherapy, Other compounds: Including citronellol, geraniol, and various aldehydes, which contribute to its aroma and potential health benefits. Lemongrass, scientifically known as Cymbopogon species, is a tall, perennial aromatic grass belonging to the Poaceae family. There are two main species: East Indian lemongrass (Cymbopogon flexuosus), native to India, Sri Lanka, Burma, and Thailand, and West Indian lemongrass (Cymbopogon citratus), which is widely used in culinary applications. The plant typically grows up to 1.5–1.8 meters tall, with long, slender, green leaves that emit a strong lemon-like aroma when crushed. Lemongrass thrives in tropical and subtropical climates, favoring temperatures between 20°C and 30°C with good sunshine. It is cultivated commercially in many regions, including India (notably in the Western Ghats), Southeast Asia, Africa, and parts of South America. India produces around 300-350 tons annually from about 3,000 hectares, mainly in Kerala, Karnataka, Tamil Nadu, and Arunachal Pradesh. The plant is valued for its essential oil, extracted from the leaves and flowering tops, which contains high levels of citral—a compound responsible for its distinct lemon scent and flavor. This oil is widely used in perfumery, cosmetics, flavoring of soft drinks, and as a fragrance in soaps and detergents. Lemongrass oil also serves as a source for producing beta-carotene and vitamin A derivatives.Culinarily, lemongrass is a staple in Southeast Asian cuisines such as Thai, Vietnamese, and Malaysian, where it is used fresh or dried to impart a citrusy flavor without acidity, often combined with other herbs in curries and soups. Its edible stalks have a tangy, floral flavor with hints of ginger and mint. Medicinally, lemongrass contains antioxidants, flavonoids, and phenolic compounds like luteolin and quercetin, which provide anti-inflammatory, antifungal, and antimicrobial properties. It is traditionally used to aid digestion, relieve gastrointestinal issues like indigestion and bloating, and treat infections. Additionally, lemongrass is explored for its potential in managing hypertension and other health benefits. In summary, lemongrass is a versatile plant with significant culinary, medicinal, and commercial importance, widely cultivated in tropical regions and valued for its aromatic oil and health-promoting properties.

Tulsi:-

Synonyms: Holy Basil, Ocimum sanctum, Ocimum tenuiflorum, Basil of the Gods.

Biological Source: Tulsi is a sacred herb in Hinduism, primarily found in the Indian subcontinent. It belongs to the Lamiaceae family and is often cultivated in gardens for its aromatic leaves.

Chemical Composition: Tulsi contains a variety of bioactive compounds Essential Oils: Eugenol: Provides anti-inflammatory and analgesic properties. Linalool: Offers calming effects and antimicrobial properties.Camphor: Known for its anti-inflammatory and antimicrobial effects.Phenolic Compounds:1.Rosmarinic Acid: Exhibits antioxidant and anti-inflammatory properties. Flavonoids: Apigenin, Luteolin: Known for their antioxidant and anti-cancer properties. Vitamins and Minerals: Contains vitamins A, C, and K, along with minerals like calcium, iron, and magnesium. Other Compounds: Saponins: Known for their immune-boosting properties. Tannins: Offer astringent properties and may help in wound healing.Tulsi, scientifically known as Ocimum sanctum or Ocimum tenuiflorum, is a highly revered aromatic herb native to the Indian subcontinent and widely cultivated across tropical regions. Known as "The Queen of Herbs" and "The Incomparable One" in Ayurveda, Tulsi holds a sacred status in Hindu culture, where it is worshipped as a goddess and integrated into daily spiritual rituals. Medicinally, Tulsi is celebrated for its broad spectrum of therapeutic properties. It acts as a potent adaptogen, helping the body cope with physical and mental stress. Its bioactive compounds, including essential oils rich in eugenol, flavonoids, and phenolic acids, contribute to its antioxidant, anti-inflammatory, antimicrobial, and immunomodulatory effects. Tulsi is traditionally used to treat respiratory ailments like asthma and bronchitis, digestive disorders, fever, skin diseases, and infections caused by bacteria and viruses. Beyond its medicinal uses, Tulsi is also valued for promoting overall health and longevity. Regular consumption is believed to enhance immunity, improve cardiovascular health by lowering blood pressure and cholesterol, and support mental well-being by reducing anxiety and promoting calmness. The plant is an integral part of Ayurvedic holistic health practices, emphasizing balance and wellness of body, mind, and spirit. Tulsi grows as a small shrub typically 2 to 4 feet tall, with small purple flowers. It thrives in moist soil across India and other parts of Asia. There are several varieties, including Rama Tulsi (green leaves) and Krishna Tulsi (purple leaves), both sharing similar medicinal properties. In summary, Tulsi is a sacred and medicinal herb with a rich cultural heritage and scientifically supported health benefits. It is used both as a spiritual symbol and a natural remedy for a wide range of health conditions, making it a cornerstone of traditional Indian medicine and lifestyle.

Cardamon: -

Synonym: Choti – Ilalchi

Biological source: Ripe fruit of Elettaria cardamomum var

Family: Zingiberacea

Chemical composition: Seeds of Elettaria cardamomum are rich in volatile oil that mainly includes phenolic and flavonoid components. Starch, protein, waxes and Sterols are other components of the o. Cardamom (Elettaria cardamomum), often called the "Queen of Spices," is a highly aromatic spice widely used in culinary and medicinal applications. Native to the tropical forests of India and Sri Lanka, it is now cultivated

in several countries including Nepal, Vietnam, Thailand, and Central America.

Botanical and Physical Characteristics

Cardamom is a perennial herbaceous plant belonging to the ginger family (Zingiberaceae). It grows in mid-elevation wet evergreen forests, with slender leaves and produces seed pods known as capsules. The green seed pods contain small black seeds that are dried and used as a spice.

Culinary Uses

Cardamom is prized for its strong, sharp, and punchy aroma with flavor notes that are camphoraceous, eucalyptus-like, resinous, mentholated, and lemony. It is widely used in Indian, Middle Eastern, and Scandinavian cuisines to flavor rice dishes, meats, vegetables, coffee, tea, liquors, ice cream, baked goods, and is a principal ingredient in curry powders and masala chai. In Iran and India, cardamom is commonly added to coffee and tea for its distinctive taste.

Medicinal Properties

Traditionally used in Ayurveda and other systems of medicine, cardamom is valued for its antiseptic, carminative, digestive, diuretic, stimulant, stomachic, tonic, antispasmodic, antimicrobial, and anti-inflammatory effects. It has been used to treat digestive disorders, nausea, asthma, bronchitis, kidney and urinary diseases, heart problems, sore throats, bad breath, and infections. Modern research supports some of these uses, highlighting cardamom's antioxidant, antibacterial, anticancer, antidiabetic, and gastro-protective activities.

Additional Benefits

- Cardamom may help lower blood pressure and improve antioxidant status in hypertensive patients.

- It is used as a natural breath freshener and in oral health due to its antimicrobial properties.

- It has been employed to aid cigarette de-addiction by reducing cravings. In summary, cardamom is a versatile spice with a unique flavor profile and significant traditional and emerging medicinal applications, making it a valuable component in both culinary and health contexts worldwide.

Nutmeg: -

Synonyms: Myristica fragrans, Aromatic nutmeg

Biological Source: The seed of the fruit of the tree Myristica fragrans.

Family: Myristicaceae.

Chemical Constituents:

Essential oils (e.g., myristicin, sabinene)

Phenolic compounds

Aliphatic compounds

Flavonoids

Dietary fiber

Nutmeg is a spice made from the seed of the Myristica fragrans tree, an evergreen native to the Molucca Islands (Spice Islands) of Indonesia. The seed is dried and ground to produce nutmeg, which has a warm, slightly sweet, and pungent flavor

used to season a variety of baked goods, meats, sauces, vegetables, and beverages like eggnog.

Botanical and Physical Characteristics

Nutmeg is the inner seed of the fruit, which is about the size and shape of a small peach. The fruit splits open to reveal a bright red, lace-like covering called mace, which is a separate spice with a more delicate flavor. The nutmeg seed itself is roughly egg-shaped, about 20.5–30 mm long and 15–18 mm wide, and weighs 5–10 grams when dried.

Culinary Uses

Nutmeg is commonly used ground or whole in both sweet and savory dishes. It pairs well with cream- or cheese-based recipes and is a quintessential autumn spice. Mace, the aril around the seed, is used in baked goods, meat, fish, vegetables, and pickling, offering a flavor similar to nutmeg but spicier and more delicate.

Nutritional and Health Aspects

Nutmeg is rich in antioxidants and fiber, which support digestive health and help regulate blood sugar. It contains compounds like myristicin, which have antibiotic properties and can act as a natural insecticide. In small doses, nutmeg can aid digestion, reduce flatulence, treat nausea and diarrhea, and lower blood pressure. Topically, nutmeg has been used for pain relief and to treat rheumatism, mouth sores, and toothache.

Toxicity and Safety

Nutmeg is safe in culinary amounts but can be toxic in larger doses. Consuming as little as 2 teaspoons (5 grams) can cause symptoms of poisoning such as nausea, dizziness, dry mouth, hallucinations, and in severe cases, death. Nutmeg poisoning often occurs from recreational misuse or accidental ingestion by children.

Historical Significance

Nutmeg was historically a highly prized spice, once worth its weight in gold. Its value led to conflicts such as the Dutch conquest of the Banda Islands to monopolize the nutmeg trade, which contributed to the establishment of the Dutch East India Company. In summary, nutmeg is a versatile and historically significant spice derived from the seed of Myristica fragrans. It offers culinary, nutritional, and medicinal benefits but must be used cautiously due to its potential toxicity in large amounts.

Roselle: -

Synonyms: Hibiscus sabdariffa, Sorrel, Red sorrel

Biological Source: The calyces (sepals) and leaves of the plant Hibiscus sabdariffa.

Family: Malvaceae.

Chemical Constituents:

Organic acids (e.g., citric acid, tartaric acid)

Anthocyanins (e.g., hibiscus acid), Flavonoids

Vitamins (C, A) Polyphenols.

Roselle (Hibiscus sabdariffa) is a species of flowering plant native to West Africa, now widely cultivated in tropical and subtropical regions worldwide. It is an annual or perennial herbaceous plant or woody subshrub that typically grows 2–2.5 meters (7–8 feet) tall, with deeply lobed leaves and large, showy flowers that are white to pale yellow with a dark red spot at the base of each

petal. The plant produces bright red, fleshy calyces around the seed pods, which are harvested for culinary and medicinal uses.

Botanical and Growth Characteristics

- Roselle has dark green to reddish, palmately lobed leaves with serrated edges and reddish stems.

- It is a short-day plant requiring 12 or more hours of darkness to flower abundantly.

- In USDA zones 8–11, it can be grown as a perennial; in cooler zones, it is grown as an annual due to its sensitivity to frost and long growing season needs.

- The plant thrives in warm, sunny, well-draining soil and tolerates heat, humidity, and poor soil conditions.

Culinary Uses

- The red calyces have a tart, cranberry-like flavor with citrusy notes and are commonly used to make hibiscus tea (also called carcade), jams, sauces, and beverages.

- The leaves are edible and add a tangy flavor to salads and dishes.

- The calyces are also used as a natural dye in culinary and cosmetic products.

Nutritional and Health Benefits - Roselle is rich in vitamin C, antioxidants (notably anthocyanins), iron, and other minerals.

- It supports immune health, aids digestion, and may help manage blood pressure.

- The plant exhibits anti-inflammatory, antimicrobial, and potential cardiovascular benefits beyond blood pressure regulation.

- Traditionally, it has been used for its therapeutic properties in African and Caribbean cultures.

Ornamental and Other Uses

- Roselle's bright red stems, red-veined leaves, and large flowers make it a popular ornamental plant in gardens and landscapes.

- The bast fibers from the stems are also used for making ropes and textiles.

In summary, Roselle (Hibiscus sabdariffa) is a versatile plant valued for its culinary, medicinal, and ornamental qualities. Its tart red calyces are widely used in beverages and food, while its health benefits include antioxidant, anti-inflammatory, and cardiovascular support. It grows best in warm climates with sufficient sunlight and a long growing season.

Menthol:-

Synonyms: Peppermint oil,L-menthol, Mentha arvensis (for specific types)

Biological Source: Derived from the essential oil of peppermint (Mentha piperita) or corn mint (Mentha arvensis).

Family: Lamiaceae (mint family).

Chemical Constituents:

Menthol, Menthone, Menthyl acetate, Isomenthone

Limonene.

Menthol is a naturally occurring monoterpene alcohol with the chemical formula C10H20O, known for its strong minty odor and cooling sensation. It is primarily obtained from peppermint oil or produced synthetically by hydrogenation of thymol.

Chemical and Physical Properties

- Menthol appears as white or colorless crystalline solids with a melting point around 36–45 °C depending on the isomer.

- It is slightly soluble in water but soluble in ethanol, diethyl ether, and other organic solvents.

- Menthol exists as two enantiomers: the naturally occurring (-)-menthol (levomenthol), which is levorotatory, and the synthetic racemic mixture containing both (-)- and (+)-menthol.

Biological and Pharmacological Effects

- Menthol activates cold-sensitive TRPM8 receptors in the skin, producing a cooling sensation without lowering temperature.

- It has local anesthetic, analgesic, antipruritic (anti-itch), and counterirritant properties, making it useful in topical pain relief and soothing minor throat irritation.

- Menthol also acts as a positive allosteric modulator of the GABAA receptor, contributing to its analgesic effects.

- It influences multiple receptors and ion channels, including calcium channels, sodium channels, dopamine receptors, and opioid receptors, which may underlie its diverse biological activities.

- The (-)-menthol enantiomer exhibits antibacterial, antifungal, anticancer, and analgesic effects, while the (+)-menthol enantiomer lacks many of these bioactivities.

Uses

- Medicinally, menthol is widely used in ointments, cough drops, nasal inhalers, and topical analgesics to relieve pain, itching, and throat irritation.

- It serves as a flavoring agent in foods, cigarettes, liqueurs, cosmetics, and perfumes due to its pleasant minty aroma and cooling effect.

- Menthol is also employed as a carminative (to relieve digestive discomfort) and in traditional medicine for treating indigestion, nausea, colds, and headaches.

Safety and Toxicity

- Menthol has low toxicity with an oral LD50 in rats around 3300 mg/kg, but excessive ingestion or topical use can cause adverse effects.

- It is generally recognized as safe when used in appropriate amounts in consumer products. In summary, menthol is a versatile natural compound valued for its cooling sensation, analgesic and antipruritic properties, and widespread use in medicinal and flavoring applications. Its biological effects are mainly mediated through activation of cold receptors and modulation of various ion channels and receptors in the nervous system.

Giloy:-

Synonyms: Tinospora cordifolia, Guduchi, Amrita

Biological Source: The stem of the plant Tinospora cordifolia**.**

Family: Menispermaceae.

Chemical Constituents:

Alkaloids (e.g., berberine)

Glycosides, Steroids, Tannins, Essential oils

Chemical Constituents:

Alkaloids (e.g., berberine)

Glycosides, Steroids, Tannins, Essential oils.

Giloy, scientifically known as Tinospora cordifolia, is a climbing shrub widely used in Ayurvedic medicine for its extensive health benefits. It is often called "Amrita" or "nectar of life" due to its potent medicinal properties.

Key Health Benefits and Uses-Immunity Booster: Giloy enhances the immune system by increasing the activity of macrophages and cytokine production, helping the body fight infections and diseases effectively.

-Anti-inflammatory and Antipyretic: It reduces inflammation and fever, making it useful in treating chronic fevers, including those caused by dengue and malaria, by increasing blood platelet count and speeding recovery.

- Blood Sugar Regulation: Giloy acts as a hypoglycemic agent, improving insulin sensitivity and lowering blood sugar levels. It contains berberine, a compound similar to the diabetes drug metformin, which also helps reduce bad cholesterol and blood pressure.

-Digestive Health:The stem of giloy improves digestion, alleviating constipation, acidity, gas, and bloating.

- Arthritis and Gout Management: Its anti-inflammatory and antiarthritic properties help relieve joint pain and swelling by inhibiting pro-inflammatory cytokines.

-Skin Health: Giloy's antioxidant and detoxifying effects help combat skin issues like acne and eczema, promoting a clear complexion and reducing signs of aging.

Respiratory Benefits: It helps manage respiratory conditions such as asthma, bronchitis, cough, and cold by soothing mucous membranes and reducing inflammation.

-Liver Protection: Giloy supports liver health by detoxifying and regenerating liver cells, aiding in managing fatty liver and other liver diseases.

-Stress Reduction: Its adaptogenic properties help calm the nervous system, reducing stress and promoting mental balance.

- Cholesterol Management: Giloy improves metabolism and reduces LDL (bad cholesterol), contributing to cardiovascular health.

Nutritional and Phytochemical Profile

Giloy contains several bioactive compounds including:

- Terpenoids (affecting taste and aroma)

- Alkaloids such as berberine and choline (bitter compounds with medicinal effects)

- Lignans and polysaccharides (antiviral and antimicrobial properties)

- Steroids like beta-sitosterol (cholesterol-like compounds with health benefits).

It also provides protein, vitamin C, fiber, and fats in modest amounts.

Precautions

While giloy is generally safe when consumed in recommended doses, it may overstimulate the immune system in autoimmune conditions and should be used cautiously. Overconsumption can also have adverse effects, so moderation is advisedIn summary, giloy (Tinospora cordifolia) is a versatile medicinal herb with immunomodulatory, anti-inflammatory, antioxidant, antidiabetic, and hepatoprotective properties. It supports immunity, digestion, blood sugar regulation, joint health, skin care, respiratory function, and stress management, making it a valuable herb in traditional and modern health practices.

Rosemary: -

Synonyms: Rosmarinus officinalis, Compass plant , Incense plant

Biological Source: The leaves and flowering tops of the plant Rosmarinus officinalis.

Family: Lamiaceae (mint family).

Chemical Constituents:

Essential oils (e.g., 1,8-cineole, camphor, rosmarinic acid), Flavonoids, Carnosic acid, Rosmarinic acid, Triterpenes

used to relieve digestive issues and promote liver health.

Rosemary is valued for its culinary versatility, aromatic qualities, and numerous health benefits. Rosemary (Salvia Rosmarinus, formerly Rosmarinus officinalis) is a fragrant, evergreen shrub native to the Mediterranean region, known for its needle-like, aromatic leaves and small two-lipped flowers that can be white, pink, purple, or blue.

Botanical Description

- Rosemary typically grows 0.6 to 2 meters (2 to 6.5 feet) tall, with woody, angular stems that become more rigid with age.

- The leaves are dark green, glossy on top, linear, leathery, and about 2–4 cm long and 2–5 mm wide, with fine hairs underneath giving a whitish appearance.

- Flowers appear in clusters along the branches, blooming mainly in spring and summer but can flower almost year-round in warm climates.

Growing Conditions and Ecology

- It thrives in full sun, preferring well-drained, sandy or loamy soils, and tolerates drought and maritime exposure.

- Rosemary grows best in temperate to warm climates and is sensitive to waterlogged or heavy clay soils, which can be fatal.

- The plant has a fibrous root system and can live up to 30–35 years under favorable conditions.

Culinary and Medicinal Uses

- Rosemary leaves are widely used fresh or dried to flavor meats, vegetables, soups, and beverages, prized for their pungent, slightly bitter taste.

- The essential oil extracted from rosemary is valued for its energizing and invigorating properties, stimulating circulation and senses, and is used in topical applications such as ointments, body oils, and skin creams.

Rosemary has recognized antioxidant and therapeutic properties and is used in traditional medicine and as a natural food preservative.

Additional Notes

- The plant is fairly resistant to pests but can be susceptible to powdery mildew in humid climates and is a host for spittlebugs.

- Rosemary is easily propagated from cuttings and is cultivated worldwide due to its culinary, aromatic, and medicinal value. In summary, rosemary (Salvia Rosmarinus) is a hardy, aromatic evergreen shrub native to the Mediterranean, valued for its distinctive needle-like leaves and flowers, culinary flavoring, essential oils, and health benefits. It thrives in sunny, well-drained environments and has a long lifespan, making it a staple herb in gardens and kitchens globally.

Amla: -

Synonyms: Indian gooseberry, Emblica officinalis, Amla berry

Biological Source: The fruit of the plant Emblica officinalis.

Family: Euphorbiaceae.

Chemical Constituents:

Vitamin C (ascorbic acid), Tannins, Flavonoids (e.g., quercetin) Polyphenols, Carotenoids, Minerals (e.g., calcium, iron)

Amla, also known as Indian gooseberry (Phyllanthus emblica), is a fruit highly valued for its rich nutritional and medicinal properties, especially in traditional Ayurvedic medicine.

Nutritional Profile

- Amla is exceptionally rich in vitamin C, containing about 600–700 mg per 100 grams, which is several times higher than that found in oranges.

- It also provides significant amounts of dietary fiber (around 4.3 g per 100 g), carbohydrates, protein, and small amounts of fat.

- Other vitamins present include vitamin A, B-complex vitamins (B1, B2, B3, B5, B6), and vitamin E.

- Minerals such as calcium, iron, magnesium, phosphorus, potassium, and zinc are also found in notable quantities.

Health Benefits

1. Powerful Antioxidant Source

Amla is one of the most antioxidant-rich fruits, containing polyphenols, flavonoids, gallic acid, and ascorbic acid. These antioxidants help reduce oxidative stress, lowering the risk of chronic diseases like heart disease, diabetes, and cancer.

2. Immune System Booster

The high vitamin C content enhances immune function by stimulating white blood cell production and reducing inflammation, helping the body fight infections and recover from illness.

3. Blood Sugar Regulation

Amla's soluble fiber slows sugar absorption, helping to reduce blood sugar spikes. It also positively affects blood glucose and lipid profiles, making it beneficial for managing type 2 diabetes.

4. Digestive Health

The fiber in amla promotes regular bowel movements, alleviates constipation, and supports nutrient absorption. It may help relieve symptoms of digestive disorders like irritable bowel syndrome.

5. Heart Health

Amla supports cardiovascular health by reducing blood cholesterol levels, preventing arterial plaque buildup, and providing minerals like iron, calcium, and phosphorus that support heart function.

6. Liver Protection

Amla exhibits hepatoprotective effects, aiding liver detoxification and improving liver function, partly due to its antioxidant and anti-inflammatory properties.

7. Eye Health

Rich in vitamin A and antioxidants, amla helps improve vision, reduce the risk of cataracts and age-related macular degeneration, and protect against eye infections.

8. Brain and Memory Support

Phytonutrients in amla combat free radicals that damage brain cells and help produce neurotransmitters like norepinephrine, potentially improving memory and cognitive function.

9. Weight Management

Amla's fiber content promotes satiety, which can help control appetite and support weight management.

Additional Uses and Notes

- Amla is used fresh, dried, or as juice and powder in various culinary and medicinal preparations.

- It has antibacterial and anti-inflammatory properties.

- The fruit is considered safe when consumed in typical dietary amounts. In summary, amla (Phyllanthus emblica) is a nutrient-dense fruit with exceptional antioxidant capacity and a wide range of health benefits including immune support, blood sugar regulation, digestive aid, heart and liver protection, eye health, and cognitive enhancement. Its high vitamin C content and rich phytochemical profile make it a valuable natural supplement for overall wellness.

Turmeric: -

Synonyms: Curcuma longa, Indian saffron, Haldi

Biological Source: The rhizome (underground stem) of the plant Curcuma longa.

Family: Zingiberaceae (ginger family).

Chemical Constituents:

Curcumin (the primary active compound)

Turmerone, Zingiberene, Essential oils, Vitamins (B6, C). (Curcuma longa) is a bright yellow-orange spice derived from the root of a plant in the ginger family, widely used both as a culinary ingredient and traditional medicine, especially in Ayurvedic and Chinese practices.

Key Health Benefits

-Anti-inflammatory and Antioxidant: Turmeric's primary active compound, curcumin, has potent anti-inflammatory and antioxidant properties that help reduce chronic inflammation linked to heart disease, cancer, metabolic syndrome, and neurodegenerative diseases.

-Joint Pain and Arthritis Relief: Curcumin has been shown in human studies to reduce joint inflammation and pain associated with osteoarthritis and rheumatoid arthritis, sometimes with effects comparable to ibuprofen.

-Digestive Health:Turmeric may improve symptoms of digestive disorders such as irritable bowel syndrome (IBS), Crohn's disease, and ulcerative colitis by reducing gut inflammation.

-Heart Health: Turmeric helps protect the heart by improving endothelial function, reducing oxidative stress, lowering cholesterol, and decreasing inflammation, which collectively reduce the risk of heart disease.

-Cancer Prevention and Treatment: Laboratory and animal studies suggest curcumin can inhibit tumor growth and metastasis, particularly in digestive system cancers, though more human research is needed.

Brain Health and Cognitive Function: Curcumin crosses the blood-brain barrier and may reduce brain inflammation, improve memory, and potentially lower the risk of Alzheimer's disease by increasing brain-derived neurotrophic factor (BDNF)

- Mood Enhancement: Curcumin may help alleviate symptoms of depression by increasing levels of neurotransmitters such as serotonin and dopamine.

-Blood Sugar Regulation:Turmeric may help maintain steady blood sugar levels and has potential benefits for type 2 diabetes management.

Usage and Absorption

- Curcumin has low natural bioavailability, but its absorption is enhanced when consumed with black pepper (piperine) or fats.

- Turmeric can be added to foods like curries, smoothies, teas, and soups or taken as supplements.

Safety and Considerations

- Turmeric is generally safe when consumed in culinary amounts.

- High doses or supplements may interact with medications, including chemotherapy drugs, and should be used cautiously under medical supervision. In summary, turmeric is a versatile spice with scientifically supported anti-inflammatory, antioxidant, digestive, cardiovascular, cognitive, and anticancer benefits largely attributed to curcumin. While promising, many benefits require further research to determine optimal dosages and long-term effects in humans.

METHOD:

Preparation:

Measure out the ingredients as specified. If using fresh ingredients (like fresh coriander leaves, lemongrass, etc.), dry them thoroughly before use.

Mixing: In a large mixing bowl, combine all the dried herbs and spices. Ensure that the ingredients are well-blended for an even distribution of flavors and benefits.

Storage: Store the blend in an airtight container, away from light, heat, and moisture to preserve its potency and flavor.

Brewing: To prepare a cup of tea, use 1-2 teaspoons of the blend per cup of hot water (about 8 oz). Let it steep for 5-10 minutes, depending on your desired strength. Strain the tea and enjoy. You can add honey or lemon if desired.

CONCLUSION: -

From this study, it shows prepared herbal tea good for health and acceptable to drink. powder characteristics and shows good flow ability so good for leaking test. Herbal tea also examined the microbial growth and its shows potent antimicrobial activity. The most of ingredients shows antioxidant, anti-inflammatory properties. The herbal tea also help in Immune support.Herbal tea is a delightful and healthy beverage option, offering a wide range of flavors, benefits, and cultural traditions. Whether you're seeking relaxation, immune support, or simply a soothing cup, herbal tea is an excellent choice.

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