Therapeutic Study of Selected Divine Plants

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ABSTRACT:

Many civilisations' spiritual and religious activities integrate medicinal plants, which serve not only as healing agents but also as emblems of deities or sacred elements in rituals. Certain plants, such as Aegle marmelos (Belvia tree), Hibiscus rosa-sinensis (China rose), Prosopis cineraria (Shami) and Nyctanthes arbor-tristis (Parijat), are employed to symbolise divine connection. Aside from their medical and spiritual processes, these sacred plants are culturally significant, with their use frequently prompting conservation efforts to safeguard their vital ecological and cultural heritage.

This study summarises current literature (2020-2025) on selected species. The search approach focused on literature that included descriptions and was published within the last five years. The survey can be found in major scientific databases such as ScienceDirect, Web of Science, PubMed, and Google Scholar.

This study explores the ethnobotanical relevance of these plants and their local treatments for various diseases. It emphasises the significance of their utility for human health and the potential for pharmaceutical applications. Current research trends include ethnobotanical surveys, bibliometric analysis of global research, and the software of integrated scientific methodologies to better comprehend the therapeutic effects of natural compounds and construct more effective and sustainable pharmaceutical manufacturing processes. The primary concepts include secure long-term supply, ethnobotanical surveys to catalogue endangered species, and global collaboration to establish complete gene banks. Additionally, this research highlights the need of keeping traditional knowledge. It does so by promoting awareness and by comparing various cultural practices to improve the comprehension and protection of these unique plants before they are gone forever.

Keywords: Pharmacological; Spiritual; Ethnobotanical; Conventional; Scientific; Antidiabetic; Antioxidants; Sacred.

INTRODUCTION:

The plant Aegle marmelos is a staple of Ayurvedic therapy and belongs to the Rutaceae family. The fruit, leaves, bark, and roots are used to make a variety of therapeutic products. It treats diarrhoea, dysentery, and stomach ulcers. It contains antibacterial, antifungal, and wound healing effects. The principal biological active component of bael fruit is polysaccharides, which are commonly ascribed to its numerous health advantages. It is a vital biological macromolecule required for the body's optimal functioning. Bael fruit polysaccharides are made up of monomeric units of arabinose, glucose, galacturonic acid, galactose, and rhamnose, linked together by (1 → 4) or (1 → 6) glycosidic linkages [1]. Conventional uses include curing skin issues, jaundice, high blood pressure, malaria, and even serving as an anti-inflammatory agent. The edible fruit is loaded with vitamins, minerals, and antioxidants. It is a sacred plant in Hinduism, renowned for its connection to Lord Shiva and use in rituals, particularly the gift of its leaves.

Hibiscus rosa-sinensis (China rose) symbolises love, passion, femininity, change, and spiritual purity across several cultures and traditions. This plant comes from the Malvaceae family.

Natural products derived from Malvaceae plants are utilised all over the world, and the Hibiscus genus has received a lot of attention for its extracts' different pharmacological properties and high phenolic content.

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Hibiscus spp. Encompasses over 240 species of annual or perennial flowering herbs, shrubs, or trees that can be identified in various parts of the world [2]. It has a wide range of therapeutic qualities, including antioxidant, anti-inflammatory, antibacterial, antifungal, and antidiabetic actions, and has been utilised for centuries to treat hair loss, coughs, headaches, and cardiovascular problems. Its leaves, flowers, roots, and bark contain bioactive chemicals like as flavonoids, tannins, and alkaloids, which contribute to its medicinal properties, making it an important resource in both traditional medicine and modern pharmacological research.

Aegle marmelos (Belvia tree)

Nyctanthes arbor-tristis (Parijat)

Hibiscus rosa sinensis (China rose)

Prosopis cineraria(Shami)

Prosopis cineraria (Shami tree) has religious and medical importance, particularly in Hinduism, where it is a revered symbol of success and prosperity and is usually venerated during festivals such as Dussehra .This is a representation of the resilience that is exhibited in the dry and semi-arid parts of South Asia, where it flourishes in locations where few other plants are able to thrive[3]. It is a species of flowering tree in the pea family, Fabaceae. Traditional medicine uses its many elements, such as roots, leaves, bark, and pods, to cure skin illnesses, respiratory troubles, digestive problems, diabetes, and rheumatism. The tree is also a good source of food for animals and a traditional medicine with antioxidant, anti-inflammatory, and antidiabetic properties.

Nyctanthus arbor-tristis Linn., belonging to the family Oleaceae, is a fabulous plant having high medicinal value. Nyctanthes arbor-tristis (Parijat) has important pharmacological and spiritual properties, that has many plant parts employed in traditional Indian culture. This plant includes a variety of secondary metabolites, including alkaloids, terpenoids, amino acids, glycosides, carbohydrates, tannins, flavonoids, saponins, proteins, and phenols. The leaves of this plant are widely used in Ayurvedic medicine to treat a variety of ailments, including internal worm infections, persistent fever, sciatica, and rheumatism [4].

The plant Piper betle is globally distributed and predominantly cultivated in Southeast Asian nations for its appealing, glossy, heart-shaped leaves, which are chewed or consumed as betel quid. It is widely used in Chinese and Indian traditional medicine for its carminative, stimulant, and astringent attributes, as well as for treating parasitic worms, conjunctivitis, rheumatism, and wounds, among numerous other uses, and is additionally used for religious purposes[5].

Areca catechu, usually referred to as supari, comprises dehydrated mature nuts belonging to the Palmae or

Arecaceae family, farmed in the tropical regions of India, Malaysia, Sri Lanka, the East Indies, the Philippines, South China, and parts of East Africa.The main component of Areca catechu is tannins. Tannins are water-soluble polyphenols visible in various plant diets. These chemicals diminish feed intake, feed efficiency, growth rate, net metabolic energy, and protein metabolism in experimental animals[6].

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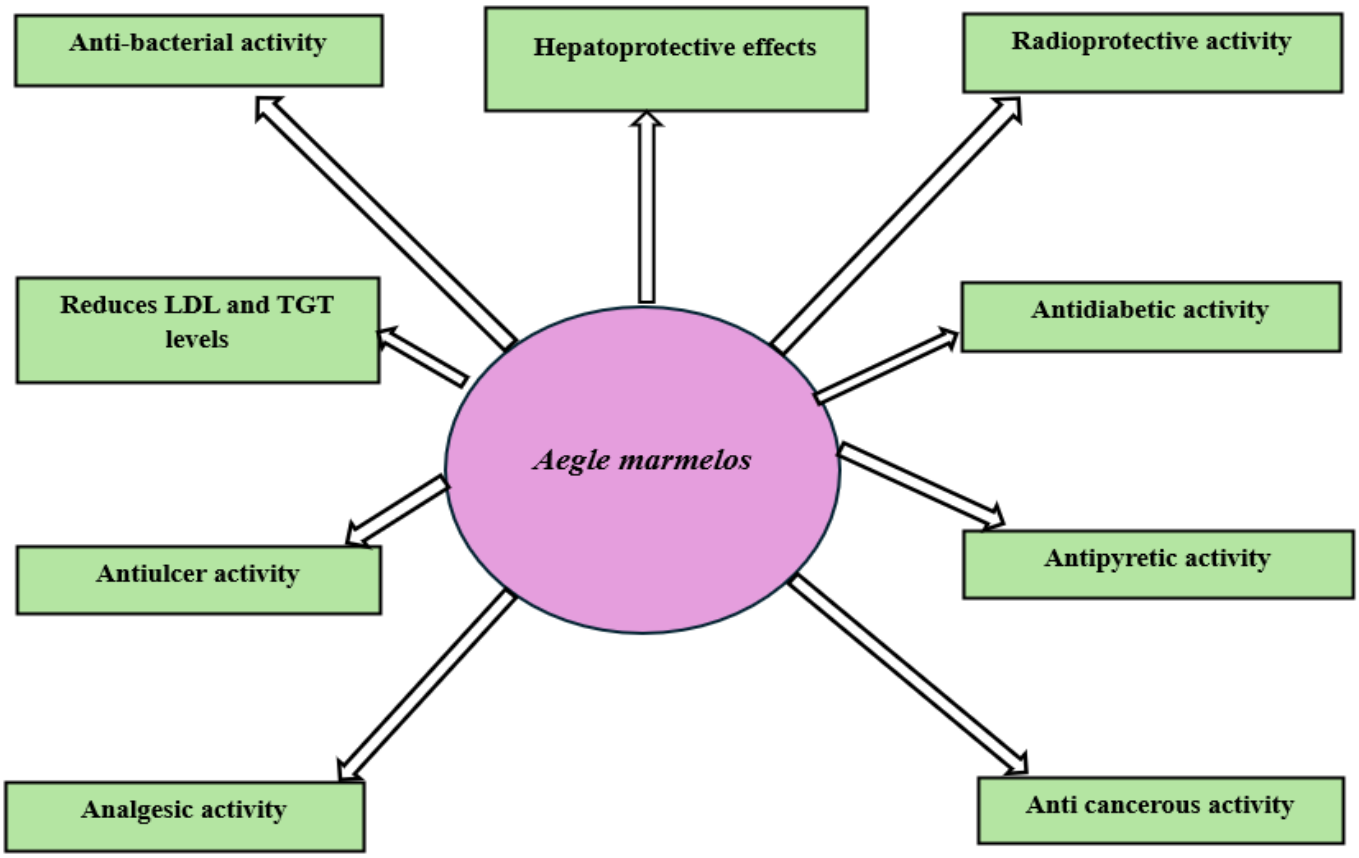
Ethereal and Therapeutic Properties:

1. Aegle marmelos

In India, Aegle marmelos, often called bilva in Sanskrit, is a common conventional medicinal herb. It is indigenous to a number of places, including the Andaman Nicobar Islands, Thailand, Malaysia, the western Himalayas, India, Pakistan, and Sri Lanka. Ancient Indian texts including the Atharvaveda, Rigveda, Charak Samhita, Yajurveda, and Sushrut Samhita all mention the thousands of years that people have been using plants for medicinal purposes. These ancient books emphasise the value of natural medicines for preserving health and offer insights into the historic usage of plants in Indian medicine [7]. The Bael tree is regarded sacred by Hindus, a "Kalpavruksha" or wish-fulfilling tree that sprouted during the fabled churning of the ocean, according to the Skanda Purana.



Flow-Chart-1

2. Hibiscus rosa - sinensis

In addition to colouring flowers and fruits, flavonoids contained by this plant has a variety of biological functions such as antioxidant, anticancer, and anti-swelling. Phytochemical analyses of several portions of the *Hibiscus rosa-sinensis* plant reveal the presence of alkaloids, coumarins, tannins, saponins, and flavonoids. Several studies have found flavonoids, including catechin, epicatechin, cyanidine-3-glucoside, quercetin, kaempferol, and glycosylated derivatives [8]. The flower's ability to absorb negativity is thought to represent Kali's role in absorbing her devotees' sufferings. It represents beauty, passion, and delicate love in the language of flowers. In Hawaii, where it is the state flower, the hibiscus represents monarchy and is used to make leis, which are given as a token of hospitality.

The table shows the therapeutic importance of several parts of the plant –

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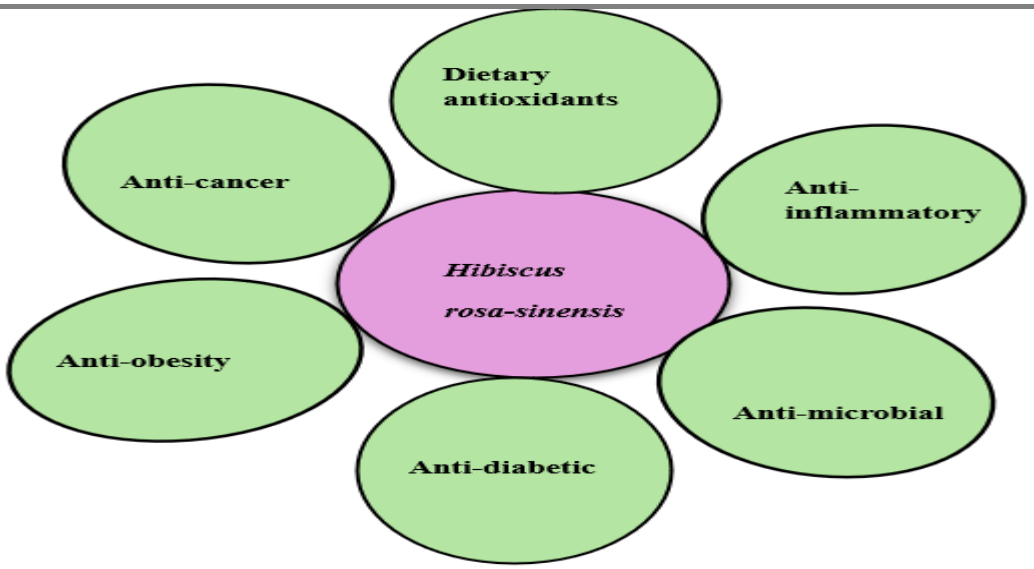
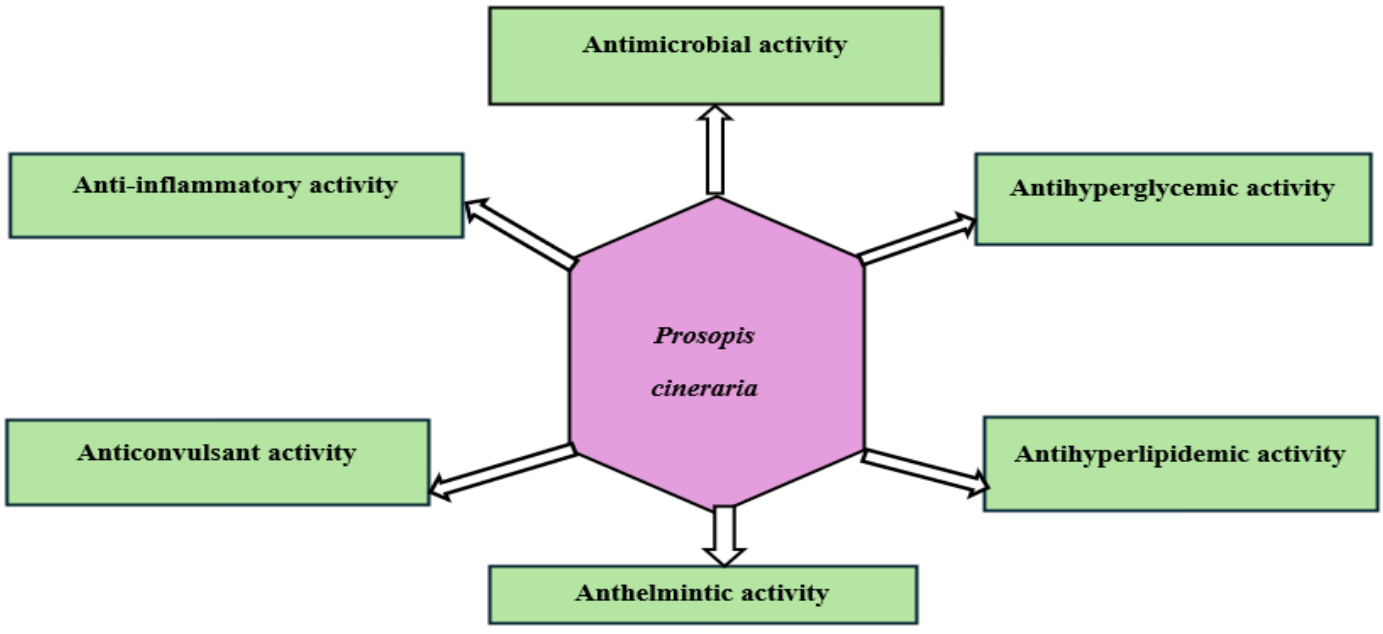


Flow-Chart-2

3. Prosopis cineraria Dietary

Prosopis cineraria contains many phytochemicals such as carbohydrates, proteins, fatty acids, minerals, and **antioxidants** vitamins. Furthermore, phenolic compounds have been found from various sections of the plant. Flavonoids (particularly C-glycosyl flavonoids), tannins, catechin, 4′-Omethyl-gallocatechin, mesquitol, and quercetin Oglycosides are all important phenolic components in **Anti-cancer Anti**Prosopis. . Prosopis extracts exhibited a variety of biological activities, including antioxidant, antihyperglycemic, antibacterial, anthelmintic, antitumor,**inflammatory** and anticancer activity [9]. On Lord Krishna's birth anniversary, green twigs from the Khejri tree are worshipped in homes as a symbol of the deity in several Rajasthan districts. The tree is worshipped on the tenth day of the Dussehra ***Hibiscus*** festival, with rites that frequently include the release of a jay (a sacred bird) and the collection of its dropping leaves. Worshipping the Shami tree, according to devotees, can promote spiritual growth and inner calm, while ***rosa-sinensis*** meditating near it is said to increase beneficial energy.

Pharmacological benefits of the tree have mentioned below: -



Flow-Chart-3

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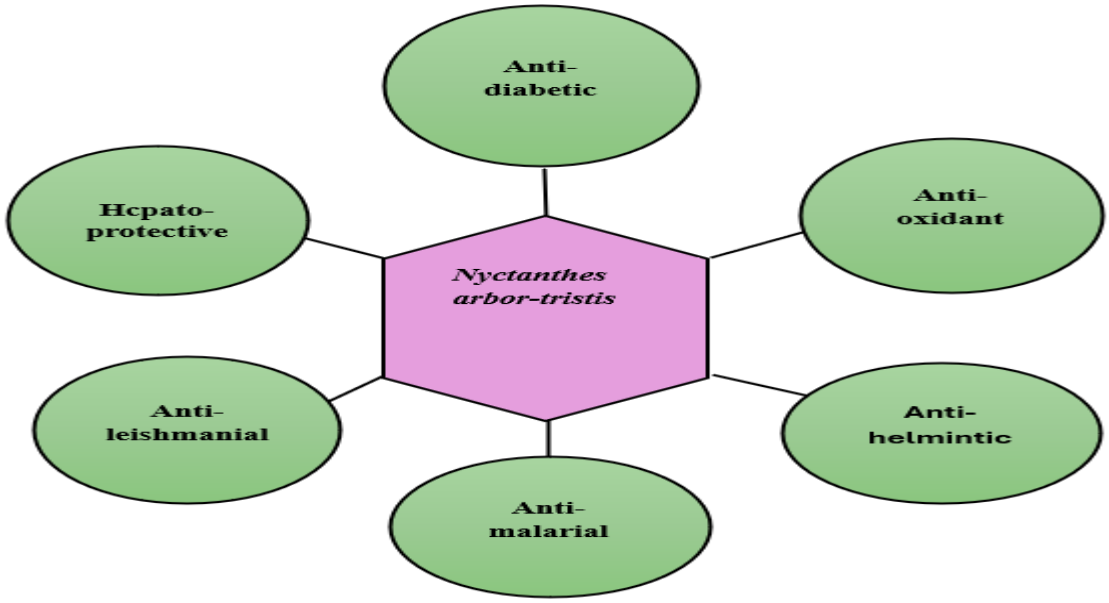
4.Nyctanthes arbor - tristis

Nyctanthes arbour tristis is a widely used medicinal herb in Ayurveda, Homoeopathy, Unani, and Siddha. Naturopathic medicine therapy is used in ethnomedicine to treat a variety of conditions, including persistent fever, rheumatism, malaria, wound healing, skin problems, stomach difficulties, astringent effects, menstruation problems, wound healing, falij or lekba, paralysis, and nervine diseases. Since ancient times, traditional healers, tribes, vedas, and hakims have extensively used the entire plant for therapeutic purposes in the Chittoor region of Andhra Pradesh, India, as well as other southern and northern Asian regions. The root is used to treat fever, sciatica, and anorexia, and the bark is used as an expectorant[10].The fragrant blossoms, which bloom at night and fall in the morning, are considered sacred and presented to Hindu deities such as Lord Vishnu and Goddess Lakshmi. Buddhist rites and temple ceremonies integrate the flowers because of their delicate aroma, which invokes heavenly connection. The falling petals serve as a reminder that beauty and life are fleeting, urging spiritual growth over material things.

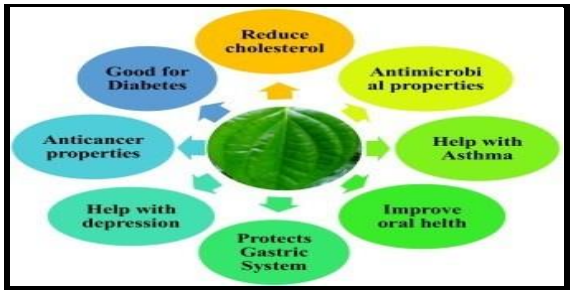
The flow chart depicts the therapeutic importance of Nyctanthes arbor tristis: -



Flow-Chart-4

5. Piper betel

Saponins and tannins impact tissue regeneration during wound healing because of their antioxidant and antibacterial properties, which regulate how wounds join and accelerate epithelial growth. The saponin found in this plant may have antibacterial or cleansing qualities. These compounds' major pharmacological attributes include antimicrobial, antioxidant, antifungal, anticancer, anti-inflammatory, anti-diabetic, digestive, and gastroprotective abilities, which are listed below[11].



Flow chart-5

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6. Areca catechu

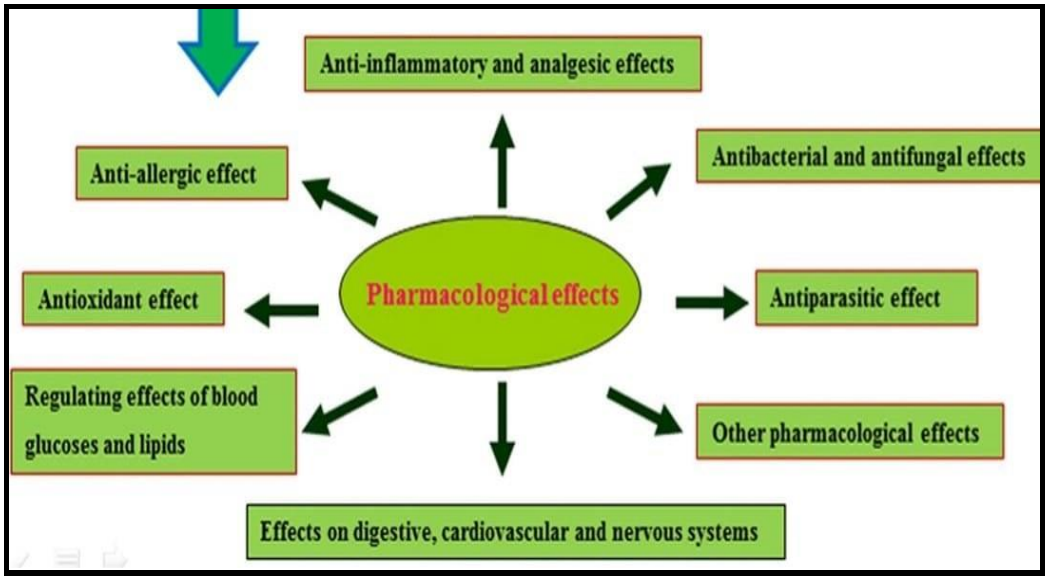
Prior research has demonstrated that the principal functional bioactive constituents in *Areca catechu* are alkaloids, polyphenols, and polysaccharides, which demonstrate a variety of bioactivities including antiinflammatory, antioxidant, neuroprotective, gastrointestinal-supporting, cardiovascular and cerebral vesselprotective, endocrine-regulating, anti-tumor, anti-allergic, anthelmintic, and antibacterial properties[12].

Reviewed Species:

Aegle marmelos is renowned for their antioxidant, Acetylcholinesterase (AChE)inhibitory, and antiamyloidogenic capabilities, as well as their neuroprotective actions against amyloid betapeptide (Aβ1–42)[13].

An investigation of *Hibiscus rosa-sinensis* found tannins, steroids, alkaloids, total phenols, and total proanthocyanidins. Phytochemical substances found in leaves, blossoms, stems, and roots include phenolic compounds (e.g., phlobatannins), glycosides, saponins, and terpenoids, as well as vitamins thiamine, riboflavin, and niacin. According to existing studies, the material is primarily made up of anthocyanins and flavonoids, specifically cyanidin-3,5-diglucoside, cyanidin-3-sophoroside-5-glucoside, quercetin-3,7-diglucoside, and quercetin-3-diglucoside [14].

Prosopis cineraria has numerous applications in the sectors of business, growth, and development. *Prosopis cineraria* leaves, bark, and gum have all been used traditionally for medicinal purposes. They are thought to have medicinal characteristics and are used in treatments for respiratory disorders, skin concerns, digestive



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Flow chart-6

problems, and as a general tonic. *Prosopis cineraria's* applications in a variety of disciplines demonstrate its adaptability, economic value, and benefits to sustainable development in dry places [15].

The absence of heavy metals including lead (Pb), cadmium (Cd), arsenic (As), and mercury (Hg) demonstrates the safety of using *Nyctanthes arbour-tristis* medicinally. Similarly, the detection of aflatoxins and pesticide residues ensures that the plant meets AYUSH and WHO requirements, making it suitable for both domestic and international markets.

The UV-Vis spectroscopy examination of *Nyctanthes arbor-tristis* extract revealed a maximum absorption peak (λmax) at 252 nm. This absorption peak indicates the presence of specific phytochemical components, mainly terpenoids, that contribute to the plant's therapeutic qualities, such as antipyretic action [16].

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Piper betle is a significant medicinal plant with proven nutritional and therapeutic benefits. The rich phytochemical profile, which includes essential oils, phenolic compounds, and alkaloids, adds to its wide range of pharmacological properties Many traditional applications have been validated by modern scientific research, which has also revealed new medicinal potential. The antioxidant, antibacterial, and anti-inflammatory qualities discovered through study promote its use in modern therapeutic applications[17].

Areca catechu is an important medicinal plant used in indigenous medicine to treat a variety of ailments and disorders. The areca nut is used in Ayurveda to strengthen teeth and gums, treat vomiting and nausea, and get rid of foul breath and other symptoms. It is safe for therapeutic use in low dosages, but further research is essential to understand its chemical constituents and medicinal properties[18].

DISCUSSION:

This study is the first to use computational network pharmacology and molecular docking to determine the mechanism of *Aegle marmelos*' effect on inflammatory bowel disease treatment. However, because this study is based on predictions from a range of datasets, additional experimental research is required. The study's strong preliminary results may help researchers focus on possible *Aegle marmelos* targets for treating inflammatory bowel disease [19]. Previous studies have reported that *Aegle marmelos* leaf extract has potential anti-diabetic activity by decreasing the fasting plasma glucose, oxidative enzyme level, pancreatic β-cell modulation and regeneration, lipidemic status and elevated the antioxidative enzyme in the diabetes induced animal models [20].

The *Hibiscus rosa-sinensis* plant, a member of the Malvaceae family, has a long history of usage in traditional Chinese medicine and other tropical areas. It has numerous medical applications, including the treatment of inflammation, fever, and bacterial infections, as well as the usage as a form of birth control. Tannins, alkaloids, flavonoids, terpenoids, and saponins are the most common phytochemicals. This is because they are found in a wide range of extracts and are most likely responsible for the biological activity that they display. This plant's low toxicity makes it a promising target for developing new therapeutic treatments [15].The study provides vital insights into the possible therapeutic characteristics of *Hibiscus rosasinensis* and contributes to the expanding body of knowledge regarding the health benefits of this plant[21]. Phytochemicals found in *Prosopis cineraria* are also advantageous to anti-cancer cells. Network analysis revealed that the posterior cruciate ligament had a strong repressive effect on body composition analysis by acting on the tumor-associated signaling cascade, which could be useful for future anticancer research into the posterior cruciate ligament against breast cancer[22].

Prosopis cineraria, which is often used to treat many disorders, is recognised as a plant with significant medicinal value due to its leaves and bark. This plant has been suggested for a variety of therapeutic uses, including antidepressant, anticancer, and anti-inflammatory properties. *Prosopis cineraria* has a variety of phytochemical elements such as alkaloids, carbohydrates, phytosterols, saponins, phenols, tannins, flavonoids, terpenoids, phlobatannins, protein, and free amino acids in its leaf material[23]

Detailed review revealed that *Nyctanthes arbor-tristis* is rich in iridoid glycosides, flavonoids, tannins, and phenolic compounds, NAT exhibits multi-targeted pharmacological actions including inhibition of Cyclooxygenase and Lipoxygenasesenzymes, suppression of proinflammatory cytokines, and strong antioxidant activity [24]. *Nyctanthes arbor-tristis* is an ornamental and spiritual plant with numerous therapeutic and pharmacological qualities. It is an essential herbal remedy for the treatment of a variety of ailments, including malaria, hypertension, skin infections, and diabetes. The plant has a lot of phytochemicals, and practically every component of it has different pharmacological effects. According to studies, the plant has immunomodulatory, antipyretic, analgesic, antiarthritic, and hepatoprotective properties. The plant is also important in ecological and cultural terms. Its bioactive chemicals have the potential to help create new medications for a variety of ailments and disorders [25].

Piper betel is considered as superior to pharmaceuticals and one of nature's most effective cures. It includes antimicrobial, anti-apoptotic, anticancer, antioxidant, and anti-inflammatory properties. It contains anticarcinogens, which have the potential to aid in the development of cancer treatments. Economic crises have occurred as a consequence of illnesses such as foot rot, leaf spot, powdery mildew, and collar rot. Most farmers

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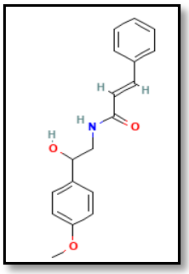
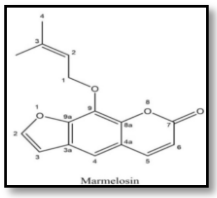
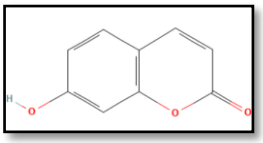
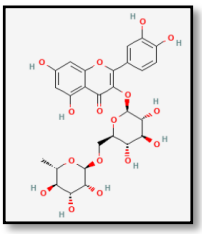
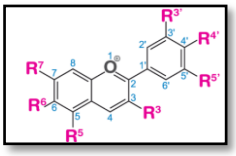
obtained seasonal income, whereas betel vine cultivation provided year-round income from a small area of land[26].

The interaction and synergistic processes of bioactive compounds in *Areca catechu* have not been extensively researched. As a result, more research is needed to determine the physiological consequences of these beneficial chemicals in the human body. Further studies should concentrate on the pharmacological mechanisms and composition correlations of areca nut extracts, as well as their applications in other industries, for offering theoretical support for the green transformation and development of the areca nut industry[27].

Table with phytochemicals and their applicability:

Plant	Phytochemical /Active Compound(s)	Chemical Structure	Future Research Scope
Aegle marmelos **(Bael)**	Aegeline, Marmelosin, Umbelliferone, Rutin	 **Aegeline**  **Marmelosin**  **Umbelliferone**  **Rutin**	• Conduct detailed clinical trials for antidiabetic effects • Develop drug formulations for gastroprotective and hepatoprotective use • Explore synergistic effects with modern medicines
Hibiscus rosa-sinensis	Anthocyanins, Hibiscus acid,		• Develop nutraceuticals for metabolic syndrome

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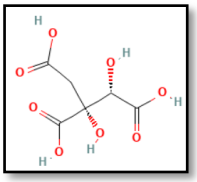
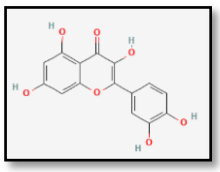
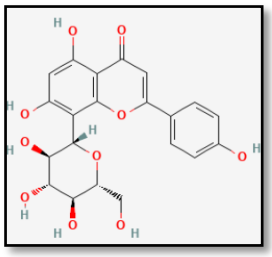
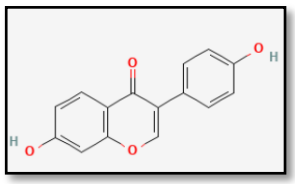
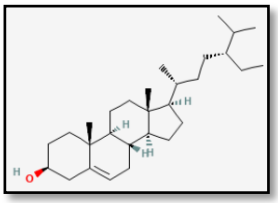
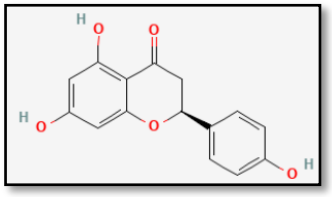
(China rose)	Quercetin	**Anthocyanins**  **Hibiscus Acid**  **Quercetin**	• Evaluate bioavailability and stability of anthocyanins • Advanced studies on hair growth promotion and dermatological applications
***Prosopis cineraria* (Khejri)**	Vitexin, Daidzein, β-Sitosterol	 **Vitexin**  **Daidzein**  **β-Sitosterol**	•Investigate antihyperlipidemic potential in large cohorts • Create novel delivery systems for isoflavones • Conduct pharmacogenomic studies for personalized therapy applications
Nyctanthes arbor-tristis **(Night Jasmine)**	Naringenin, Crocin, Oleanolic acid	 **Naringenin**	• Further studies on anticancer and antidiabetic effects • Explore neuroprotective potential

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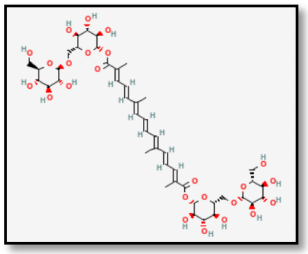
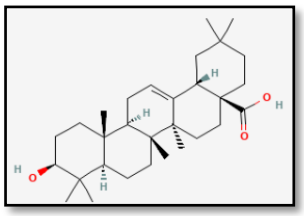
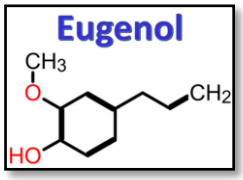
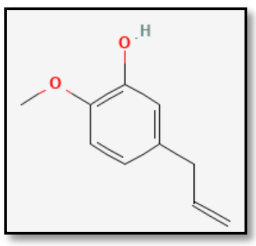
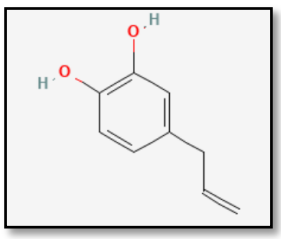
		 **Crocin**  **Oleanolic acid**	• Standardize extracts for phytopharmaceutical development
Piper betle ***(Betel leaf)***	Eugenol, Chavibetol, Hydroxychavicol	  **Chavibetol**  **Hydroxychavicol**	• Focus on isolating and testing specific compounds against various cancer cells. • Exploring its efficacy against parasites like Plasmodium berghei and Leishmania donovani. • Further investigate its anti-inflammatory and wound healing properties to develop new therapeutic products.
Areca catechu	Arecaidine,		• Further comprehensive clinical trials are needed to validate the

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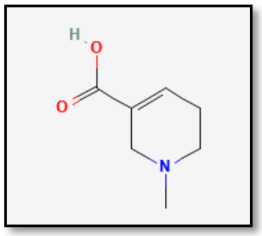
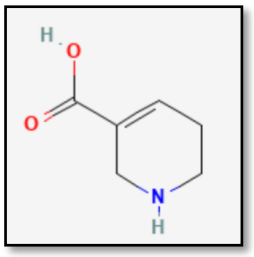
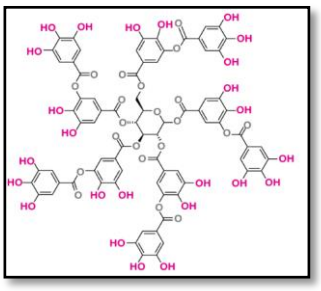
	Guvacine, Tannic Acid	 **Arecaidine**  **Guvacine**  **Tannic Acid**	traditional medicinal uses (e.g., anti-diabetic, anti-migraine). • Studies are needed to understand how the active ingredients (alkaloids, polyphenols, etc.) are metabolized, absorbed, and distributed in the body to better guide the development of Areca-derived medications. • Exploring areca nut extracts as natural, effective, and sustainable alternatives to antibiotics in livestock production warrants further study to address the global crisis of antimicrobial resistance (AMR).

CONCLUSION:

Natural plants have enormous spiritual and medical significance, serving as the foundation for global health, traditional healing practices, and cultural legacy, thereby enabling sustainable development by contributing to the third Sustainable Development Goal (SDG3) on good health and well-being. They provide comprehensive health solutions, enhance economies through new cash crops and rural livelihoods, and promote biodiversity when protected and grown sustainably. Overharvesting, habitat damage, and climate change all pose threats to these critical resources, necessitating collaborative efforts towards responsible conservation and cultivation for future generations.

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