International Journal for Innovative Engineering and Management Research
PEER REVIEWED OPEN ACCESS INTERNATIONAL JOURNAL
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A STUDY OF TRADITIONAL MEDICINAL VALUE OF A. MARMELOS AND THE PARTS OF THE PLANT USED

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ABSTRACT

This research implies that the leaves of A. marmelos may be useful as a natural antioxidant and antibacterial therapy. Oxidative stress and the diseases it might cause may be mitigated by the presence of bioactive substances with potent antioxidant activity. Further, A. marmelos leaf extracts' antibacterial capabilities suggest they might be used as a replacement or supplement to conventional treatment for bacterial illnesses. However, further research is needed to determine the safety and effectiveness of these biological activities in vivo and to discover the chemical molecules responsible for them. In conclusion, our research lends credence to the folk medicine practice of using A. marmelos leaves for their antioxidant and antibacterial effects. Natural cures for treating oxidative stress and bacterial infections may be developed if contemporary healthcare procedures included treatments based on A. marmelos. This would help to promote sustainable and eco-friendly healthcare practices.

KEYWORDS: Traditional Medicinal Value, A. Marmelos, antibacterial capabilities, chemical molecules, Natural cures, healthcare procedures

INTRODUCTION

The Rutaceae family, which has 160 genus and 1900 species has a long history of usage in herbal medicine. The citrus family also includes the Rutaceae. Aegle marmelos is an Indian subtropical plant. Due to its adaptable character, this plant may grow up to a height of 120000 cm above sea level. Sri Lanka, Vietnam, Cambodia, Myanmar, Tibet, Thailand, Burma, Indonesia, Nepal, Malaysia, arid portions of Fiji, and, to a lesser extent, northern Luzon in the Philippine Islands are just some of the places you could find it. Bael fruit was first planted in Europe in 1959. The states of Himachal Pradesh, Uttaranchal, Madhya Pradesh, Jharkhand, Uttar Pradesh, and Bihar all do a good job of cultivating the bael tree. Successive breeding operations have shown that A. marmelos has the highest quality and nutritional value. The Aegle genus, which includes the marmelos species bael, is one of the three monotypes of the orange subfamily. Until recently, seeds were the primary means of propagation for this species. Bael is self-fruitful and its early fruit set is quite heavy, but its ultimate retention is very poor because of a substantial decline in fruit, which may be attributable to climatic conditions however additional variables have not yet been investigated.

REVIEW OF LITERATURE

Timbadiya, Priyanka et al., (2023) Different extracts of Aegle marmelos leaves were studied for their phytochemical profiles, physicochemical reactions, oxidative enzyme activities, antimicrobial effects, antioxidant capacities, and anti-inflammatory capacities. The objective of this study was to isolate and identify phytochemicals with antidiabetic activity from bioactive extracts of medicinal plants that had been extracted using a variety of solvents (including hexane, chloroform, methanol, water, and 90% methanol) and then tested for oxidative enzyme activity, antimicrobial activity, antioxidant activity, and antidiabetic activity. Across all polar extracts, Aegle marmelos leaf was found to have the greatest concentration of phytochemicals. The high concentration of flavanoids (63.640.45) and phenol (53.450.39) in the plant's leaves. High concentrations of calcium (51861.81 ppm), magnesium (1713.01 ppm), and iron (161.08 ppm) were found in the plant leaf powder. All of the Aegle maemelos-leaf extracts tested demonstrated antibacterial activity against Bacillus subtilis, Bacillus cereus, Bacillus megaterium, and Escherichia coli, with the exception of the hexane and chloroform extracts. Plant extract was not shown to have any antifungal efficacy against Alterneria. Aspergillus flavus and Aspergillus parasiticus had the most activity, followed by Fusariumoxispora. The development of Fusariumoxispora was stopped by all five Aegle maemelos-leaf extracts. Aspergillus flavus was only inhibited by hexane, water, and 90% methanol extracts, whereas Aspergillus parasiticus was only inhibited by water and 90% methanol extracts. The DPPH scavenging activity of Aegle marmelos (Beal) leaf extracts was found to be highest in the methanol extract, at 79.52 0.35%. The methanol extract of Aegle marmelos (Beal) leaf was the most effective in inhibiting albumin denaturation, with an activity of 65.301.07%. Introduction Commonly referred to as bael (or bel), the Aegle marmelos (Linn) correa is a small to medium-sized tree in the family Rutaceae. The herb has been utilized in Ayurvedic and other forms of traditional Indian medicine for centuries. It's been linked to a number of potentially life-saving therapeutic effects. Many unique and intriguing metabolites have been isolated through chemical studies of the plant's many sections. The bioactivity of some of the chemicals has been tested. The principal alkaloids found in it are aegline, marmesin, marmina, and marmelosin. Myocardial disorders may be avoided with the use of an aqueous leaf extract. According to the World Health Organization (WHO), almost 80% of the global population relies on traditional medicines as their main form of health care, with the vast majority of these treatments including the use of plant extracts or their active ingredients. Antioxidant activity, antibacterial impact, regulation of detoxification enzymes, immune system stimulation, decreased platelet aggregation, hormone metabolism modification, and anticancer property are only few of the biological qualities possessed by secondary plant metabolites. Plants contain thousands of different

phytochemicals, many of which are yet unidentified. Phytochemicals are known to be produced by plants for self-defense, but new studies show that many of these substances may also serve to shield humans from illness. Alkaloids, Parusnath, Myuri, and the rest of the plant compounds make up the secondary ingredients.

Parusnath, Myuri et al., (2023) Medicinal plants are safe, effective, and easily available substitutes for manufactured medications that lack the toxicity, disease resistance, and unwanted side effects that are common with pharmaceuticals. Combretum molle has been used in African folk medicine because of its putative medicinally helpful bioactive components. Using 2,2′-diphenyl-1-picrylhydrazyl radical scavenging and ferric-reducing antioxidant power tests, the antioxidant properties of hexane, chloroform, and methanol leaf and stem extracts were examined. Agar well diffusion testing was also used to examine the antibacterial activity of the methanol extracts against strains of Gram-negative Escherichia coli (ATCC 25922) and Gram-positive Staphylococcus aureus (ATCC 25923). The radical scavenging activities of the methanolic leaf and stem extracts of the plant were significantly higher than those of the ascorbic acid control (p 0.05) at concentrations of 15 and 240 micrograms per milliliter, respectively (94.58 1.10% and 99.22 0.30% and 91.57 1.71% and 99.60 0.20%, respectively). Both the chloroform stem (78.68 1.18% at 15 g/mL to 98.14 1.22% at 240 g/mL) and hexane leaf (72.12 4.38% at 15 g/mL to 89.87 1.50% at 240 g/mL) extracts showed significant scavenging activity (p 0.05). When compared to the gallic acid control (100 0.00%), all extracts failed to reduce ferric at any concentration (p 0.05). There was substantial action at greater doses of the leaf and stem extracts against both tested bacteria (p 0.05). Antioxidant and antibacterial properties were shared by C. molle leaf and stem extracts. These results support the need for more pharmacological study of C. molle for possible medication development.

Subedi, Aliza. (2022) Medicinal plants have been used as a treatment method in almost every civilization. Plants have been utilized for thousands of years to add taste to food, keep it fresh longer, treat and prevent illness, and even stop epidemics. Bel is one of the plants that has been used to cure a wide range of medical conditions for centuries. In this study, we want to determine the Bel's potential therapeutic applications. To that end, a variety of internet resources were used to evaluate print and digital publications from 1979 through 2021. For this reason, we looked at 73 articles. The usage of Bel in ethnomedicine has been shown to be beneficial. Phytochemicals such as alkaloids, cardiac glycosides, terpenoids, saponoids, flavonoids, steroids, and tannins make up the various sections of the Bel plant. Their therapeutic qualities, which include those of an anti-diarrheal, anti-dysentric, antipyretic, antimicrobial, wound healing, diuretic, antifertility, antioxidant, analgesic, anti-inflammatory, hepatoprotective, etc., justify their use as medication. In addition to its usefulness as a medicinal plant, the giving of Bel leaves is a mandatory ceremonial in the worship of Lord Shiva in Hinduism. Bel embodies

a wide range of qualities that are indicative of their respective religious and therapeutic value. More research is needed to identify and explore the plant's undiscovered qualities and applications.

Balraj, Thendral, et al., (2022). The plant family Solanum indicum (Solanaceae) is extensively utilized in folk and traditional medicine for the treatment of a broad range of illnesses (The purpose of this research is to examine Solanum indicum's leaf, root, and stem aqueous extract for its antioxidant, free radical (DPPH) scavenging, in vitro anti-inflammatory, and antibacterial properties. GC-MS was also used to examine the aqueous extract of Solanum indicum to identify any potential bioactive components. When compared to extracts of the leaves and stems, the aqueous extract of the Solanum indicum root has the greatest concentrations of phenols, tannins, flavonoids, and vitamin C. Both the DPPH scavenging potential and the HRBC membrane stabilizing experiment demonstrated the root extract's excellent antioxidant status. In all, 11 compounds were found in the leaf aqueous extract, 10 compounds in the root aqueous extract, and 9 compounds in the stem aqueous extract of Solanum indicum using GC-MS. The aqueous extract of Solanum indicum stem showed significant antibacterial activity against Escherichia coli and Klebsiella pnuemoniae. The current research demonstrates that the leaves and stem of Solanum indicum also contain antioxidant, anti-inflammatory, and antibacterial activity, although these properties are more often associated with the root. Compounds with strong antibacterial potential have been found in Solanum indicum, particularly in its stem, which may have use in pharmacognosy.

Siang, Chon, et al., (2022) Antioxidants and antimicrobials are found in abundance in plants. The goal of this research was to determine whether or not the hydroalcoholic extract (PALHE) of Plumeria alba leaves had antioxidant and antibacterial properties. The phytochemical composition, antioxidant capacity, and antibacterial efficacy of PALHE were investigated. The maceration process was used to create the PALHE using ethanol at 95% as the solvent. Total phenolic content (TPC) and total flavonoid concentration (TFC) were measured to evaluate the antioxidant activity. The antioxidant activity of PALHE was measured using the DPPH (1,1-Diphenyl-2-picryl hydrazyl) radical scavenging test. The well diffusion technique was used to examine the PALHE for its antibacterial efficacy against S. aureus and E. coli. Carbohydrates, reducing sugar, mucilage, proteins, steroids, volatile oil, tannins, phenolics, and flavonoids were all found in the PALHE after it was subjected to a battery of phytochemical screening assays. In addition, the DPPH test result over the ethanolic leaves extract of the PALHE demonstrated considerable antioxidant activity, with an IC50 of 23.96 mcg/ml. The total phenol content (in terms of gallic acid equivalent) and total flavonoid content (in terms of rutin equivalent) were also measured, with values of 71.04 mg and 75.60 mg, respectively.

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THE TRADITIONAL MEDICINAL VALUE OF A. MARMELOS AND THE PARTS OF THE PLANT THAT ARE USED

In India, the Aegle marmelos Correa plant is used for medicinal purposes. The plant's pharmacological properties have been studied, and several chemicals have been identified. Plants are utilized for their medicinal properties, including their anti-ulcer, anti-oxidant, anti-malarial, anti-inflammatory, anti-carcinogenic, radioprotective, anti-hyperlipidaemic, anti-fungal, antibacterial, and anti-viral activity, and anti-venom properties. Numerous biologically active chemicals, including aegelenine, aegeline, lupeol, rutin, marmesinin, -sitosterol, glycoside, O-isopentenyl halfordiole -sitosterol, marmelin, and phenylethyl cinnamamides, have been identified via studies of plant photochemistry. The leaves of this plant are used to treat diabetic mellitus because to the presence of flavone condensed tannins, phlobatannins., anthocyanins, and flavonoid glycosides Diarrhea, dysentery, dyspepsia, stomachalgia, cardiopalm, seminal tiredness, etc. may all be helped by using the roots. The origin is found in a component of the Ayurvedic formula 'Dasamul' . Bark is utilized to treat high body temperatures. A significant historical and spiritual relevance to Indian culture and rituals, Bael is often addressed in medieval Sanskrit scriptures. The bark, roots, and leaves of the bael tree all contain unique chemical compounds such alkaloids, coumarins, and steroids. Ripe fruit may be used to cure diarrhea due to its laxative properties. The Ayurvedic and other Indian medical communities are significant consumers. The leaves of the tree are traditionally utilized in ritualistic sacrifices. The medicine marmelosin, extracted from the fruit as a compound that cannot be counted in crystal form, is another reason for the fruit's popularity. Aside from being a great medicine for heart and brain conditions and dyspepsia, ripe bales are also delicious, aromatic, firming, and healthy for the stomach. Bael fruit is less popular than other fruits because of its tough skin, mucilaginous texture, and high seed content. Murabba, candy, bail depleted bael powder, panji, mash, slab, toffee, RTS beverage, nectar, squash, syrup, etc. all employ ripe or unripe bael fruit in some way. Ophthalmia, hearing loss, inflammation, diabetes, and asthma may all be treated with the help of the leaves, which are also astringent, laxative, febrifuge, and diuretic. The sour, astringent, and digestive properties of unripe fruits make them useful for treating gastrointestinal issues such constipation, diarrhea, and parasites. Bael fruit's therapeutic characteristics have helped make the tree one of India's most significant medicinal plants. The roots have several medicinal uses, including relief from diarrhea, dysentery, dyspepsia, stomachalgia, and cardiopalmus due to their sweet, astringent, bitter, and febrifugal properties. The human diet would be severely lacking without fruit. They are useful foodstuffs that also have economic value as agricultural goods. These foods persisted in the human diet because they contributed variety, flavor, engagement, aesthetic appeal, and met certain dietary needs. Fruits, in addition to being rich in water content and having a soft texture, also contain a range of tastes

that includes sweet, sour, and semiastringent. There has been a lot of focus on various parts of the globe because of their amazing flavor and texture. The organoleptic and chemical qualities of foods are the primary reasons why humans consume them. Although there has been a lot of academic study on these topics, much more effort is needed to perfect the methods used to manufacture different types of bael. There is no bael fruit flavor to be found in either the current or global markets. There is a constant demand from consumers around the world for new higher quality food products that are nutrient dense, medicinally significant, and elegantly sweetened, and the use of value ingredients from bael could help facilitate their widespread adoption in each of these institutional and global markets. For quite some time, bael's potential health benefits and nutritional value have been widely suspected.Still, it's discouraging that there hasn't been a huge demand for such fruit for either fresh consumption or processing, regardless of whether the use of bael fruit, or the ripe fruit in particular, is found in the processing industry. It's going to be a huge help for gathering this precious endangered medicinal plant.

CONCLUSION

The search for phytochemicals, genes, and products with major economic worth necessitates an examination of the genetic diversity of A. marmelos and its association to phytochemicals. Chromatographic techniques and molecular markers provide light on the connection between locales and genetic diversity. In addition, taking a small sample of the alternative component might help prevent the damage caused by the careless removal of bark from trees. Finding valuable plant genotypes requires an examination of genetic diversity specifically that of A. marmelos and how it relates to phytochemicals.These high-quality genotypes, combined with the distribution of favorable environmental conditions may be a crucial source of secondary metabolites with substantial economic potential.

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