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A SYSTEMATIC REVIEW ON SOME SELECTED ETHNOBOTANICAL INDIAN MEDICINAL PLANTS WITH SPECIAL REFERENCE TO THERAPEUTIC VALUE

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ABSTRACT:

In recent decades, there has been a renewed focus on using plants as a source of novel compounds for scientific research into physiological and biochemical processes, as well as pharmaceuticals. The idea that herbal medicines are safer and less harmful to the human. Plants are being screened for biological activity with medicinal potential in laboratories all around the world. Untapped potential exists in higher plants as sources of novel medications. Plants have long been used to heal medical conditions. Since ancient times, people have employed a wide range of plant species to treat a wide range of illnesses. This is because plants are known to produce an abundance of secondary metabolites. Many of these natural compounds are used as therapeutic agents or as building blocks for the creation of contemporary medications because it has been demonstrated that they exhibit intriguing biological and pharmacological actions. In this article, a systematic review on some selected ethnobotanical Indian medicinal plants with special reference to therapeutic value has been discussed.

Keywords: Ethnobotanical, Indian, Medicinal, Plants

INTRODUCTION:

In tropical nations, infectious diseases cause almost half of all fatalities. Despite advancements in our knowledge of microorganisms and how to control them, drug-resistant germs and previously unidentified disease-causing microbes continue to cause epidemics and serious public health concerns in industrialised nations. A growing number of people are looking for antimicrobial agents from natural sources as a result of antimicrobial multiple drug resistance towards widely used commercial medications. Much more research is required in this field because plant-derived antibacterial drugs represent a mostly unexplored resource with significant medical promise. In this article, Cassia auriculata; Glycyrrhiza glabra; Piper longum; Syzygium aromaticum were selected for systematic review.

SYSTEMATIC REVIEW OF LITERATURE:

Cassia auriculata:

Nille GC et al. (2021) explored that Avartaki (Senna auriculata (L.) Roxb.) agrees. Indian Ayurvedic and Siddha medicine systems employ Cassia auriculata L. (Fabaceae family) as a traditional medicinal herb to treat a wide range of illnesses. There have been reports of

therapeutic applications for almost every part of the plant, including the flowers, leaves, seeds, bark, and roots. It has historically been used to treat metabolic problems, diabetes, asthma, rheumatism, dysentery, and skin diseases. The extracts from its various parts and their isolated compounds exhibit a wide range of pharmacological activities, including antidiabetic, antioxidant, anti-inflammatory, antihyperlipidemic, hepatoprotective, nephroprotective, cardioprotective, anti-atherosclerotic, anticancer, antimutagenic, antimicrobial, antiulcer, antipyretic, anthelmintic, immunomodulatory, antifertility, anti-venom, and anti-preclinical studies' toxicological results confirmed the plant's safety, but thorough clinical trials are necessary to confirm the plant's safety and effectiveness in humans. The point of this review paper was to show what we know about Senna auriculata (L.) Roxb right now, focusing on what it means for people with diabetes and its ethnomedicinal, phytochemical, pharmacological, and toxicological properties.

While ancient Cassia auriculata Linn is a potential folklore medicinal plant (Caesalpiniaceae) used for Ayurvedic and Siddha systems of medicine, V. Jenila Jose Jancy et al. (2021) explored that medicinal plants, herbs, spices, and herbal remedies are integral components of the alternative system of medicine. Many different phytochemical ingredients, or secondary metabolites, are found in plants and are either directly or indirectly utilised in the pharmaceutical sector. For millennia, people have successfully treated a wide range of illnesses with different plant parts or extracts. The study's objectives were to examine Cassia auriculata's phytochemical components and GC-MS analysis. The existence of several bioactive substances in C. auricular revealed the significance of pharmaceuticals. Finally, it can be said that studying plants has given researchers in the pharmaceutical industry a fresh viewpoint and that studying plants may help create new and innovative antioxidant compounds that may be used to treat a wide range of illnesses.

Sitaram, T.S.S. et al. (2021) looked into the impact diabetes has had on the health system in emerging nations and found a rising trend in the number of people living in cities. Most individuals are thought to have type II diabetes, which is readily managed with medication, diet adjustments, and exercise. Ayurvedic medicine, which has a long history in Sri Lanka, uses this herb to treat a wide range of illnesses. In order for medicinal plants to be utilised both for further research and in the traditional medical system in a safe and effective manner, it is crucial that they be screened properly. In Sri Lanka, the Ayurvedic medicinal system treats a variety of illnesses, including diabetes, with the plant cassia auriculata. We assessed the antioxidant and anti-diabetic qualities of the leaves of Cassia auriculata. Following a series of extractions using petroleum ether, the leaf methanol extract was divided between EtOAc and water. The assay for α-amylase inhibition was conducted with the 3,5-dinitrosalicylic acid technique. Folin-Ciocalteu's reagent was used to find the total phenolic content, and the DPPH free radical scavenging activity was used to test the antioxidant properties. The brine shrimp bioassay was used to assess the extract's cytotoxicity. Using the BSA and EAA assays, the extract exhibits extremely good anti-diabetic action for Cassia auriculata. The crude methanolic extract of cassia

auriculata leaves shows notable inhibition of α-amylase activity. Therefore, cassia auriculata leaves have the potential to be used as a standard green vegetable. They may also be further studied for their ability to isolate pure chemicals that have anti-diabetic properties.

According to Rohit Kumar Bargah et al. (2020), nature has been a significant source of medicinal benefits for thousands of years. Many contemporary medications have been developed through the extraction and exploitation of natural resources, which are included in conventional medical systems. The current study's primary goal was to assess. The ethanolic and aqueous extracts of Cassia auriculata Linn. flowers were tested in vitro for antioxidant, antibacterial, and preliminary phytochemical screening. falling within the Caesalpiniaceae family. The crude extract was screened for phytochemicals, and the results showed that all of the extract contained flavonoids, steroids, saponins, phenolic compounds, terpenoids, and carbohydrates, but only the ethanolic extract had tannins and alkaloids. Utilising antioxidant activities such as the 2, 2-Diphenyl-1-picryl hydrazyl (DPPH) scavenging assay, the antioxidant activity of Cassia auriculata flowers was evaluated. The content of flavonoids and total phenols was tested. Because flowers have higher levels of phenolic and flavonoid content, they exhibit the greatest antioxidant activity in both extracts. This suggests a clear relationship between antioxidant capability, total phenol, and flavonoids. Using the agar disc diffusion method, the antibacterial activity of plant materials against both Grammeme-positive and Grammeme-negative bacteria has been linked to the presence of bioactive components. The values of the minimum inhibitory concentration were 50, 75, and 100 µg/ml. In a dose-dependent way, ethanolic extract demonstrated noticeably strong antibacterial activity. Thus, it can be said that Cassia auriculata has phenolic qualities that are very antioxidant and antibacterial.

Vandana Meena (2019) stated that the Indian subcontinents over 3000 diverse medicinal plants have shown a lot of promise in the developing field of herbal medicines. Additional detailed information regarding the use of plant sources as medicine has been documented in our ancient, golden-age Ayurvedic literature as well as in other alternative medical systems. Humans consume a variety of plant parts, including leaves, fruits, seeds, and more, which contain nutrients and health-promoting substances. Auriculata Cassia Linn Also referred to as Avartaki, this herb has been used historically to treat a wide range of illnesses. The current review's objective is to assemble Cassia auriculata Linn's medicinal values that were discovered during the study endeavour, utilising cutting-edge scientific methods and instruments.

Syed Shafeeq. R et al. (2018) explored that the plant Cassia auriculata Linn is a widely used medicinal plant in India and is well-known in indigenous medical systems like Ayurveda and Siddha. Its flower is used in skin disorders and rheumatism; its bark and leaves are astringent and anthelmintic; and its powered parts are used for opthalmic, conjunctivitis, diabetes, and other conditions. It also investigated the effectiveness, safety, and reduced side effects of herbal formulations, which are highly sought after in the developed world for primary health care due to

their benefits. The goal of this paper is to provide a thorough overview of plant pharmacological activity.

Based on P. Saritha and U. Anitha Devi (2017) research, the majority of people in underdeveloped nations have been using herbal medicines for centuries as a primary source of health care due to their safety, effectiveness, cultural acceptability, and lower side effects. Owing to this growing tendency, pharmaceuticals that are significant and therapeutically intriguing can be developed from plant sources, which are already utilised in conventional medical systems. Commonly referred to as Tanner's Cassia, Cassia auriculata is a significant medicinal plant that is grown throughout Asia and most of India. It is used in ancient medical systems. Particularly in Ayurvedic and Siddha medicine, the flower, leaves, stem, root, and unripe fruit are employed for therapeutic purposes. The current review's objective is to look through the literature for studies on the medicinal uses of the Cassia auriculata plant. Telangana's state flower, Cassia auriculata, also known as Tangedu, has numerous historical uses in the treatment of numerous illnesses. In addition, it is used to treat rheumatism, conjunctivitis, ulcers, fever, urinary tract issues, discomfort, and liver illness.

Guruprasad C. Nille and K.R.C. Reddy (2015) explored that the Cassia auriculata has been used therapeutically for a long time in the treatment of a variety of chronic disorders. The current review's objective is to search the literature for studies on the pharmacological characteristics, phytochemical analysis, safety/toxicity, and pharmacognostic aspects of the Cassia auriculata plant. Specifics regarding phytochemical isolation, pharmacological activities, toxicity investigations, and other related topics were taken from published reports that concentrated on the plant's safety profile. The review concluded with plant-wide safety concerns. The collected data can help the researchers concentrate on the most important yet unexplored study topics.

Glycyrrhiza glabra:

According to research by Shadma Wahab et al. (2021), the Glycyrrhiza genus has more than 30 species that are widely distributed throughout the world. It was the most often prescribed herb in East China, the West from the Former Han dynasty, East Egypt, Rome, and Greece. Antibacterial, anti-inflammatory, immunodeficiency, respiratory, liver, and throat infections are just a few of the conditions that licorice root extracts can help with. However, traditional medicine is becoming more and more popular as a means of treating a wide range of illnesses. To discover the potential of novel chemicals to treat chronic diseases like respiratory, cardiovascular, anticancer, hepatoprotective, etc., it is crucial to screen medicinal plants. This paper, which will serve as a resource for upcoming clinical and basic studies, thoroughly analyses the ethnopharmacological applications, phytochemistry, biological activities, clinical data, and toxicology of licorice. A number of studies have been conducted to determine the pharmacological effects of licorice on various illnesses. This review paper is mostly about the molecular mechanism of licorice extracts and their four flavonoids (glabridin, lichalocone,

liquiritigenin, and isoliquiritigenin) in terms of their pharmacologic activity. With few adverse effects, licorice may be a natural replacement for present treatment in the fight against newly discovered illnesses. For the sake of future research and therapeutic application, this review will offer methodical insights into this antiquated medication.

Kamrul Hasan et al. (2021) explored that nature has always been a great source of therapeutic ingredients, offering us a variety of beneficial bacteria and medicinal plants. As a result, there is a constant need for cosmetics, health products, and medicinal plants. Glycyrrhiza glabra Linn, the scientific name of licorice, is one such plant in the Leguminoceae family. This plant has medicinal properties and resembles an herb. We will examine the phytochemical components of the plants and their pharmacological effects in detail in the upcoming essay. This plant contains a number of compounds, including glycyrrhizin, glycyrrhizinic acid, isoliquiritin, and glycyrrhizic acid. These compounds have been shown to have anti-cancer, anti-atherogenic, anti-diabetic, anti-inflammatory, anti-microbial, and antispasmodic properties, making them beneficial to human pharmacology. Furthermore, the hepatoprotective, immunologic, and memory-enhancing activities of these products differ. In addition to having antidepressant, sedative, and anticoagulant properties, they can promote hair growth and regulate weight. This article highlights some of the toxicity and side effects of licorice and its bioactive components, as well as new investigations on the phytochemical and pharmacological data.

Mejía-Argueta et al. (2020) stated that we collected 135 strains of Escherichia coli that produce extended-spectrum β-lactamase (ESBL) to test clove essential oil's antimicrobial potential against organisms that are resistant to antibiotics. This has not been studied in depth before. The primary organism that is being identified more frequently as the source of complex urinary and gastrointestinal tract infections is E. coli, which continues to be a significant factor in antibiotic therapy failure in the medical field. The next part of this study looked at the link between the presence of antibiotic-resistant genes (TEM-20, SHV-2) in the plasmatic DNA of ESBL-producing E. coli bacteria and the antibacterial activity of Syzygium aromaticum essential oil (EOSA). Coli employs the RT-PCR method. Hydrodistillation was used to obtain the EOSA. By employing the Kirby-Baüer technique, we discovered that EOSA had a smaller medium (mean = 15.59 mm) than chloramphenicol (mean = 17.73 mm). As a result, the differences were substantial ($p<0.0001$). EOSA also showed bacteriostatic activity by killing bacteria quickly and antibacterial activity, especially against ECB132 (MIC: 10.0 mg/mL and MBC: 80.0 mg/mL). We discovered that there was no expression of blaSHV-2 and that the antibiotic-resistant gene blaTEM-20 was expressed in 23.52% (4/17 strains). EOSA used the GC-MS technique to present predominant chemicals (eugenol, caryophyllene). The active components of plant essential oils have the potential to be highly bioactive against numerous targets, such as the cytoplasm, genetic material, and membranes. According to this research, EOSA may prove to be a valuable adjuvant against gastrointestinal and urinary disorders brought on by ESBL-producing E. coli.

Zhou J-X et al. (2019) stated that a methanol extract from Glycyrrhiza glabra L. has an antibacterial, cytotoxic, antioxidant, and phytochemical composition. (Ge), a Paeonia lactiflora Pall. extract prepared with 50% ethanol (in water). (Pe) and an Eriobotrya japonica (Thunb.) Lindl. 96% ethanol extract. (Ue) were looked into. LC-MS/MS was used to examine the extracts' phytochemical profiles. The Folin-Ciocalteu method was used to find out how much total phenolic content there was. To test the antioxidant activity, 2,2-diphenyl-1-picrylhydrazyl (DPPH) and 2,2′-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid) (ABTS) radicals were scavenged. The 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay was used to test cytotoxicity in murine macrophage RAW 264.7 cells. Using the broth microdilution method, the antimicrobial activity of three plant extracts was examined against six bacterial strains. In the DPPH experiment, only Pe showed strong antioxidant properties compared to the positive controls, which were ascorbic acid and (−)-epigallocatechin gallate (EGCG). In general, the order of antioxidant activity was ascorbic acid, or EGCG > Pe > Ue > Ge. After being treated for 24 hours, the three plant extracts did not significantly kill RAW 264.7 cells, as their IC50 values were less than 60.53 ± 4.03 μg/mL. When compared to the six tested bacterial strains, urea did not exhibit toxicity, with minimum inhibitory concentrations (MIC) greater than 5 mg/mL. Ge was moderately effective at killing Acinetobacter bohemicus, Kocuria kristinae, Micrococcus luteus, Staphylococcus auricularis, and Bacillus megaterium, with MICs ranging from 0.31 to 1.25 mg/mL. At a MIC of 0.08 mg/mL, Pe reduced the growth of Micrococcus luteus, Bacillus megaterium, and Acinetobacter bohemicus. It was found that all three extracts were low-cytotoxic. However, Pe had strong antibacterial activity and a good ability to remove DPPH radicals. Ue did not have any antioxidant or antibacterial activity, and Ge did not have any antioxidant potential but had a medium level of antibacterial activity against five types of bacteria. For their potential to be developed as antioxidant or antibacterial candidates, Pe and Ge could be investigated further.

Giulia Pastorino et al. (2018) explored that the common perception of natural substances' safety has led to consumers' increased attention to natural treatments and principles in recent years. However, the business is becoming more and more interested in using plants that are used in traditional medicine in meals, nutraceuticals, cosmetics, and even medications. Rhizophora glabra Linn. is a member of the Fabaceae family that has been valued for its ethnopharmacological properties since ancient times. This plant includes a variety of phytocompounds with diverse pharmacological effects, including glycyrrhizin, 18β-glycyrrhetinic acid, glabrin A and B, and isoflavones. Numerous extracts and pure chemicals from this species have been shown through pharmacological investigations to exhibit a wide range of biological capabilities, such as antibacterial, anti-inflammatory, antiviral, antioxidant, and antidiabetic actions. Certain toxicological investigations have raised some red flags. All of those concerns are included in this review, which also concentrates on the pharmacological activity submitted for G. scabros. Consequently, a thorough, critical, and up-to-date summary of what is now known about G. The composition and biological activities of glabra are presented

here to investigate its therapeutic potential and potential future difficulties for use in the development of new products that will improve human well-being.

Syed Luqman Shah et al. (2018) explored that Glycyrrhiza glabra L. in traditional medicine (Leguminosae) is commonly used. Glycyrrhizin is one of G's active constituents, glabra, which has anti-inflammatory properties. This research looks into G. glycyrrhizin and glabra methanol extracts for the management of corneal neovascularization (CNV). 70% aqueous methanol was used to remove the glabra. Chemical composition was analysed using high-performance liquid chromatography (HPLC), thin-layer chromatography (TLC), and phytochemical assays. The topical remedy for G. normal saline was used to prepare glabra methanol extract (2% w/v) and glycyrrhizin (1% w/v). Animals were not given any treatment for a week following a corneal burn (1 N NaOH) to allow for the appearance of neovascularization in all groups. Beginning on day seven, the treatments ran for the next twenty-one days. Three drops of different topical treatments were applied to the animals three times a day. Histological investigations and digital picture analysis were employed to assess CNV. The methanol extract of glabra revealed the presence of proteins, carbohydrates, flavonoids, phenols, and saponins. Glycyrrhizin was confirmed to be present by TLC and HPLC. Photographic examination of the group treated with glycyrrhizin and extract revealed a significant reduction in CNV. The glabra and glycyrrhizin-treated groups did not exhibit any blood vessels with collagen fibres organised correctly. This research revealed that G. glycyrrhizin and glabra can be used to cure CNV. Using bioassay-guided isolation, ocular solutions for CNV therapy can be prepared.

Faruk Karahan et al. (2016) say that this study looked into the antibacterial and antioxidant effects of methanolic extracts from Glycyrrhiza glabra var. root. glandulifera Boiss, Waldst, and Kit (Fabaceae) underwent research. Plant samples were gathered from several habitats in Turkey's East Mediterranean region. We used the minimum inhibitory concentration and disc-diffusion methods to test the plant extracts' antibacterial properties against two types of yeast and nine types of bacteria. Through the use of the DPPH (1,1-diphenyl-2-picrylhydrazyl) technique, the antioxidant activity was ascertained. Plant root extracts were found to be more efficient against Grammeme-positive bacteria than Grammeme-negative bacteria, according to the results of the antimicrobial testing. Furthermore, the antibacterial impact of the extracts was greater against Candida species than against bacteria. The extracts demonstrated good antioxidant activity, with a range of 588 ± 0.86 µg/mL to 2190 ± 1.73 µg/mL for the median inhibitory concentration (IC50). The findings suggested that various environmental factors within each habitat could have an impact on the chemical composition and biological activity of native populations of licorice. This study not only confirmed the traditional use of licorice but also raised the possibility that it could have a positive effect on the treatment of other infections. The data obtained suggested that variations in the environmental conditions within each habitat may have an impact on the chemical composition and biological activity of natural populations of licorice.

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Piper longum:

Kanmani Subramaniam et al. (2021), the climbing vine Piper longum, also referred to as Pippali, is a member of the Piperaceae family and was first found in the Western Ghats and northeastern India. It is primarily used in the traditional and Ayurvedic medical systems to treat tumours, coughs, colds, spleen illnesses, respiratory infections, diarrhoea, bronchitis, and viral hepatitis. There is information about Piper longum in articles indexed by electronic databases like Scopus, Science Direct, and PubMed. Pippali has a wide variety of phytochemicals, such as flavonoids, steroids, alkaloids, and essential oils. The plant's pharmacological characteristics reveal its anti-inflammatory, anti-microbial, adulticidal, anti-obesity, anti-fungal, antipyretic, and cardioprotective properties. In addition, pipili possesses a wide range of antiviral properties that support stronger immunity and efficient hepatitis B virus resistance. This plant appears to be non-toxic, affordable, and simple to grow, and free of negative consequences. While there are several indications for its medical usage, little research has been done on its potential for treating illnesses resembling viral influenza. It can, however, be quite effective in treating symptoms like fever, colds, and coughs. Given the current state of the global coronavirus, it is imperative to search for substitutes that can both effectively combat the virus and offer extra immunity-boosting capabilities. Effective experimentation and research are therefore necessary to evaluate its competence. Because of the plant's enormous potential, researchers must thoroughly examine it.

According to Neha Chauhan et al. (2018), the study's main objectives were to ascertain P. longum's antibacterial capabilities against harmful bacteria and to examine the phytochemical components in charge of these therapeutic effects. The plant fruits were gathered, sun-dried, ground into a powder, and then cold macerated in both polar and nonpolar solvents to extract the contents. The antibacterial activity of the extracts was assessed using the MIC assay and the agar-well diffusion technique. Additionally, the important botanicals were examined. The outcome shows that the P. longum fruits' ethyl acetate extract was the most successful in combating the chosen harmful bacteria. It was discovered that the main phytochemical component in several P. longum fruit extracts that inhibits the pathogens in question is the phenol content. Because the plant-based formulations have few side effects and are packed with healthy antioxidants, they are a successful treatment for bacterial illnesses.

According to D.K. Pandey (2018), pippali, also known as long pepper (Piper longum Linn. L; family Piperaceae), is a highly significant medicinal herb. It is native to the Western Ghats and South India, and it is grown in the country's hotter regions, primarily in Orissa, Kerala, and the Central to Northeastern Himalayas. It has been used for thousands of years in many ancient medical systems, including Unani and Ayurveda. Along with these pharmacological properties, Piper longum has antifungal, insecticidal, antimicrobial, anti-amoebic, antidiabetic, antioxidant, and anti-cancerous properties. The current review addresses P. longum's pharmacology, phytochemistry, and botany.

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According to Neha Choudhary and Vikram Singh (2017), Piper longum L. (also known as long pepper) is a common culinary plant that has been widely employed as a significant component of numerous traditional Indian medicinal systems, particularly in the Ayurvedic system. In this work, we first examined the phytochemicals found in P. longum and then used a network pharmacology technique to study their pharmacological and therapeutic properties in order to obtain a global regulatory framework of the herb's contents.

Piper longum Linn is one of the significant medicinal plants of the Piperaceae family, according to Ashalatha M. and Rekha B. Sannappanawar (2015). It is an ingredient in trikatu, panchakola, and other preparations that are extensively used in Ayurveda for the treatment of a variety of ailments. It is found in numerous formulations as prakshepaka dravya. Due to its extensive medical benefits, it has been highly prized since the beginning of time. It has a wide range of applications, including anti-inflammatory, hepatoprotective, and analeptic, antinarcotic, antiulcerogenic, antibacterial, insecticidal, antimalarial, CNS stimulant, antitubercular, anti-helminthic, hypoglycemic, antispasmodic, antigiardial, immunostimulatory, and CNS stimulation. This article gives all the information you need to know about classical literature.

Syzygium aromaticum:

Amanda Mara Teles et al. (2021), the flavonoids and total phenolic compounds found in Syzygium aromaticum's plant products cause the fungus to do many different biological things. The current study details the essential oil of S. cerevisiae's chemical analysis as well as its antibacterial, antioxidant, and antitrypanosomal properties. fragrantum. The primary component, eugenol (53.23%), was confirmed via gas chromatography-mass spectrometry. S. essential oil of aromaticum proved more potent against S. eugenol (MIC 250 µg/mL) than aureus (MIC 50 µg/mL). Compared to S, eugenol showed greater antioxidant activity. aromaticum essential oil, with corresponding EC50 values of 12.66 and 78.98 µg/mL. S. With IC50 values of 28.68 ± 1.073 and 31.97 ± 1.061 µg/mL against epimastigotes and 64.51 ± 1.658 and 45.73 ± 1.252 µg/mL against intracellular amastigotes, respectively, aromaticum essential oil and eugenol showed inhibitory efficacy against Trypanosoma cruzi. Both substances showed minimal cytotoxicity, with S. aromaticum essential oil showing a parasite selectivity that is 15.5 times higher than that of the cells. T's nitrite levels. Treatments with essential oil (47.01%; $p = 0.002$) and eugenol (48.05%; $p = 0.003$) decreased cruzi-stimulated cells. S.'s trypanocidal action. Aromaticum essential oil demonstrated that its application makes sense for future investigations aimed at finding novel therapeutic alternatives for trypanosomiasis.

Sushma Surbhi and Sharma R. (2021) found that cloves (Syzygium aromaticum), a plant used for centuries as a remedy and food preservative, are the most important spice. Although it is a native plant of Indonesia, it is now used around the world, especially in the Brazilian province of Bahia. This plant has a vast potential for use in food, medicine, and cosmetics. It is one of the many

sources of phenolic chemicals. Studies on the biological action of clove and eugenol are included in this analysis. Clove has more antibacterial and antioxidant qualities than many fruits and vegetables, so it should be given special attention. The variety of studies cited in this review attest to clove's long history of use as a remedy plant and in food preservation.

Batiha, Gaber El-Saber et al. (2020) stated that herbal medical products have been reported as a major source for finding novel pharmaceutical compounds that have been used to treat critical ailments. It has been stated that phytoconstituents such as glycosides, saponins, flavonoids, steroids, tannins, alkaloids, terpenes, and others are responsible for the pharmacological effects of many plant species. Clove, or Syzygium aromaticum, is a classic spice with a variety of medicinal uses, including food preservation. The following phytochemicals are abundant in aromaticum: hydrocarbons, phenolic compounds, monoterpenes, and sesquiterpenes. The main phytochemicals in clove oil are β-caryophyllene, eugenol, and eugenyl acetate. The antibacterial, antiviral, antifungal, antidepressant, analgesic, antioxidant, anticancer, antiseptic, antispasmodic, anti-inflammatory, and antiviral properties of eugenol against a variety of pathogenic bacteria, including methicillin-resistant Staphylococcus epidermidis and S. augustus, Eugenol was also found to be effective against the growth of several parasites, including Giardia lamblia, Fasciola gigantica, Haemonchus contortus, and Schistosoma mansoni, and could even kill them. It also protected against CCl4-induced hepatotoxicity. Together with clove essential oil and the primary active ingredient, eugenol, this review looks at the phytochemical makeup, biological properties, and implications of recent discoveries from gas chromatography-mass spectroscopy (GC-MS) investigations.

Seema Yadav et al. (2020) explored that clove is the common name for Syzygium aromaticum. That is a member of the Myrtaceae family. The Indian spice clove is well-known for its flavor and therapeutic qualities. They are mostly used in ayurvedic treatment. Eugenol, acetyl eugenol, beta- and alpha-caryophyllene, vanillin, tannins, and other phytochemical constituents are found in cloves, which also exhibit pharmacological activities like anti-oxidant, anti-cancer, anti-microbial, anti-inflammatory, anti-pyretic, anti-viral, anti-diabetic, anaesthetic, analgesic, anti-carcinogenic, antibacterial, antifungal, and antibiotic. This article provides an overview of the pharmacological and phytochemical activity related to Syzygium aromaticum.

According to L.A. Alawiyah et al. (2019), antioxidants have been found in the essential oil of Syzygium aromaticum (L.) leaves. This investigation sought to identify the volatile substances and antioxidant properties of the essential oil extracted from Syzygium aromaticum (L.) leaves. Steam distillation was used to extract the leaves of Syzygium aromaticum (L.). Gas chromatography mass spectroscopy (GC-MS) was used to identify volatile chemicals. The antioxidant activity of the sample was assessed using the DPPH assay. The extract contains fifteen volatile components from the essential oil of Syzygium aromaticum (L.) leaves, according to the results. Additionally, the DPPH test discovered a very potent antioxidant with an IC50 value of 8.224 g/mL.

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According to K. Kaur and S. Kaushal (2018), cloves, also known as Syzygium aromaticum (Family: Myrtaceace), are the most important and second-most valuable spice in the world market and are widely grown in Indonesia's North Maluku Islands. Studies using gas chromatography-mass spectroscopy (GC-MS) on essential oils showed that eugenol was a prominent component present. An examination of the essential oil's phytochemistry revealed the presence of steroids, glycosides, alkaloids, flavonoids, tannins, and saponins. The fragrance oil of S. The biological actions of aromaticum include nematicidal, anticancer, antibacterial, antifungal, herbicidal, and anti-inflammatory properties. This review discusses cloves' essential oil, different extracts, phytochemistry, and pharmacological properties.

A.T. Mbaveng and V. Kuete (2017) stated that Syzygium aromaticum is a tree in the Myrtaceae family that is native to Indonesia and is widely used as a spice due to its aromatic flower buds, often known as cloves. Indonesia, along with India, Pakistan, Sri Lanka, the Comoro Islands, Madagascar, the Seychelles, and Tanzania, are among the countries where the plant is commercially harvested. We have discussed this plant's biological activities and ingredients in this chapter, along with its anticancer, antidiabetic, anti-inflammatory, anti-nociceptive, antibacterial, antifungal, antiprotozoal, antioxidant, and antithrombotic qualities. Because of all of its pharmacological properties, S. aromaticum is a possible therapeutic candidate for a variety of conditions.

Clove (Syzygium aromaticum) is a well-known medicinal plant that has been used historically in India as a spice and medication to treat a variety of illnesses, according to Aakanksha Pant et al. (2016). Nevertheless, further research is needed to fully understand this plant's capacity to modulate stress and slow ageing. Thus, utilising the Caenorhabditis elegans model system, the current work assesses the impact of clove oil (CO) on oxidative stress, lifespan, motility, and the expression of ageing-related proteins. It was discovered that 10 parts per million of CO increased the mean lifetime of worms by 21.4% ($p < 0.001$) in normal settings and by 63% ($p < 0.0001$) in oxidative stress conditions caused by juglone. The mev-1 mutant's longer mean lifespan and higher levels of gst-4 and sod-3 expression supported CO's stress-modulating effects. Furthermore, CO decreased the proteotoxicity of Aβ1-42 and intracellular ROS. The current study, taken as a whole, reveals the anti-ageing and stress-modulatory properties of CO and points to CO as a possible medicinal ingredient in the process of ageing modulation.

CONCLUSION:

An estimated 250,000 higher plant species are thought to exist on Earth (with 500,000 being the highest level and 215,000 being the lowest). Merely 6% and 15% of them have undergone screening for biological activity and pharmacological activity, respectively. Additionally, plant extracts can have thousands or even more secondary metabolites. Alkaloids, saponins, flavonoids, anthraquinones, terpenoids, coumarins, lignans, polysaccharides, polypeptides, and proteins are the main chemical categories found in Indian medicinal herbs. The quick and

accurate identification of these constituents based on molecular characterizations can lead to a deeper understanding of the pharmacological uses of these herbal remedies.

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