



A REVIEW ON BIOACTIVE CONSTITUENTS AND PHARMACOLOGICAL CONSEQUENCES OF SOME MEDICINAL PLANTS

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Abstract:

Bioactive constituents have the capability to interact with living tissue and provide a wide range of probable effects. They are Secondary metabolites that are produced during the primary biosynthetic and different metabolic processes of growth and development. This review examined the pharmacological activity of some medicinal plants as alternative medicine. In the present paper nine plants Piper spp including Piper nigrum, P. betel , P. longum, P. capense, Catharanthus roseus (L.) G. Don, Cannabis sativa (L.), Emblica officinalis (L.), Plumbago zeylanic(L.), Hemidesmus indicus R. Br, Moringa oleifera (Lam.), Azadirachta indica A. Juss, Tinospora cordifolia (Willd) Hook. f. are viewed for bioactive constituents and their therapeutic use.

Key Words: Bioactive constituents, pharmacological property, medicinal plants, secondary metabolites

Introduction-

Bioactive constituents have many applications in pharmaceutical, nano-bio-science, plant science, food, and cosmetic industries. Bioactive constituents have the capability to interact with living tissue and provide a wide range of probable effects. They can be obtained from terrestrial or aquatic plants, animals, and microorganisms. Bioactive constituents are secondary metabolites that are produced during the primary biosynthetic and different metabolic processes of growth and development and elicit pharmacological and harmful

effects in man and animals, most of them perform important functions in living plants like protection, attraction, and signaling **1**. The medical use of plants dates back many centuries. The World Health Organization (WHO) reported that about 80% of the global population utilizes medicinal herbs in their primary health care **2**. Medicinal plants have played an important role in the creation of Ancient Indian Material Medica in India. The Charaka Samhita (1000 B.C.) is one of the earliest treatises in Indian medicine, and it details the use of over 340 plant-based medications. To meet the need of the medical sector, the majority of these are still obtained from wild plants **3**. Herbal medicines are produced from different parts of plants including seeds, stems, leaves, roots, berries, flowers, bark, etc by the worldwide people for the control and treatment of a variety of diseases **4**. Plants are the most exclusive source of bioactive compounds, which are used in the majority of the world's population. The use of plant cells for production has increased over the past decades to produce natural or recombinant products that can be used for commercial purposes **5**. The presence of many complex chemical compounds of varied compositions identified as secondary plant metabolites in one or more parts of medicinal plants gives them therapeutic capabilities. The pharmaceutical industry is growing quickly because of the increase in demand for a variety of secondary metabolites of medicinal plants such as alkaloids, terpenoids, steroids, saponins, glycosides, fatty acids, methyl esters, and phenol-based compounds. According to the World Health organization, medicinal plants are a great source of these phytochemicals **6**. Complementary and alternative medicines have been utilized to treat a variety of infectious diseases in many underdeveloped nations. Many traditionally important herbal treatments have been used for clinical testing due to the efficacy of scientific confirmation **7**. There are many medicinal plants that have been used for centuries for their pharmaceutical properties and health benefits. This review discusses the pharmaceutical properties secondary metabolites of nine medicinal plants with their use in the traditional medicinal system.

Bioactive compounds from different plants and their Pharmacological effects:

A. Piper species

Piperaceae family is the large family including, Piper longum L.(Pipli, Long pepper) P. nigrum L.(Black paper), P.betel Linn. (Paan), P. capense L.f. This family contains valuable natural compounds and is often cultivated for their seeds and leaves which have a strong pungent aroma **8**. The entire unripe dried spikes are used as spices and in medicine. Piper longum contains many bioactive constituents such as piperlongumine and Piperlongumine,

n- heptade-cane, n- eicosane, trace; Dihydrocarveol, phenethyl alcohol, and new monocyclic sesquiterpenes, piperine, pipartine dresses of a yellow crystalline pungent alkaloid, triacontane, dihydro stigmasterol, and unidentified steroid, reducing sugars and glycoside **9**. Piper longum has many therapeutic properties, roots and fruiting spikes are used in treating fever, appetizer, aphrodisiac, expectorant and cures dyspepsia, anemia, chest congestion, intestinal worms etc. **10**.

Piper longum (L.) contains rasayana (tonic) drug which is used in enhancing memory power and intelligence. Piper nigrum (L.) is commercially important condiment because of the source of black and white pepper. Commercially useful different bioactive constituents obtain from different parts of the plants such as seeds contain alkaloid piperine, piperetine, chavicine and an Essential oil, consisting of terpene, phellandrene, caryophyllene, piperonal-Dihydrocarbeol, caryophyllene oxide. The major components of oil are sabinene, myrcene, limonene, α and β -pinenes, - α burgamotene, α - humulene, p-cymene and α - selinene. The berries well known for their stomachic, anodyne and antibacterial properties, prescribed for treating dyspepsia, vomiting, diarrhoea and colic resulting from cold, powdered berries applied topically to cure toothache, they can also be used as an insecticide against cloth moths. Piper nigrum also used in the treatment of cardiac diseases, eczema, diabetes and night- blindness. Pepper exhibits anticonvulsant properties and enhances the bioavailability of antitubercular drugs when given together. Bioactive compound ,Piperine shows CNS depressant, antipyretic, analgesic, anti-inflammatory, antioxidant and hepatoprotective properties.

Piper betel Linn. (paan leaf) contains phytochemical Chavibetol (an isomer of eugenol). Leaves of Piper betel have some medicinal properties like, carminative, stimulant, anthelmintic, expectorant and antiseptic and cures dyspepsia, fever, flatulence and filariasis. Betel oil is used in the treatment of respiratory troubles. Root of Piper betel causes sterility effect in women **11**.

Root of Piper capense L.f. is used as sleep inducing or for CNS related ailments because it contains antiepileptic compounds **12**,

B. Catharanthus roseus (L.) G. Don (Sadabahar)

Catharanthus roseus (L.) G. Don, is the member of Apocynaceae, commonly known as Sadabahar. Swedish naturalist Carl Linnaeus named the species as Vinca rosea **13**. It is common wild plant in coastal areas and is also cultivated, leaves contain alkaloids; serpentine, ajmaliine, Catharanthine, Catharanthinole, vindoline, vindolinine,

vincalucoblastine, leurosidine, vincristine, vinblastine. Leaves are useful in treating oliguria, hematuria, Diabetes mellitus, hypertension, leukaemia and menstrual disorders. Vincristine and vinblastine contain anticancer properties, and are being used in the drug manufacturing industries **14**. Cancer is deadly disease of today's world, medicinal plants like *Catharanthus roseus* with anticancer bioactive constituents have become a source of lifesaving medicines. Many secondary metabolites are being extracted from *C. roseus* which are used to make lifesaving drugs for mankind **15**. A lot of work has been done on this plant but still it is not enough and the need of the hour is that more biotechnological advancement and research should be done **16**. In addition, conventional seed propagation and environmental conditions control the synthesis and accumulation of bioactive constituents in *Catharanthus roseus* **17,18**.

C. *Cannabis sativa* L. (Indian hemp, Bhang, Ganja)

It is an annual herbaceous flowering plant with an erect, angular stem. More than 100 phytochemicals are detected from *C. sativa*. This plant contains important bioactive constituents such as 9-tetrahydrocannabinol (THC), cannabidiol (CBD), cannabinol, cannabichromene, Cannabicitran, cannabicyclol, cannabigerol, cannabielsion, stereoisomers of cannabitol, cannabicumaronone, cannabiglendol and cannabi terol. Recently, a lot of attention has been given to the main phytochemicals present in *Cannabis sativa* L., namely, cannabidiol (CBD) and 9-tetrahydrocannabinol (THC). Therapeutic use of leaves, they are astringent, tonic, aphrodisiac, Anti diarrhoeic, Intoxicating, stomachic, anal-gasic and Abortifacient. The bark is tonic and is useful in inflammation, hemorrhoids and hydrocele. seeds are carminative, astringent, aphrodisiac, antiemetic and anti-inflammatory. Bioactive compounds are found in Secretary hair situated in the bracts of female flowers **19**. Bulbous glands, capitate-sessile glands, and capitate-stalked glands, three different type of trichomes are found, out of which capitate-stalked glands have maximum number of cannabinoids **20,21**. Preclinical investigations in vitro and in vivo have revealed that cannabidiol has a complicated mode of action for inhibiting tumour development in many cancers. Despite the vast number of preclinical trials, further study is needed to verify that cannabidiol may be used to treat cancer in humans safely and efficiently **22**. According to recent study conducted by Richard B van Breemen (Jan,2022), it is found that, *Cannabis sativa* contains cannabigerolic acid and cannabidiolic acid which prevent infection and live entry of SARS-CoV-2 and its alpha variant B.1.1.7 and the beta variant B.1.351 in human epithelial cells. Both Cannabinoid acids, extracted from *C. sativa* have capability to prevent and treat infection caused by SARS-CoV-2 **23**.

D. *Emblica officinalis* Gaertn.(Anwala)

Emblica officinalis is a deciduous tree of the family phyllanthaceae, commonly known as indian gooseberry or anwala. All parts of gooseberry plants such as fruits, leaves, seed, root, bark and flowers are used in indian traditional and Ayurvedic medicinal system.

Plant contains major amino acids and bioactive compounds like, alanine, aspartic acid, ascorbic acid (vitamin C), glutamic acid, gallic acid, lysine, Proline and tryptophan. Analysis of fresh fruit pulp gave protein, fat, carbohydrate, fibre , mineral, riboflavin, iron, niacin, calcium, phosphorus and vitamins. Fruit ash contains chromium and copper, due to presence of these phytochemicals and minerals, the plant has immuno-modulating property against many diseases and helps to stand against all forms of stress **24**. The root bark is astringent and is useful in ulcerative stomatitis and gastrohelcosis,. The bark is effective against Gonorrhoea, jaundice, dysentery. The leaves are useful in conjunctivitis, dyspepsia, dysentery. The fruits are sweet ,cooling , anodyne, ophthalmic, carminative, digestive, stomachic, laxative, diuretic, antipyretic. They are useful in vitiated condition of vata, pitta and kaffa, diabetes, cough, asthma, bronchitis, Ophthalmopathy, dyspepsia, flatulence, Hyper-acidity, peptic ulcer, Skin diseases, leprosy, hematemesis, inflammations, anaemia, hepatopathy, Jaundice. strangury, Diarrhoea dysentery, leucorrhoea, Menorrhagia, cardiac disorders, intermittent fevers, and in greying of hair.

Anwala is popular rasayna drug containing Gallic acid that makes it so special in being a great antioxidant. Gallic acid is believed to be the one that ensures better transportation of vitamins C and minerals like Fe to the cells and retaining them in the body for a long duration; unlike normal vitamin C which tends to get flushed out faster through urine. Amla therefore, is an excellent food that retards ageing and checks carcinoma. Ghosal and co-workers (1996), discovered that the vitamin C like action of Amla is due to two gallotannins, Emblicanin A and –B, which have the core sugar acid structure similar to that of ascorbic acid, and there is no free or conjugated ascorbic acid in fruits of *Emblica officinalis* (Sukhdev, 2006) **25,26**. The vitamin C action of Emblicanin lasts much more, than the short lived action of Ascorbic acid. It helps in gastric ulcer and reduces blood triglycerides and cholesterol. Amla (or rather putranjivain A- a tannin) inhibits HIV virus also **27**.

It is main constituents of some indian ayurvedic formulation such as, Chyawanprash rejuvenating substance, triphala, herbal shampoo and hair tonics **28**. Recent years have seen an increase in the development of plant-based nano- materials. In comparison to the traditional chemical procedure, this method is straightforward, environmentally benign, and cost-effective.**29**.

E. *Plumbago zeylanica* (Linn.)

It is a perennial, sub-scandent, glabrous plant, commonly known as chitrak, belonging to Plumbaginaceae family. Flowers are white, arranged in elongated spikes, having viscid, glandular persistent calyx. Chitrak contains many life saving secondary metabolites such as, plumbagin, which stimulates sweating. In root bark naphthaquinone, sitosterol, and tannins are found. Roots are very effective in leucoderma and other skin diseases. They are digestive, diuretic, germicidal, and abortifacient. *Plumbago zeylanica* is also used in the treatment of haemorrhoidal inflammation of anus, diabetes, loose motion and elephantiasis **30**. From centuries, in Indian conventional preventive medicines Chitrak has tremendous remedial properties against many diseases **31**.

Root is acrid and stimulates sweating. In West Africa the root is traditionally mixed with Okara to treat leprosy. The leaves and roots are used to cure infections and digestive issues including diarrhoea in Indian herbal medicine. A paste made from the leaves and root is administered externally to painful rheumatic areas or persistent and itchy skin conditions, it speeds the clearing of toxins from the affected area **3**. Leaf powder has been used for the treatment of gonorrhoea, syphilis, tuberculosis, edema and injuries in Ethiopian conventional medicines **32**. Heneicosane is principal bioactive constituents, obtained from *Plumbago zeylanica* show antimicrobial activity against many bacteria and fungi **33**.

F. *Hemidesmus indicus* (L.) R. Br. (Anantmool)

This plant is perennial, slender, twining, undershrub belongs to family Apocynaceae also known as Anantmool. Flowers are greenish purple, crowded in axillary cymes and root is woody, aromatic. Anantmool contains very important phytochemicals, that's why it is widely used in drug and cosmetic industry.

Air dried roots yield Essential oil containing p- methoxy salicylic aldehyde as the major constituent. The Aroma of the drug is attributed to the aldehyde. Other constituents present in the roots are α - sitosterol, α and β -amyrins, lupeol, tetracyclic triterpenoid Alcohols, small amounts of resin, tannins, saponins, a glycoside and a Ketone **34**. Snake bites are treated with 2-hydroxy-4-methoxybenzaldehyde, which is extracted from the root of *Hemidesmus indicus*.**35**.

Therapeutic properties of Anantmool includes, roots astringent, refrigerant, aphrodisiac, carminative, appetizer, anthelmintic. Root is effective against disturbed condition of Pitta, burning sensation, achromoderma, Hansen's disease, skin diseases, asthma, bronchitis, hyperdipsia. hemorrhoids, epileptic fits, dyspepsia, helminthiasis, dysentery. The leaves can be used to treat nausea, wounds, and leucoderma. The stems are effective against

inflammation, cerebropathy, hepatopathy, nephropathy, syphilis, cough and asthma, good for eye infection. Phytochemical which are found in *H. indicus*, also reported for significant antioxidant property **36**. The root is used in the form of powder in gastric ulcer and decoction as syrup used as coolant and blood purifier and also as revitalizing fluid with sugar and lemon and served at most small refreshment shops in south India . The root can be given to pregnant women to prevent miscarriage and efficiency in treating ulcers, fever, loss of appetite, excessive thirst **37**. It is investigated that alcoholic extract of *Anantmol* exhibit antinociceptive property in mice **38**.

G. *Moringa oleifera* Lam. (Sahjan)

Moringa oleifera is a deciduous plant with tripinnate compound leaves and frail branches, commonly know as Sahjan, Drumstick or Munga. Due to its high therapeutic value it is also called miracle tree. Plant contains several phytochemicals like carotene, nicotinic acid, ascorbic acid, oxidases, sulphur and prolamin **39**. The essential amino acids present in leaves and fruits, are arginine, histidine, Lysine, tryptophan, phenylalanine, methionine, threonine, leucine, isoleucine, and Valine **40**. Leaves are anti-inflammatory , anodyne, anthelmintic, ophthalmic and significant source of vitamin A, vitamin B, vitamin K, beta-carotene, Manganese and protein **41**. They are also useful in scurvy , wounds, tumors, and inflammations **42**. *Moringa* pods and seeds are the rich source of vitamin C, dietary fibers, potassium and magnesium **43**. Roots are bitter, acrid, thermogenic, digestive, carminative, anthelmintic, constipating, anodyne, anti-inflammatory, ophthalmic, expectorant. It is also useful in disturb conditions of vata and kapha, dyspepsia, diarrhoea, colic flatulence, otalgia, Paralysis, inflammations, dysmenorrhea, fever, vesicle and renal calculi, ophthalmopathy, cough, asthma, bronchitis, pectoral diseases, epilepsy, Hysteria, cardiopathy. Bark is useful against ringworms also having antifungal property cardiac and circulatory stimulant. The seeds are purgative, antipyretic and ophthalmic and are useful in neuralgia, inflammation, intermittent fever and ophthalmopathy. All parts of *Moringa* plant has great nutritional as well as pharmacological value and they have many applications in food also **44**.

H. *Azadirachta indica* A. Juss (Neem)

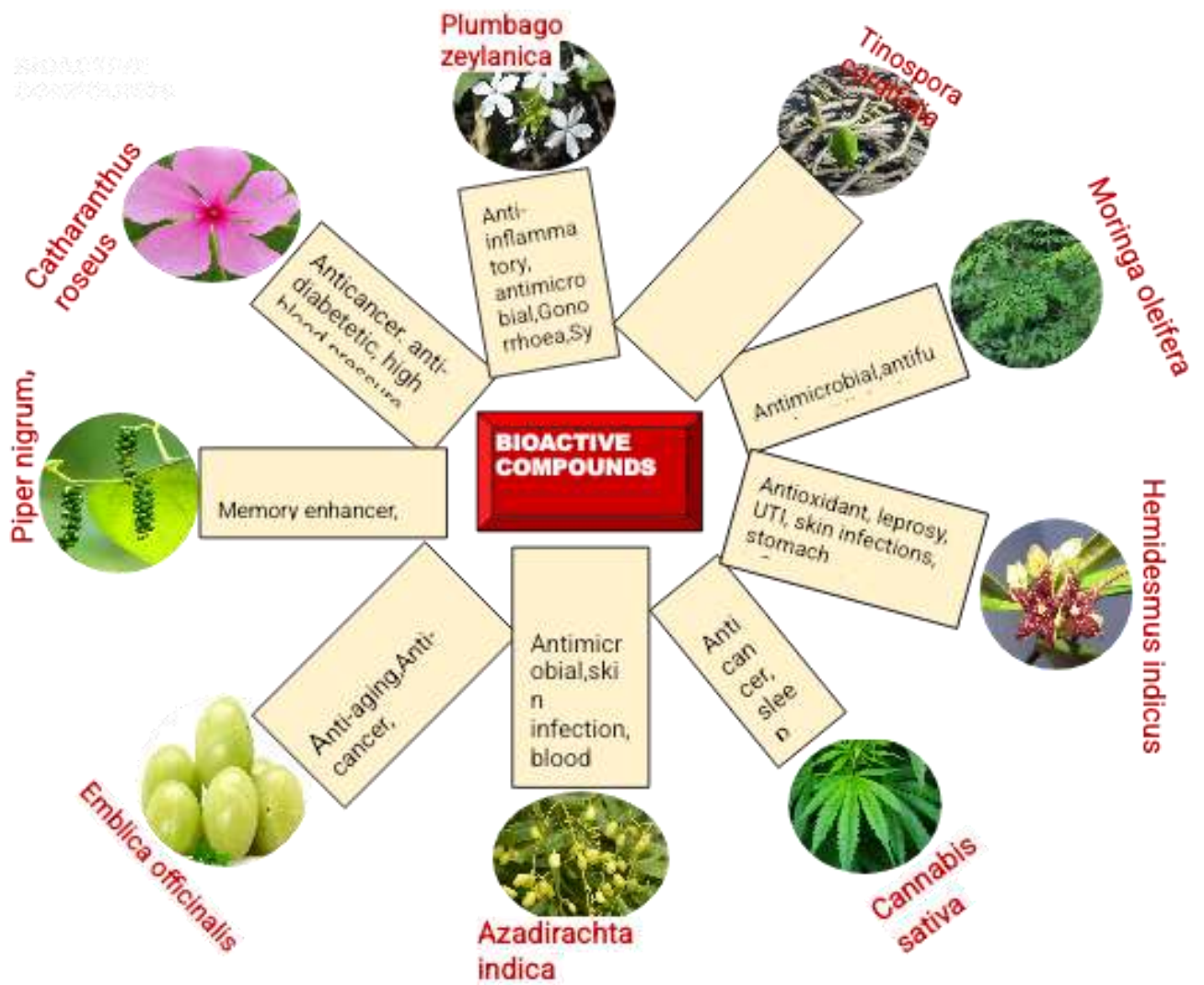
Neem is a large evergreen, most resourceful herbal tree found all over India cultivated or wild. For centuries many diseases have been treated by different parts of this plant. All the parts of the plant contain limonoid bitter principles. The bioactive compounds are: nimbin

and nimbidin, nimbinene, 6- desacetylnimbinene, nimbandiol, nimbolide, gedunin, azadirachtin, 7-deacetoxy-7-hydroxygedunin, azadiradione, azadiradone, 17-hydroxy azadiradione, 17-epiazadiradione, nimbiol, meliantriol as major components along with meldonin, desacetylgedunin, salannin, azadirone, epoxyazadirodione, vepinin, nimbinene, 6-o-acetyl nimbandiol etc **29**. Fruits and seeds yield a fatty oil called “Margosa or neem oil. Neem extracts have been reported to be antibacterial, anthelmintic, and effective against fever, particularly malarial fever. Because all of the ingredients are bitter, they are also utilised as anti-diabetic medications. The leaves can help with skin problems. The fruits are also used to treat urinary disorders and piles as tonics, antiperiodics, and purgatives. Some chronic skin disorders and ulcers can be treated with the oil. Externally, it is used to treat rheumatism and leprosy.³



Nimbidin, the crude fraction containing unsaponifiable fraction (mainly limonoids) is used against fungal, bacterial and parasitic infections like eczema, ringworm, scabies, Mycobacterium tuberculosis (in vitro). Nimbidin is antiulcer and antihistaminic in nature and used against peptic and duodenal ulcers and against Helicobacter pylori. Nimbidin and bark extract are antiarthritic and anti-inflammatory used against a number of rheumatic afflictions. The leaves are used as insect repellents and are kept among clothes and books. Larvae of Lucerne weevil and locust (*Schistocerca gregaria* Forsk.) are the other organisms repelled or destroyed by the leaves. The pulp extract of fruit also is used against locusts. The powdered fruit/kernel mixed with wheat or legumes (green gram, cow pea or pea) are used against bruchid (*Callosobruchus maculatus* and flour beetle. The anti-feeding property is attributed to azadirachtin and salanin. But the crude preparations of kernel are found to be more effective than refined ones. Other insects on which the kernel exhibited a toxic/deterrent activity are *Locusta migratoria*, *Schistocerca gregaria*, *Spodoptera litura* and *Boarmia* (*Ascotis*) *selenaria*. The essential oil from seeds is found to be effective against pulse beetle and *Callosobruchus* sp. The oil cake also is used as an insecticide and nematicide **45**. The extract from the fresh Neem leaves showed a strong antibacterial and antifungal properties due to the presence of polyphenols and flavonoids. Extract from Neem bark has been used to treat Herpes Virus Simplex, even in different concentration it can stop the entry of this virus inside the cell **46**. Previous research reports have been suggested that neem plant is very effective in the treatment of various viruses including poliovirus, bovine herpes virus type-1, duck plague virus **47**. Nimbaflavone, Rutin and Hyperoside are the very effective bioactive constituents which have exhibited vast antiviral property against influenza viruses **48,49**.




I. *Tinospora cordifolia* (Willd) Hook. f. (Giloy or Amruta)




Tinospora cordifolia is climbing shrub of weak and fleshy stem with heart shaped leaves, commonly known as Giloy or Amruta. Amruta is dioecious, having male and female plants separate. Research indicates that *Tinospora cordifolia* contains a variety of chemicals, including alkaloids, diterpenoid lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides. In addition leaves also contain protein (11.2%), calcium and phosphorus. Pharmacological activities exhibited by *T. cordifolia* are Antioxidant, Immunomodulator, Antidiabetic, Increase eyesight, Indigestion, Cough and cold, anti-inflammatory, anti-spasmodic, anti-arthritis, anti-stress, anti-allergic, anti-malarial, hepato-protective etc.⁵⁰ Important bioactive phytochemicals of *T. cordifolia* are diterpenes, alkaloids and, phenylpropanoids. Of these, diterpenes are soluble in organic solvents and are to be extracted in oil/alcohol. The phenyl propanoids like cordifolioside are generally soluble in water. The alkaloids are, to some extent, are soluble in water, but are best extracted in water containing acids like citric acid. Bioactive alkaloids such as jatrorrhizine, magnoflorine, isocorydine, palmatine, and tetrahydropalmatine were successfully quantified in male and female plants, according to Bajpai et al. (2015). Male plants had considerably greater mean abundances of magnoflorine, jatrorrhizine, and oblongine, whereas female plants had significantly higher mean abundances of tetrahydropalmatine, norcoclaurine, and reticuline.⁵¹ According to Choudhry and et al. (2014), the female plant is better for medicinal phytoconstituents, and the optimum harvesting seasons for antioxidant potential and immunomodulator activities is winter and late summer, and monsoon season for antidiabetic activity of *Tinospora cordifolia* ⁵². Female varieties have higher starch and mucilage contents, implying that the female variety will produce more Guduchi Satva which is aqueous extractable starchy material of *Tinospora cordifolia* ⁵³.




Source of different bioactive compounds and their Pharmacological use

S.N.	Plant Name	Bioactive compound	Pharmacological properties	Reference
A	<p>Piper spp. Piper nigrum,</p>  <p>P. betel P. longum, P. capense</p>	<p>Chavicine, Piperlongumine, Guineensine, Chabamide, pellitorine, Piperine, 4,5-dihydropiperine, Piperlongumine, Piperlonguminin, Piplartine, Essential oil contains Terpene, Phellandrene, Caryophyllene, Piperonal- Dihydrocarbeol, Caryophyllene oxide, Sabinene, Myrcene, limonene.</p>	<p>Memory enhancer, Anticancer, Antimicrobial, Antimalarial, Hives, Stomach disorders, the roughness of voice, Choking of the throat, Fever, Blood deficiency, Nausea, Earache, Throat pain, Intestinal worms, Central Nervous system depressant, Antiepileptic, Pain-relieving property, Anti-inflammatory, Antioxidant, Antihepatotoxicity</p>	8,9,10,11,12
B.	<p>Catharanthus roseus (L.) G. Don,</p> 	<p>Vindoline, Vinblastine, Serpentine, Catharanthine, Catharanthinole, Vindoline, Vindolinine, Vincalucoblastine, Leurosidine, Vincristine,</p>	<p>Anticancer. Anti-diabetic, High blood pressure, Nausea Leaves are useful in Hematuria, Menstrual disorders, Root is useful in inducing cerebrovascular dilation.</p>	13,14,15,16, 17,18

C.	<p>Cannabis sativa L.</p> 	<p>Cannabinol, Cannabichromene, Cannabicitran, Eannabicyclol, Cannabigerol, Cannabielsion, Stereoisomers of Cannabitrinol, Cannabicumaronone, Cannabiglendol, Cannabiterol, Cannabidiol 9- tetrahydrocannabinol</p>	<p>Anticancer, sleep- inducing, leaves are astringent, tonic, aphrodisiac, Anti diarrhoeic, Intoxicating, stomachic, analgesic, Abortifacient, Convulsions, otalgia, Abdominal disorders, Diarrhoea, Stomatalgia Haematorrhoea.</p>	<p>19,20,21,22, 23</p>
D.	<p>Emblica officinalis L.</p> 	<p>Gallotannins, Emblicanin-A, Emblicanin-B, β-sitosterol, Leucodelphinidin, Lupeol, Tannin, Alanine, Aspartic acid, Ascorbic acid (Vit. C), Glutamic acid, Gallic acid, lysine, Proline, Tryptophan. Protein, Fat, Carbohydrates, Fiber, Riboflavin, Iron, Niacin, Calcium, Phosphorus, Chromium, Copper,</p>	<p>Anti-aging, Anti- cancerous, Antidiabetic, Anti-pyretic, Analgesic, Anti Hepatotoxicity, Immunity booster, Memory Enhancing. Gastrohelcosis, Bark is useful in Gonorrhoea, jaundice, Diarrhoea, Dysentery, Conjunctivitis, Dyspepsia, useful in disturbed conditions of tridosha (vata, pitta and kaffa), Heart Problem, Intermittent fevers, Greyness of hair.</p>	<p>24,25,26,27, 28,29</p>
E	<p>Plumbago zeylanica L.</p> 	<p>Heneicosane, Starch Steroids, Terpenoids, Triterpenoids Plumbgin, Napthaquinone, Sitosterol, Tannins</p>	<p>Piles inflammation of anus, Diabetes, Diarrhoea, Gastrointestinal stimulants, Germicidal, Abortion causing, Achromoderma, Skin problem, Gonorrhoea, Syphilis</p>	<p>30,31,32,33</p>

F.	<p>Hemidesmus indicus R. Br.</p> 	<p>P- methoxy salicylic aldehyde, α- sitosterol, α and β -amyrins, Lupeol, tetracyclic triterpenoid Alcohols, Resin, Tannins, Saponins, Glycoside, Ketone, Vanillin, 2-hydroxy-4-methoxybenzaldehyde, Isovanillin,</p>	<p>Antioxidant, Antidyslipidaemic Antiophidian, In Snakebite, Achromoderma, Leprosy, Skin problem, Bronchitis, Hyperdipsia. Antiabortifacient Hemorrhoids, Epileptic fits, Delminthiasis, Hepatopathy, Nephropathy, Syphilis, Cough, good for Conjunctivitis</p>	<p>34,35,36,37, 38</p>
G.	<p>Moringa oleifera Lam.</p> 	<p>Carotene, Nicotinic acid, Ascorbic acid, Oxidases, Sulphur, Prolamin, Arginine, Lysine, Tryptophan, Phenylalanine, Methionine, Threonine, Leucine, Isoleucine, Valine, Vitamin- A, Vitamin- B, Vitamin -K, Beta-carotene, Manganese, Protein, Vitamin C, Dietary fibers, Potassium and Magnesium, Chlorogenic acid</p>	<p>Antiviral, Antimicrobial, Antifungal, Anticarcinogenic, Immunity enhancer, Anti-inflammatory, Anodyne, Anthelmintic, Scurvy, Wounds, Tumors, Seeds are Purgative, Antipyretic, useful in Neuralgia, Intermittent fever, Thyroid control. Ophthalmopathy</p>	<p>39,40,41,42, 43,44</p>
H.	<p>Azadirachta indica A. Juss</p> 	<p>Nimbidin, Nimbin, Meliantriol, Gedunin, Meldenin, Desacetylgedunin, Salannin, Azadirone, Vepinin, Nimbinene, Flavonoids, Terpenoids, Coumarins, Alkaloids, Tannins, Sulphur compounds, Nimbaflavone, Rutin and Hyperoside</p>	<p>Poliovirus, Herpesvirus, Duck PlagueVirus, Antidiabetic, Antimicrobial, Skin infection, Blood purifier, Anti-influenza virus, Anti-arthritic, Anti-inflammatory</p>	<p>45,46,47,48, 49</p>

I.	Tinospora cordifolia (Willd) Hook. f. 	Piterpenes, Phenylpropanoids. Diterpenoid, Magnoflorine, Palmatine, Tetrahydropalmatine Protein, Calcium, Phosphorus, Alkaloids, Lactones, Glycosides, Steroids, Isocorydine, Sesquiterpenoid, Phenolics, Polysaccharides, Jatrorrhizine, Tinosporaside Berberine,	Antioxidant, Immunomodulator. Antidiabetic, Increase eyesight, Indigestion... In Fever Cough and cold, anti-inflammatory, antispasmodic, anti-arthritic, Relaxing, antiallergic, anti-malarial, hepatoprotective.	50,51,52,53
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Result and Discussion:

The purpose of this review is to compile some medicinal plants with their bioactive components and pharmacological applications. Plants described in this review are Piper spp including Piper nigrum, P. betel P. longum, P. capense, Catharanthus roseus (L.) G, Don, Cannabis sativa(L.), Emblica officinalis (L.), Plumbago zeylanica (L.), Hemidesmus indicus R.Br, Moringa oleifera (Lam.), Azadirachta indica A. Juss, Tinospora cordifolia (Willd) Hook. f. Bioactive constituents obtained from Piper spp. are piperlongumine, Piperlonguminine, piperine, piperetine, chavicine, Chavicine, piperidine. The pungency of pepper is due to chavicine, piperine and a resin. The distinctive component of betel oil (P. betel) is chavibetol. Betel leaf oil is used as an antispasmodic and carminative in the treatment of respiratory problems.. Piperine shows central nervous system depressant, pain relieving, anti-inflammatory and anti-hepatotoxicity properties. Piper nigrum is a popular condiment, and is used medicinally in cold, cough, and increases digestion and appetite. It is also used in heart diseases, skin problem, diabetes and night- blindedness. Piper longum is a rasayana (tonic) herb that can help you improve your memory and intelligence.. In Emblica officinalis Gaertn. emblicanin –A and -B are main biologically active constituents and good amount of amino acids like alanine, aspartic acid, glutamic acid, lysine, proline are found. Gallic acid that makes amwala so special in being a great antioxidant. Gallic acid is believed to be the one that ensures better transportation of vitamin C and minerals like Fe to the cells and retaining them in the body for a long duration; unlike normal vitamin C which tends to get flushed out faster through urine. Amla therefore, is an excellent food that retards ageing and checks carcinoma. Recent study reveals thst extract of Cannabis sativa L. contains cannabigerolic acid and cannabidiolic acid which prevent infection and live entry of SARS-CoV-2 along with its alpha variant B.1.1.7 and beta variant B.1.351 in human epithelial

cells. Both Cannabinoid acids can prevent and treat against SARS-CoV-2. Vincristine and vinblastine are biologically active compounds obtained from *Catharanthus roseus* (L.) G. Don, contain anticancer properties, and are being used in the drug manufacturing industries. Major bioactive content of *Hemidesmus indicus* (L.) R. Br. roots are Hemidezminine, Hyperoside, Rutin, Desinine and Hexatricontane. Methoxybenzaldehyde is isolated from the root of *Hemidesmus indicus* and is used in the treatment of snake bite. The root can be given to pregnant women to prevent miscarriage and efficiency in treating ulcers, fever, loss of appetite, excessive thirst. Bioactive molecules of *Azadirachta indica* A.Juss contains nimbaflavone, rutin, ahyperoside, flavonoids, terpenoids, coumarins, alkaloids, tannins, sulphurous compounds, carbohydrates, proteins and minerals, important bioactive compound. Nimbidin is used against fungal, bacterial and parasitic infections like eczema, ringworm, scabies. It is antiulcer and antihistaminic in nature and used against peptic and duodenal ulcers. Heneicosane is bioactive constituents, obtained from *Plumbago zeylanica* show antimicrobial activity against many bacteria and fungi. A paste prepared from the leaves and root of *P. zeylanica* is administered externally to painful rheumatic areas or persistent and itchy skin conditions. *Moringa oleifera* Lam. is also called wonder plant due to the presence of vitamins, amino acids and many essential phytochemicals. Pods and seeds contain vitamin C, dietary fibers, potassium and magnesium, essential amino acids present in leaves and fruits, are arginine, histidine, Lysine, tryptophan, phenylalanine, methionine, threonine, leucine, isoleucine, and Valine. All parts of *Moringa* plant has great nutritional as well as pharmacological value, that's why this plant has great applications in food industry also. *Tinospora cordifolia* contains bioactive compounds such as Piterpenes, Phenylpropanoids. Diterpenoid, Magnoflorine, Palmatine, Tetrahydropalmatine. Pharmacological activities exhibited by *T. cordifolia* are antioxidant, Immunomodulator, Antidiabetic, Increase eyesight, Indigestion, Cough, cold, antispasmodic, anti-arthritic, stress-relieving, anti-allergic, anti-malarial,hepato-protective and also used against inflammation.

Conclusion: This review provides a brief investigation of nine medicinal plants that have been utilized in traditional health care, including the treatment of various human ailments, since ancient times. India is rich in a variety of medicinal plants, and it has a tradition of using natural remedies to treat health issues. Most of the population in India believes in using herbs for their healthcare instead of modern allopathic practices. This review examined the pharmacological activity of medicinal plants as an alternative medicine. The plants in this review are brought up for their pharmacological properties including anticancer,

antimicrobial, antifungal, antiepilepsy, memory enhancer, hepatoprotective, antiviral, anti-inflammatory etc. which are very useful in traditional as well as in modern medicine. Many medicinal plants may not be as beneficial as they are touted to be or may have more therapeutic properties than previously thought. The actual medicinal potentials of these native plants will require more scientific investigation.

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