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Review Paper

Pharmacognostical Studies and Clinical Applications of Medicinal Plants as Immunity Booster

Himani Malode*, Dr. Ajay Baitule, Jaydeep Wankhade, Gayatri Yeole

Vidyabharti College of Pharmacy, C K Naidu Road, Amravati

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ABSTRACT

The COVID-19 pandemic has highlighted the urgent need for effective prevention and treatment strategies. While there isn't a specific drug that targets the virus, boosting the immune system can greatly improve resistance to infections. Groups at higher risk—like children, the elderly, and individuals with existing health issues—are especially vulnerable to severe consequences. Herbal medicinal plants have gained significant interest for their potential antiviral properties and ability to boost the immune system. Many traditional remedies are currently being investigated as complementary treatments for viral infections, including COVID-19. Some notable examples are *Tinospora cordifolia*, *Echinacea purpurea*, *Nigella sativa*, *Caesalpinia sappan*, and *Isatis indigotica*. These plants are rich in various bioactive compounds—such as alkaloids, flavonoids, terpenoids, and polysaccharides—that may influence different stages of the viral life cycle, including entry, replication, and release.

INTRODUCTION

The use of herbal drugs in the preparation of ayurvedic medicines is well-documented in the Indian system of traditional medicine (ISTM) and other traditional medicinal practices. In India and neighbouring countries, many people in rural and tribal areas still rely on ISTM. These systems have been in use for over 5,000 years, offering aesthetic value, higher patient compliance, and fewer side

effects. ISTM has been developed through the guru-shishya tradition and is referenced in various ayurvedic texts such as the Charak Samhita, Sushruta Samhita, and Kapila Hridayam. Immunity refers to the body's capability to protect itself from disease-causing organisms. Every day, we encounter numerous pathogens, but only a small number lead to illness. This is because our body can produce antibodies that target these pathogens, safeguarding us from diseases. This protective system is known as immunity.

***Corresponding Author:** Himani Malode

Address: Vidyabharti College of Pharmacy, C K Naidu Road, Amravati

Email ✉: hpmalode@gmail.com

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Immunity booster is named by various names such as Immunomodulator, Immunostimulatory, Immunopotential, etc.

- **Ancient Reference:**

Nootropic herbs are a category of medicinal plants recognized in Ayurveda for their numerous benefits, particularly in enhancing immunity. Some of these Ayurvedic herbs include Garlic, Ginger, Cinnamon, Turmeric, Holy Basil, Liquorice, Black Pepper, Ashwagandha, Neem, Betel, Guduchi, Clove, Kalonji, and Jeera, among others.

- **Natural Immunity Booster**

- Food

Eating right diet helps to boost immunity. Leafy greens and cruciferous vegetables like broccoli, cabbage, spinach and kale are recommended by some researchers, as are berries, citrus fruit and garlic and yogurt.

- Supplements

Dietary supplements and herbal extracts provide concentrated doses of specific vitamins and minerals that may help support immune function, though they are not necessary if you're eating a

balanced diet. Some popular supplements for immune support include Vitamin C, Vitamin D, Zinc, etc.

- Medicinal Plant

A number of herbs traditionally employed in ISTM and other plant-based medicine systems such as Chinese herbal medicine system, Unani medicine system, have yielded positive results [1-3].

2. Immunity Booster Plants

2.1. *Tinospora cordifolia*

2.1.1. Description

Tinospora cordifolia commonly named as “Guduchi” in Sanskrit belonging to family Menispermaceae is a genetically diverse, large, deciduous climbing shrub with greenish yellow typical flowers, found at higher altitude. [4–6] In racemes or racemose panicles, the male flowers are clustered and female are solitary. The flowering season expands over summers and winters. [7] A variety of active components derived from the plant like alkaloids, steroids, diterpenoid lactones, aliphatics, and glycosides[7] have been isolated from the different parts of the plant body, including root, stem, and whole plant.



Fig 2: *Tinospora cordifolia*

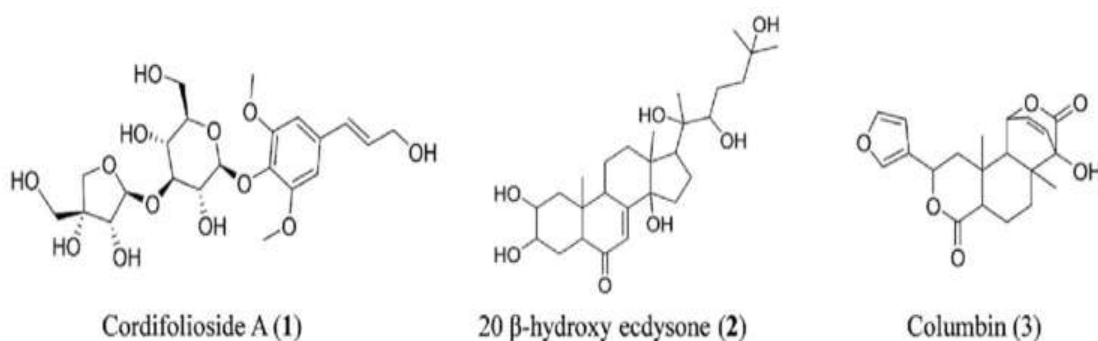
2.1.2. Chemical Constituents

The chemical constituents of *T. cordifolia* belong to different classes such as alkaloids, glycosides, steroids, phenolics, aliphatic compounds, polysaccharides; leaves are rich in protein (11.2%), calcium and phosphorus [9]. The stem contains clerodane furano diterpene glucoside

(amritoside A, B, C, and D) and the structure has been established by different spectroscopic studies [9,10,11]. Some of the essential constituents reported in and major constituents, whereas the structure of the active chemical constituent for *Tinospora cordifolia* has been depicted in below figure:

Table 1: Essential constituents of *T. cordifolia*

Active Component	Compounds
Terpenoids	Tinosporide, Furanolactone diterpene, Furanolactone clerodane diterpene, furanoid diterpene, Tinosporaside, ecdysterone makisterone and several glucosides isolated as poly acetate, phenylpropene disaccharides cordifolioside A, B and C, cordifolioside D and E, Tinocordioside, cordioside, palmatosides C and F, Sesquiterpene glucoside tinocordifolioside, Sesquiterpene tinocordifolin.
Alkaloids	Tinosporine, (S), Magnoflorine, (S), Berberine, (S), Choline, (S), Jatrorrhizine, (S), 1,2-Substituted pyrrolidine(S), Alkaloids, viz. jatrorrhizine, palmatine, beberine, tembeterine, choline.
Lignans	3 (a, 4-dihydroxy-3-methoxybenzyl)-4-(4-hydroxy-3-methoxybenzyl), (S)
Steroids	Giloinsterol, (S), β -Sitosterol, (S), 20 α - Hydroxy ecdysone, (S).
Others	Giloin, Tinosporan acetate, Tinosporal acetate, Tinosporidine, Heptacosanol, Octacosanol, sinapic acid, Tinosponone, two phytoecdysones an immunologically active arabinogalactan.



Structure 1: Essential constituents of *T. cordifolia*

2.1.3. Uses

Tinospora Cordifolia is used in various traditional and modern medicinal practices for its therapeutic properties. It is commonly used for Treating Fever, Malaria, and Dengue Fever, boosting the immune system, preventing infections, reducing inflammation and also used as anti-diabetic, anti-periodic, anti-spasmodic, anti-inflammatory, anti-

arthritic, anti-oxidant, anti-allergic, anti-stress, anti-leprotic, anti-malarial, hepatoprotective, immunomodulatory and anti-neoplastic activities.

2.1.4. Marketed Product

As prescribed by the physician.

Contra-indication: None

Side effects: No known side effects

Expiry: 5 years from the date of manufacturing.

Disclaimer: The information provided herein on request, is not to be taken as a replacement for

medical advice or diagnosis or treatment of any medical condition. Do Not Self-Medicate. Please Consult Your Physician for Proper Diagnosis and Prescription.



Fig 3: Marketed product of *T. cordifolia*

2.2. *Echinacea purpurea*

2.2.1. Description

Echinacea purpurea (L.) Moench is one of the most important and well-known medicinal plants in the world, belonging to the Asteraceae (Compositae) family. *Echinacea purpurea* is an herbaceous perennial wildflower native to North America. Commonly known as Purple Coneflower, this species typically grows 3' tall and

prefers full sun with well-drained soil. Blooming from summer to fall, this showy flower attracts bees, butterflies and hummingbirds to your garden. This large multi-stemmed perennial will bloom for months beginning in Summer, and extending to frost if deadheaded. The long stems make this an excellent cut-flower. The foliage has a rough texture, and is browsed by rabbits and other herbivores. The native range is meadows, prairies, roadsides, and open woods. *Echinacea purpurea* has high value to wildlife of all kinds.

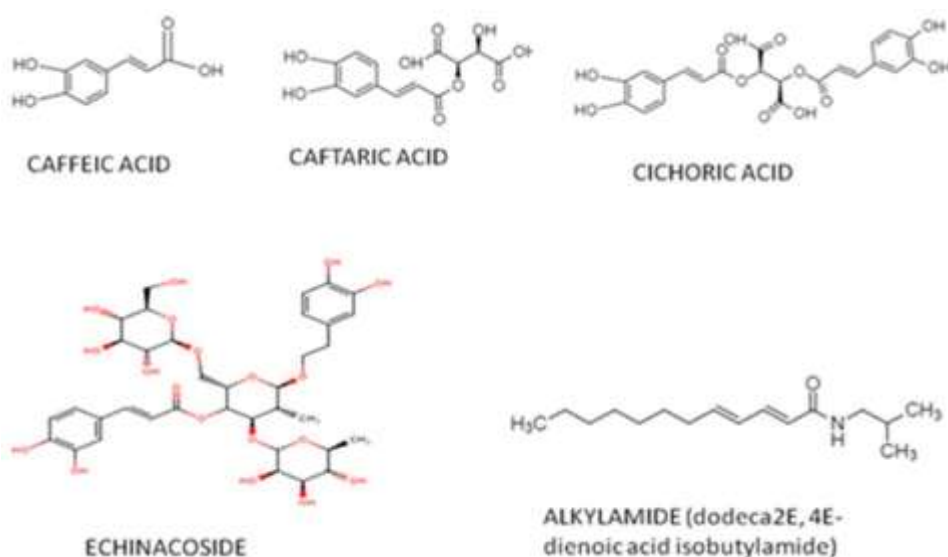


Fig: 4: *Echinacea purpurea*

2.2.2. Chemical constituents

Various compounds belonging to different classes of secondary metabolites have been isolated and identified in *E. purpurea* extract. Alkamides, caffeic acid derivatives, and polysaccharides are the three major groups of secondary metabolites in the plant, which have been considered mostly in manuscripts. In one study, 10 alkamides, mostly with isobutylamide and 2-methylbutylamide moieties, have been successfully purified from the *n*-hexane extract of the plant root.[38] Purification of the chloroform extract of the plant root also has resulted in the purification of some alkamides with isobutylamide and 2-methylbutylamide moieties and nitidanindiisovalerianate as well as a sequesterpene, 1 β -hydroxy-4 (15),5E,10 (14)-germacatriene, using chromatographic methods.[39] Isolated alkamides (with isobutylamides) mostly contained 2,4-dienoic units in their structures.[40] The results of a high-performance liquid chromatography-diode array detector-mass spectrometry (HPLC-DAD-MS) analysis of the roots and aerial parts of the plant showed that the storage conditions and methods of the extraction can significantly influence the contents of cichoric acid and alkamide derivatives.[41] Contents of alkamides

and cichoric acid in *E. purpurea* (root and aerial parts) have been analyzed in different samples, and the results showed that high-quality root contains more than 6 mg/g alkamides, while cichoric acid content for root and aerial parts was evaluated as more than 15 mg/g. The aerial parts of the plant usually cannot be considered as a source of alkamides. For marketing, a minimum standard level could be assumed as > 3 mg/g for alkamides and > 5 mg/g for cichoric acid.[42] Polysaccharides and polyacetylenes along with glycoproteins were also purified from the aerial parts of the plant as well.[40] The juice of the plant contains heterogeneous polysaccharides (MW < 10 kDa), inulin-type fractions (MW = 6 kDa) and acidic highly branched arabinogalactan polysaccharide (MW = 70 kDa). Arabinogalactan-protein isolated from the aerial parts of the plant is composed of 83% polysaccharide (galactose/arabinose), 4-5% uronic acids, and 7% protein, with high concentrations of serine and hydroxyproline. [40,81] Other compounds including alkaloids, amides, and flavonoids (quercetin, kaempferol, isorhamnetin and their free phenolic acids including p-coumaric, p-hydroxybenzoic, and protocatechuic acids) have also been isolated and identified from the plant.



Structure 2: Essential constituents of *E. purpurea*

2.2.3. Uses

Echinacea purpurea has reportedly shown good results in treating cancer, boosts the immune system, alleviates pain, used as laxative, anti-inflammatory agent, treats skin problem, improves mental health, relieves upper respiratory issues, fights infections, reduces cold symptoms and its duration.

Indications: Low immunity

Net Quantity: 30 mL

Product Form: Liquid drop

Dosage: Adults: Take 2 mL 3 times daily

Children ages 6-12 years of age: Take 1 mL 3 times daily

Intensive: Take 2 mL every 2 hours for first 48 hours. Then take 2 mL 3 times daily for the next 8-9 days.

2.2.4. Marketed Product



Fig: 5: Marketed product of *E. purpurea*

2.3. *Nigella sativa*

2.3.1 Description

Among medicinal plants, *Nigella sativa* (*N. sativa*) (Family Ranunculaceae) is emerging as a miracle herb with a rich historical and religious background since many researches revealed its wide spectrum of pharmacological potential. *N. sativa* is commonly known as black seed. *N. sativa* is native to Southern Europe, North Africa and Southwest Asia and it is cultivated in many countries in the world like Middle Eastern

Mediterranean region, South Europe, India, Pakistan, Syria, Turkey, Saudi Arabia [45]. The seeds of *N. sativa* and their oil have been widely used for centuries in the treatment of various ailments throughout the world. And it is an important drug in the Indian traditional system of medicine like Unani and Ayurveda [46], [47]. Among Muslims, it is considered as one of the greatest forms of healing medicine available due to it was mentioned that black seed is the remedy for all diseases except death in one of the Prophetic hadith. It is also recommended for use on regular basis in Tibb-e-Nabwi (Prophetic Medicine) [48].

Fig: 6: *Nigella sativa*

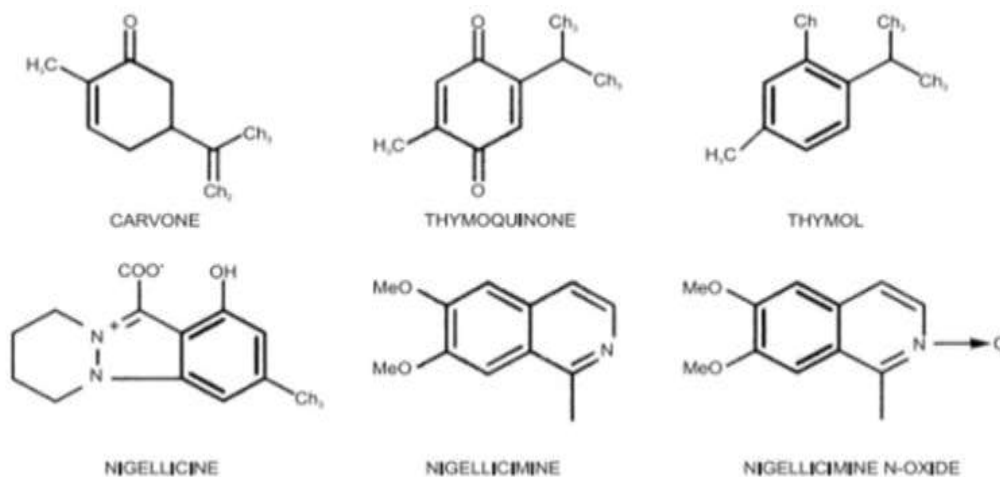
2.3.2. Chemical constituents

Many active compounds have been isolated, identified and reported so far in different varieties of black seeds. The most important active compounds are thymoquinone (30%-48%), thymohydroquinone, dithymoquinone, p-cymene (7%-15%), carvacrol (6%-12%), 4-terpineol (2%-7%), t-anethol (1%-4%), sesquiterpene longifolene (1%-8%) α -pinene and thymol *etc.* Black seeds also contain some other compounds in trace amounts. Seeds contain two different types of alkaloids; *i.e.* isoquinoline alkaloids *e.g.* nigellicimine and nigellicimine-N-oxide, and pyrazol alkaloids or indazole ring bearing alkaloids which include nigellidine and nigellicine. Moreover, *N. sativa* seeds also contain alpha-hederin, a water soluble pentacyclic triterpene and saponin, a potential anticancer agent [49], [50]. Some other compounds *e.g.* carvone, limonene, citronellol were also found in trace amounts. Most of the pharmacological properties of *N. sativa* are mainly attributed to quinine constituents, of which TQ is the most abundant. On storage, TQ yields dithymoquinone and higher oligocondensation products. The seeds of *N. sativa* contain protein (26.7%), fat (28.5%), carbohydrates (24.9%), crude fibre (8.4%) and total ash (4.8 %). The seeds are also containing good amount of various vitamins and minerals like Cu, P, Zn and Fe *etc.* The seeds contain carotene

which is converted by the liver to vitamin A. Root and shoot are reported to contain vanillic acid [49], [51]. The seeds reported to contain a fatty oil rich in unsaturated fatty acids, mainly linoleic acid (50-60%), oleic acid (20%), eicodadienoic acid (3%) and dihomolinoleic acid (10%). Saturated fatty acids (palmitic, stearic acid) amount to about 30% or less. α -sitosterol is a major sterol, which accounts for 44% and 54% of the total sterols in Tunisian and Iranian varieties of black seed oils respectively, followed by stigmasterol (6.57-20.92% of total sterols) [52-54]. Examples of various other reported chemical components includes nigellone, avenasterol-5-ene, avenasterol-7-ene, campesterol, cholesterol, citrostadienol, cycloeucalenol,, gramisterol, lophenol, obtusifoliol, stigmastanol, stigmasterol-7-ene, β -amyrin, butyro-spermol, cycloartenol, 24-methylene-cycloartanol, taraxerol, tirucallol, 3-O- $[\beta$ -D-xylopyranosyl(1 $\rightarrow$ 3)- α -L-rhamnopyranosyl(1 $\rightarrow$ 2)- α -L-arabino-pyranosyl]-28-O- $[\alpha$ -L-rhamnopyranosyl(1 $\rightarrow$ 4)- β -D-glucopyranosyl(1 $\rightarrow$ 6)- β -D-glucopyranosyl] hederagenin, volatile oil (0.5-1.6%), fatty oil (35.6-41.6%), oleic acid, esters of unsaturated fatty acids with C15 and higher terpenoids, esters of dehydrostearic and linoleic acid, aliphatic alcohol, β -unsaturated hydroxy ketone, hederagenin glycoside, melanthin, melanthigenin, bitter principle, tannin, resin, protein, reducing

sugar, glycosidal saponin, 3-O-[β -D-xylopyranosyl-(1 $\rightarrow$ 2)- α -L-rhamno-pyranosyl-(1 $\rightarrow$ 2)- β -D-glucopyranosyl]-11-methoxy-16, 23-dihydroxy-28-methy-lolean-12-enoate, stigma-5,

22-dien-3- β -D-gluco-pyranoside, cycloart-23-methyl-7, 20, 22-triene-3 β , 25-diol, nigellidine-4-O-sulfite, N. mines A3, A4, A5, C, N. mines A1, A2, B1, and B2[55-59].



Structure 3: Essential constituents of *N. sativa*

2.3.3. Uses

N. sativa is used to lowers high blood sugar, controls type-II diabetes, promotes liver health, boosts memory, treats asthma, boosts immunity, enhances skin complexion, treats hair loss and also reduces cancer risk.

2.3.4. Marketed Product

Safety Information

Don't exceed recommended dose. Not intended for pregnant or nursing mothers or children under the age of 18. Speak to your doctor before taking any supplement. This product contains herbal ingredients which may cause allergic reactions for sensitive users. Some may also experience side effects such as migraines and nausea. Discontinue use immediately if you experience these symptoms.

Ingredients; Cold Pressed Black Seed Oil Cumin
Directions: 2 capsules taken daily preferably with meals or as directed by a healthcare professional.



Fig 7: Marketed product of *N. sativa*

2.4. *Caesalpinia sappan*

2.4.1. Description

Caesalpinia sappan Linn. or Sappanwood belonging to the Leguminosae family is a redwood full-fledged in numerous regions of Southeast Asia. *Caesalpinia sappan* is a small to medium-sized, shrubby tree, 4-8(-10) m tall; trunk up to 14 cm in diameter; bark with distinct ridges and many prickles, greyish brown; young twigs and buds



hairy, brownish. Flowering can occur after 1 year of growth and usually during the rainy season, fruiting about 6 months later. In Myanmar, the tree flowers in August, and in Indonesia pods are produced 13 months after planting. The medicinal properties of sappanwood (*C. sappan*) were documented in the Indian Ayurveda, Chinese traditional herbs (Efferth et al., 2008), Japanese pharmacopeia, medicinal plants in Vietnam, and medicinal Thai plants (Kennedy et al., 2004).

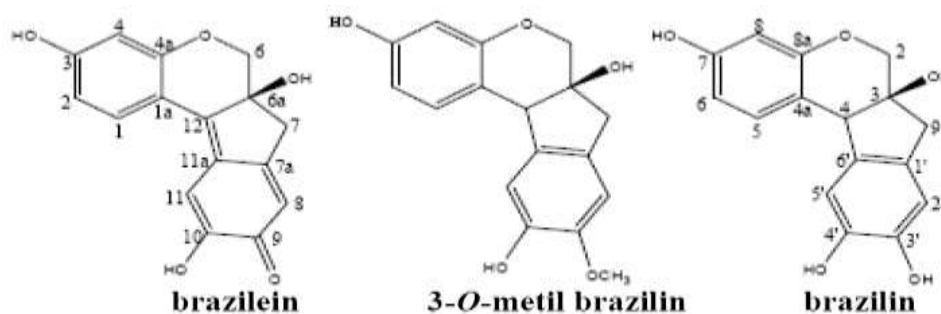


Fig 8: *Caesalpinia sappan*

2.4.2. Chemical constituents

The phytochemical composition of sappan wood has been studied extensively, and it has been found that it contains various bioactive compounds. The major constituents of sappan wood are flavonoids, phenolic acids, and anthraquinones. Other substances found in sappan wood, in addition to flavonoids and phenolic ones, are triterpenoids, steroids, alkaloids, saponins, and tannins. Many

different biological actions, such as anti-inflammation, anticancer, and antioxidant characteristics, are exhibited by the class of polyphenolic compounds and have been connected to several health benefits [60]. Several structurally unique phenolic components, such as brazilin, xanthone, one coumarin, chalcones, flavones, and homo isoflavonoids, are present in sappan wood [61-62].



Structure 4: Essential constituents of *C. sappan*

2.4.3. Uses

Tinospora Cordifolia is used in various traditional and modern medicinal practices for its therapeutic properties. It is commonly used for its antimicrobial properties, as powerful antioxidants, for metabolic diseases, for its antiulcer properties, for antiplatelet properties, for anticancer

properties, for skin care, for its anti-inflammatory properties, to boost immunity, etc.

2.4.4. Marketed Product

Usage: For filling into capsules or tablets form.

Condition: New

Packaging: 50 g



Fig 9: Marketed product of *C. sappan*

2.5. *Isatis indigotica*

2.5.1. Description

Isatis indigotica Fort. (*I. indigotica*) is an herbaceous plant belonging to *Cruciferae* family.

Its leaf (IIL) and root (IIR) are commonly used in traditional Chinese medicines (TCMs) with good clinical efficacies such as clearing away heat and detoxification, cooling blood and reducing swelling.





Fig 10: *Isatis Indigotica*

2.5.2. Chemical constituents

• Leaf:

The fresh leaves contain isatan B, 3-indolymethylglucosinolate, glucobrassicin, neoglucobrassicin, 1-sulpho-3-indolymethyl glucosinolate. [63] While the dried leaves contain alkaloids, including indigotin, indirubin, [64] 2,4(1H,3H)-quinazolinone, 5-hydroxy-2-indolinone, 10H-indolo[3,2-b] quinolone, [65] 4(3H)-quinazolinone, deoxyvascinone, tryptanthrin, [66] Isatisine A. [67] Indigotin and indirubin are fat-soluble compounds displaying poor solubility and are only soluble in chloroform, acetone and other organic solvents. They have a life span of only 24 hours in the dark after which they begin to decompose. [68] Some of the other components in the leaves are: (1) Organic acids: [69,70] 3,5-dimethoxy-4-hydroxy benzoic acid, syringic acid, nicotinic acid, succinic acid, salicylic acid, anthranilic acid. (2) Flavonoids: [71] isovitexin, 6- β -D-glucopyranosyldiosmetin. (3) Lignans: [72] (-)-lariciresinol, (+)-isolariciresinol. (4) Nucleosides: [73] uridine, adenosine, xanthine, hypoxanthine. (5) Steroids: [74] β -rosasterol, β -sitosterol, γ -sitosterol. (6) Amino acid: [75] L-pyroglutamic acid. (7) Minerals: [76] Iron, titanium, manganese, zinc, copper, cobalt, nickel,

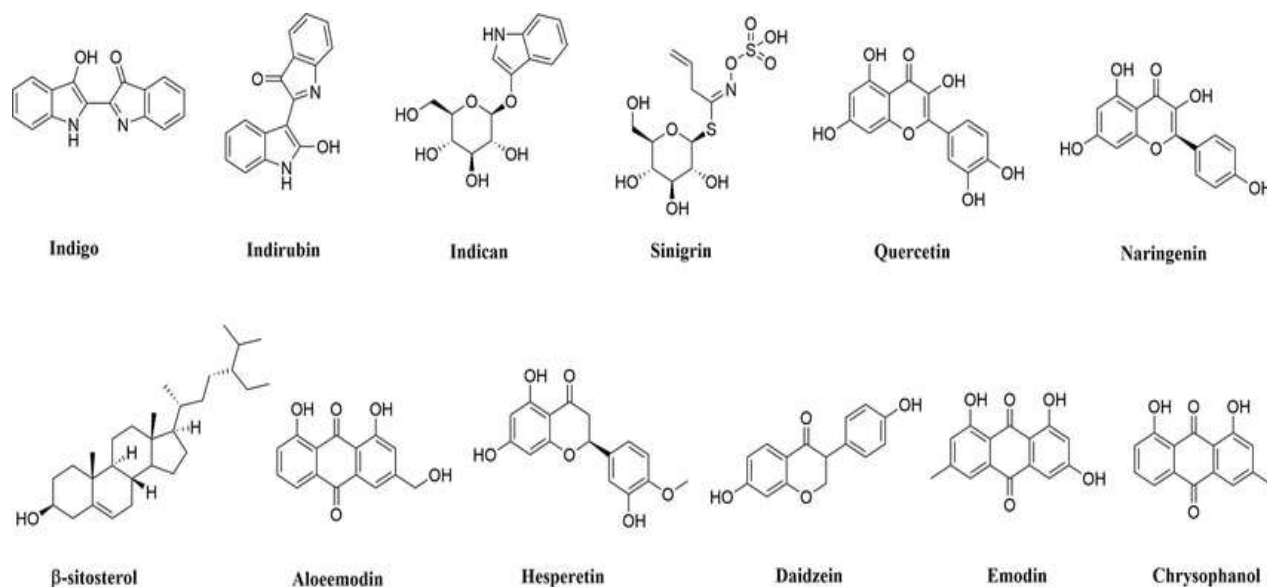
selenium, chromium, arsenic, etc. There is also volatile oil components present in folium isatidis.

• Roots:

The roots include the following chemical constituents (1) Alkaloids: indigotin, isatin, indirubin, [64] indoxyl- β -glucoside, 2,5-dihydroxy-indole, 2,3-dihydro-4-hydroxy-2-oxo-indole-3-acetonitrile, indole-3-acetonitrile-6-O- β -D-glucopyranoside, [77] hydroxyindirubin, isaindigodione, (E)-3-(3',5'-dimethoxy-4'-hydroxybenzylidene)-2-indolinone, 3-formyl-indole, deoxyvascinone, isaindigotone, tryptanthrin, [78] 3-(2'-carboxyphenyl)-4(3H)-quinazolinone, 4(3H)-quinazolinone, 3-(2'-hydroxyphenyl)-4(3H)-quinazolinone, isaindigotidione, Isatan A, [79] 3-[2'-(5'-hydroxymethyl)furyl]-1(2H)-isoquinolinone-7-O- β -D-glucoside, 2,3-dihydro-1H-pyrrolo[2,1-c][1,4]benzodiazepine-5,11(10H,11aH)-dione. [80] (2) Flavonoids: [81-83] neohesperidin, liquiritigenin, isoliquiritigenin, isovitexin, linarin, eupatorin. (3) Lignans: [72] (-)-lariciresinol, lariciresinol-4-O- β -D-glucopyranoside, lariciresinol-4,4'-di-O- β -D-glucopyranoside, 4-(1,2,3-trihydroxypropyl)-2, 6-dimethoxyphenyl-1-O- β -D-glucopyranoside, syringin, (+)-isolariciresinol. (4) Organic acids: [84] 3-pyridinecarboxylic acid, maleic acid, 2-hydroxy-

1,4-benzenedicarboxylic acid, benzoic acid, salicylic acid, syringic acid, palmitic acid, succinic acid, 2-amino benzoic acid, 5-hydroxymethyl furoic acid. (5) Anthraquinones: [85] emodin, emodin-8-*O*- β -*D*-glucoside. (6) Steroids: [86] β -sitosterol, daucosterol, γ -sitosterol. (7) Sinigrins: [87] 3-indolylmethyl glucosinolate, neoglucobrassicin, 1-sulpho-3-indolylmethylglucosinolate. (8) Sulfur compounds: [88] epigoitrin, 1-thiocyano-2-hydroxy-3-

butene. (9) Amino acids: [89] praline, arginine, tyrosine, valine, glutamic acid, γ -aminobutyric acid, leucine, tryptophan, aspartic acid, L-threonine, β -hydroxyalanine, glycine, isoleucine, phenylalanine, histidine, lysine. (10) Nucleotides: [90] uridine, hypoxanthine, uracil, adenosine, guanine. (11) Others: [91-94] ammonium formate, sucrose, 5-hydroxymethyl-furaldehyde, *n*-butyl-*O*- β -*D*-fructopyranose, mannitol, pyrophaeophorbide α , polygalitol.



Structure 5: Essential constituents of *I. indigotica*

2.5.3. Uses

Isatis indigotica have been widely used in combination with other Chinese medicines to treat and prevent a variety of diseases such as influenza, parotitis, epidemic encephalitis B, epidemic myelitis, epidemic cerebrospinal meningitis, acute infectious hepatitis and sore throat. [95,96] *I. indigotica*, display many important pharmacological activities such as liver protection and anti-microbial, and indirubin also has anti-tumor effects. [97] It shows various

pharmacological properties such as anti-viral activity, antibacterial activity, anti-endotoxin, Immunopotential, anti-inflammation, anti-tumour, etc.

2.5.4. Marketed Product

Concentration/Other Ingredients: 1:4 - Certified Organic Alcohol, Distilled Water

Suggested Use: 30-60 Drops (1.5-3 ML) In Juice or Water. Take 3 Times Per Day.

Contraindications: None



Fig 11: Marketed product of *I. indigotica*

PHYSICAL EXERCISE

Regular moderate exercise improves the immunity of the body and reduces inflammation. Achieve at least 30 minutes of moderate physical activity most days of the week. Use a combination of aerobic exercise, strength, and mind-body exercises. Limit and not over-trained, so as to prevent suppression of immunity. Hydrate yourself; consume nutrient-dense foods; manage your levels of stress.

ANALYSIS OF HERBAL DRUGS

Formulations containing either isolated phytoconstituents extracts or parts or whole drug are analyzed by routine quality control techniques. The quality control techniques include high performance thin layer chromatography, high performance liquid chromatography, UV-spectrophotometry, gas chromatography, etc [48-66].

CONCLUSION

Medicinal plants are rich source of bioactive phytochemicals, characterized by multiple and often pleiotropic activities, which can be exploited both therapeutically and as nutraceutical strategies for preventive purpose. Among plant-based nutraceuticals, immunomodulators have been highlighted to be of interest of boosters of the immune system to counteract infections or exogenous injuries, immunosuppressor, to control the abnormal immune response occurring during autoimmune diseases, or as adjuvants, which contribute by modulating nonimmune targets. Thus, these medicinal plants are effective in boosting the immune system. In addition, it is advised that the quality of good lifestyle will be ensured with appropriate herbal extract treatment to boost immunity followed with proper diet, and mindfulness to support all along.

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