CHEMICAL CONSTITUENTS AND PHARMACOLOGICAL ACTIVITIES FOR IXORA SPECIES: A REVIEW

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Article History: Received: 02/04/2023 Revised: 10/05/2023 Accepted: 25/06/2023

ABSTRACT:

A variety of bioactive substances from plants are used to treat and cure diseases. Only herbal therapy can effectively treat illnesses. Phytoconstituents, which are stronger and have a range of biological effects, are found in plants. The Ixora species is a perennial shrub of the Rubiaceae family. More than 500 species of this flowering plant are cultivated extensively in Florida and the rest of the United States. Ixora coccinea is only one of many species of the Ixora plant. The biological characteristics of Ixora alba, Ixora philippinensis Merr, and Ixora chinensis Lamk are examined. Analgesics, antioxidants, anti-microbial, and anti-cancer are some of these qualities. Among the several phytoconstituents present in Ixora plants are rutin flavonoids, -sit sterol, triterpenoid ursolic acid, D-mannitol, proanthocyanidins, quercetin, kaempferol, and anthocyanin glycosides. Highlighting the photochemistry and pharmacological traits of Ixora species and their potential uses in next Nano phytosomes research are the goals of this review.

Keywords: Ixora Species, Ixora alba, Ixora philippinensis Merr, and Ixora chinensis Lamk

Doi: 10.31838/ecb/2023.12.Si8.824

INTRODUCTION:

White, yellow, orange, pink, and red are just a few of the colours that the well-known decorative plant Ixora comes in. It is The Southeast and Asia are well-liked rising regions. In the Siddha, Unnani, conventional, and Ayurvedic medical systems, various Ixora species are used as medicines. [1] Ixora coccinea is a multi-branched ever-silver scrub. anti-inflammatory and antioxidant qualities. Efficacy in combating cancer. The Ayurvedic medical approach, Haemoptysis, leucorrhoea, dysentery, dysmenorrhoea, sprains, and bronchitis are some examples of irregular menstruation. Numerous illnesses, including fever, wounds, chronic ulcers, scabies, and skin conditions are all treated with the flowers. application of I. coccinea flowers for the management of different skin conditions and the speedy recovery of wounds. You can lessen eczema by using dried flowers that have been fried in coconut oil. A component of the treatment for oral cancer is Ixora coccinea.4Anti-oxidants, anti-cancer, and anti-

microbial properties are all present in Ixora chinensis. I. chinensis blooms throughout an entire year. China is where it is frequently seen. It is a plant that serves dual purposes of ornament and health. Anthocyanins and flavonoids are abundant.5. Ixora parviflora petroleum ether extract possesses strong antibacterial and antifungal properties [2.3].

Figure 1. Ixora species

DIFFERENT SPECIES OF IXORA:

One of the few recognized separate species of Ixora is Ixora coccinea L. Some Ixora species include Ixora ferrea, Ixora finlaysoniana, Ixora grandiflora, Ixora macrothyrsa, Ixora pavetta, and Ixora Thwaites. Ixora triantha, Ixora arborea (I. parviflora), I. duffijavanica (I. singaphorensis), I. chinensis, I. brachiate, I. lutea, I. undulata, I. amplexicaulis, I. alba, I. albersii, I. philippinensis, and I. javanica [4].

PHYTOCONSTITUENTS /PHARMACOGNOSTICAL PROFILE:

One of the principal phytoconstituents found in Ixora species is terpenoids, which are also found in glycosides, alkaloids, steroids, tannins, etc. [5]. The photochemistry tests evaluated the phytoconstituents in a few taxa. The Phytochemical studies were explored in Ixora species such as Ixora coccinea, Ixora alba, Ixora brachiata, Ixora arborea, Ixora predeepii, Ixora philippinensis, Ixora decaryi, Ixora fuscovenosa, Ixora gautieri, Ixora longipedicellata, Ixora masoalensis, Ixora pallens, Ixora ripicola, Ixora jourdanii, Ixora ooumuensis, Ixora spathoidea, Ixora tahuataensis mouly, Ixora uahukaensis, Ixora hookeri, Ixora casei Ixora undulata. Terpenoids, flavonoids, anthraquinone glycosides, cardiac glycosides, tannins, steroids, alkaloids, carbohydrates, starch, and saponin were all found throughout the tests. Ixora coccinea anatomy profiles It was talked about Ixora nicotiana and Ixora predepii [19, 20]. Ixora Undulata's isolated and reported Rubio thiazine as well as new cycloartenol esters from Ixora coccinea.

Table No: 1: Pharmacogenetic reports and phytoconstituents

S. No	The plant and part used/solvent used	Phytoconstituents reported/Pharmacogenetic
1.	Leaves of Ixora brachiate Methanolic	Cell lines from human pancreatic (PANC-1) and breast (MDA-MB-231) cancers were used. Protocatechuic acid, a flavonoid, and myricetin were discovered [6,7].
2.	Ixora coccinea Flower Alcohol and Aqueous	Flavonoids, cardiac glycoside, terpenoids, tannins, and anthraquinone glycoside [8].
3.	Ixora coccinea Leaf &stemmethanol	Tannins, Terpenoids, Flavonoids, Phenolic Compounds, and Steroids are examples of alkaloids [9].
4.	Ixora coccinea Linn. And Ixoraarborea Roxb. Root Methanol and water-solubleextract	Carbohydrates, Starch, Saponin glycoside Tannin, Alkaloid [10].
5.	Ixora alba Methanol	Anthracene and arbutin derivatives, alkaloids, coumarins, essential oils, flavonoids, tannins, cardiac Glycosides [11].
6.	Morinda citrifolia (stem &leaf) Morinda tinctoria (stem) Ixora coccinea (stem &leaf) Ixora notoniana(stem) Fresh plant parts were preserved in a fixative solution FAA (Formalin-5ml + Acetic acid-5ml + 70% Ethyl alcohol-90ml)	stem and leaf TLS of Morinda citrifolia We talked about the stems of Morinda tinctoria, Ixora coccinea, and Ixora notoniana [11].
7.	Habit, a nodal component, an inflorescence, a flower, an infructescence, and seeds. We evaluated the thorough explanation, illustration, images, and pertinent notes on phenology and ecology.	There have been Ixora specimens found in India on the hills of the Southern Western Ghats that resemble Ixora elongate. Critical analyses have established Ixora predeepii as a novel species that differs significantly from Ixora elongate [12,13].
8.	Ixora coccinea Flowers	In comparison to the crude extracts from all three solvents, the

	Ethanol, Ethyl acetate, Chloroform	separated carotenoid pigment extracts had a higher level of cytotoxicity [14].
9.	Ixora coccinea flowers 0.1% acidified ethanol (HCl inethanol)	Method: microwave oven extraction Temperature: 70˚C The time used :50mts.yield: 13.26% anthocyanin content in fresh material:704.73 mg/100 g to 662.79 mg/100g [15].
10.	I. philippinensis stems & leaves the method used: silica gel chromatography acetone in Dichloromethane	Ixora philippinensis Merr leaf: Syringaresinol, pinoresinol, isoscopoletin, squalene, and stigmasterol are isolated compounds. stems of Ixora philippinensis Merr: Squalene, -sitosterol, stigmasterol, lupeol, and lutein are isolated compounds [16].
11.	Ixora coccinea Linn root 50% Methanol	9, octadecenoic acid, methyl-ester, phenol, 2,6-dimethoxyn-hexadecanoic acid trimethyl-3,4,5 docosenamide-13 ethoxy Tetramethylheptadecan-4-olide compounds with 4, 8, 12, and 16 methyl groups were isolated [17].
12.	Ixora decaryi Ixora fuscovenosa, Ixoragautieri Ixora longipedicellata, Ixora masoalensis Ixora pallens Ixora pedalis Ixora ripicola	The evaluations come with in-depth summaries, graphics, and distribution charts [18].
13.	Leaves of Ixora undulata	HIV-1 -MT-4 HIV-1IIIB CC50 >100 g/mL and EL4 (Murine Leukemia) >100 g/mL were the cell lines used. EC50 >100 µg/mL [19].
14.	Ixora coccinea flowerMethanol	Along with 5-O-caffeoylquinic acid, D-mannitol, and stigmast-5-en-3-O-D-glucoside, ixoroid was also isolated [20].
15.	Aerial parts of Ixora coccinea Methanolic extract	Ixora peptides I and II, as well as 28 other known substances, were separated from the Ixora coccinea Me OH extract using bioassay-guided fractionation. Marfey's method and spectroscopic data were used to determine the structures of metabolites 1 and 2 [12].

16.	Ixora casei Flowers 50/50 methanol/ water with0.1% formic acid,	The tool used is electrospray ionization mass spectrometry (ESI-MS) with HPLC with UV-Vis detection. Anthocyanins and flavonols were recognized [21].
17.	Ixora coccinea, flowers Chloromethane	NMR spectroscopy and mass spectrometry were used toisolate and characterize novel cycloartenol esters [23].

The most frequent metabolites found in Ixora are flavonoids, glycosides, phenol, fatty acids, phytosterol, conjugated tetraenoic acid, terpenoid, poly phenol ester hydroxy coumarin, and carotenoid. I. coccinea, I. alba, I. parviflora, I. undulata, and I. arborea are all high in flavonoids. I. chinensis, I. coccinea, and I. parviflora are high in saturated fatty acids. I. chinensis, I. finlaysoniana, and I. philippinensis are terpenoids that are abundant in the form of Di or triterpenoids. I. parviflora, I. coccinea, and I. chinensis I. amplexicaulis high in phytosterols. I. parviflora, I. amplexicaulis, I. javanica, and I. philippinensis are high in phenolic acids [24].

Table: 2 various Ixora species, along with their isolated chemical components

I. coccinea	Rutin, cyanadin-3-rutinoside, epicatechin, procyanidin A2, and hydroxyflavan are examples of flavonoids. Other glycosides include lupeol, 17-dammara-12,20-diene-3-ol, and leucocyanidin. A carbohydrate is d-mannitol. Polyphenols include cinnamon tannin, phenol-2,6-dimethoxyphenol, and phenol-3,4,5-trimethoxyphenol. Lupeol, linoleic acid, ursolic acid, oleanolic acid, and methyl esters of palmitic, oleic, stearic, and linoleic acids are examples of fatty acids. B-1 hexadecenoic acid, 9 octadecenoic acid methyl ester, 9 octadecadienoic acid, a polyunsaturated omega-6 fatty acid, and 13 docosenamide, a fatty amide. Phytosterol: β-sitosterol [25].
I. Alba	Anthracene, arbutin derivatives, alkaloids, cardiac glycosides, coumarins, essential oils, flavonoids, and tannins [26].
I. chinensis	Carbohydrate: D-mannitol A saturated fatty acid is stearic acid (10E). Di hydro masticadienolic oleic, linoleic, and crepenynic acids, as well as the 1,5-cyclic hydrocarbon 9-oxooctadec-10-en-12-ynoic acid Phytosterol: β-sitosterol Saturated dicarboxylic acid: azelaic acid Conjugated tetraenoic acid: ixoric acid Terpenoid: iridoid glucosides, ixoroside7,8-dehydroforsythide) [27].
I. parviflora	Phytosterol: β-sitosterol, β-sitosterol-β-D-glucoside Quercetin, apigenin, kaempferol, and kaempferol-7-O-methyl ether are all flavonoids. Apigenin-7-O-D-glucopyranoside, quercetin 3-O-D, and galacto pyranoside Poly phenol ester: chlorogenic acid Examples of saturated fatty acids include capric, lauric, myristic, palmitic, stearic, arachidic, behenic, oleic, and linoleic acids [28].

I. undulata	Carbohydrate: β-gentiobioside Flavonoids β: gentiobioside, 3,4-dimethylphenol β-gentiobioside, (5R,6R, Z)-5,6- di hydroxy- 5,6-dihydro-2H-thiopyran-2-oneO-methyloxime β-D glucopyranoside, (5R,6R, Z)-5,6- dihydroxy-5,6-dihydro-2Hthiopyran-2-one O-methyl oxime β-gentiobioside Steroid glucoside: kaempferol 3- O-α-L-rhino pyranosyl-(1→6) -(4"-trans-p-coumaroyl)- β-D [29].
I. Amplexicaulis	Di terpenoid :3,6α,16αdi hydroxy -ent-kaurane, (24R)-6β-hydroxy-24-ethyl-cholest-4-en-3-onePhytosterol: 7β-hydroxy sitosterol phenolic acid: maslinic acid, 3'-bis (3,4-dihydro-4-hydroxy-6-methoxy-2H-1-benzopyran)and Protocatechuic acid [30].
I. javanica	Phenolic acid: ferulic acid-, pyrocatechinic acid, caffeic acid- caffeic acid

Table 2 There were about 21 compounds isolated from Ixora coccinea L, Ixora philippinensis, Ixora chinensis, Ixora casei, and Ixora undulata Roxb, according to clear data that described the various isolated chemical constituents and demonstrated the number of each type. The two substances that were isolated the most were fatty acids and flavonoids. Ixora coccinea was used to isolate two new peptides, Ixora peptide I and II. Ixora undulata Roxb was used to isolate Rubio thiazocine [31].

DRUG-RELATED ACTIVITIES

The role of antioxidants: An investigation into antioxidants focused on the Ixora species Ixora coccinea, Ixora parviflora, and Ixora arborea. 17,35. The IC50 value was calculated using the DPPH, Nitric oxide Scavenging, and H2O2 assay. Numerous studies have shown that ethyl acetate, hydroalcoholic, and methanolic extract all have potent antioxidant activity. when measured with regular ascorbic acid: 41, 43, and 44. Ixora coccinea total phenolic content was determined to be 210.556.31g/mg present in the leaf when it was measured and compared to the ascorbic acid standard.

Table: 3: Anti-oxidant activity reported

S. No	Species/Plant and part used/Solvent used	Method	Result reported
1.	leaves, stem, and flower part of the Ixora coccinea Distilled water	The qualitative and quantitative analysis revealed the presence of anthraquinones amino acid, flavonoid, coumarins, anthocyanin, terpenoids, alkaloid, phenol, tannin, and saponins activity. Using thin-layer chromatography, flavonoids were discovered,	TLC: flavonoid was detected as Rf value0.79. HPLC flavonoid content is 3.062 mg/ml in flower and leaf, 2.7144 mg/ml in antioxidant analysis, and 86.73, 80.42, and 65.18 percent of scavenging activity in flower, leaf, and stem, respectively.

		and the DPPH method was used to measure antioxidant activity.	
2.	leaves of Ixora parviflora Methanol	Findings from the AAPH-Induced Hemolysis Assay, the Peroxide Scavenging Assay, the Fluorescence Assay of Intracellular ROS, and the Hydroxyl Radical Scavenging Activity Assay. Total Phenolic Content, High Performance Liquid Chromatography-Diode Array Detector Quantification of IPE, Physical Characteristics of IPE, pH Value Absorption Spectrum of IPE, DPPH Radical Scaven.	IPE from Ixora parviflora demonstrated antioxidant activity in erythrocytes and a cell-free system in addition to the capacity to prevent the generation of reactive oxygen species (ROS) in human fibroblasts (Hs68) following UV light exposure. .
3.	Root of Ixora coccinea Methanolic extract	DPPH radical scavenging tests ferric reducing antioxidant power assay, high-performance liquid chromatography (HPLC), and antimicrobial activity	According to HPLC analysis, pyrocatechol, catechin, and chlorogenic acid were the most prevalent phenolic compounds in both samples. According to DPPH and FRAP studies, the most active samples were ICEAF and ICME, which were superior to BHT and comparable to ascorbic acid.
4.	Ixora coccinea Leaves Hydro-alcoholic	Technique column chromatography (Ethyl acetate, glacial acetic acid, formic acid 100:11:11:27) Solvents used Nitric oxide and DPPH radical scavenging activity	It was demonstrated that isolated quercetin has incredibly low IC50 values and a difficult potency to scavenge DPPH free radicals and nitric oxide free radicals
5.	Ixora coccinea root Petroleum ether, chloroform ethyl acetate, and methanol	Nitric oxide, hydrogen peroxide, and the DPPH free radical scavenging activity assays are examples of in vitro antioxidant techniques. Antioxidant method used in vivo:	Ethyl acetate extract has good in vitro antioxidant activity when compared to other extracts. Nitric oxide scavenging 60.60 g/ml, hydrogen peroxide scavenging 75.811 g/ml, and DPPH scavenging 48.43 g/ml are the IC50 values reported by numerous studies.

		Haloperidol-induced catalepsy in mice that has progressed	
6.	Ixora coccinea flower Petroleum ether, chloroform, ethyl acetate, and methanol	the measurement of the tannin, total phenol, and flavonoid contents, Triterpene determination, power decline, and total antioxidant intake the level of lipid peroxidation inhibition is determined by the activity of superoxide anion radical scavengers, H2O2 radical scavenging, nitrate/nitrite radical scavenging, and hydroxy (HO) radical scavenging activity	All extracts inhibited free radicals in a dose-dependent manner
7.	Leaves of Ixora coccinea Ethanol, hydro-extract	Power reduction using a test for free radical scavenging Calculation of Phenolic Content and Total Lipid Peroxidation DNA damage inhibition effectiveness assay, hematolysis inhibition assay HPLC analysis to ascertain the overall antioxidant potential of phenolic compounds.	ethanol + water extract showed betterpotential as compared to the parent solvents (ethanol and water)
8.	Stem of Ixora coccinea Linn. and Ixora arborea Roxb Toluene: Ethyl acetate: Acetic acid (7: 2: 0.5) for HPTLC	Macroscopic Study, Organoleptic characters of the powder Microscopic Study Histochemical Evaluation Physicochemical Evaluation Preliminary Phytochemical Evaluation Chromatographic Analysis (HPTLC)	T.S. and each powder were examined undera microscope at resolutions of 4X, 10X, and 40X.Stone cells can be found in the Pithregion. I. arborea has annular & spiral vessels, whereas I. Coccinea does not, according to powder microscopy. I. coccinea and I. arborea, respectively, displayed 9.44% w/w and 14.86% w/w of water-soluble extractive.
9.	Different Leaf Extracts of Ixora coccinea L. Toluene: Ethyl	DPPH free radical , nitric oxide radical hydroxyl radical scavenging assay	Compared to other extracts, methanolicextract has demonstrated stronger scavenging and antioxidant properties.

ANTI-MICROBIAL ACTIVITY:

Studies on the anti-microbial and anti-fungal properties of Ixora coccinea, Ixora chinensis, Ixora lutea, Ixora parviflora, and Ixora alba have all been conducted. Strong anti-microbial activity has been demonstrated for ethanol acetate extract, which is both ethanolic and methanolic. Among the various strains used for analysis are Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Candida albicans, Mycobacterium tuberculosis, Salmonella paratyphoid, Bacillus subtilis, Salmonella Typhi, and Acinetobacter, Botrytis cinereal. In this study, the Agar well diffusion method was most frequently employed.

Table: 4: Anti-Microbial activity reported

S. No	The plant and part used/solvent used	Method	Reported result
1.	Leaves Ixora coccinea Hydroalcoholic	Gas Chromatography Mass Spectrometry(GCMS)Analysis, Antimicrobial activity	Hydrocarbons, alcohols, carboxylic acids, esters, aldehydes, ketones, sesquiterpenoids, and triterpenoids were the eight different substance types that were examined. Using the broth microdilution method, the inhibitory effect of EO was assessed against Staphylococcus aureus, Pseudomonas aeruginosa, Escherichia coli, Candida albicans, and Mycobacterium tuberculosis (BCG).
2.	Ixora coccinea Leaves Curcuma caesia Roxb 50% aqueous ethanol 95% Ethanol	Antifungal assay	The extract mixture shows greater antifungal potential than the individual extract.
3.	Ixora coccinea Flowers Water Methanol	Phytochemical screening, Antibacterial activity (Cup-plate diffusionmethod)	In contrast to orange, the methanolic extracts of red and pink flowers had high antibacterial activity. White flowers showed little activity in comparison to the moderate activity of other blooms. In comparison to extracts based on methanol, the aqueous extracts had less inhibitory effects.
4.	Ixora chinensis, Ixoralutea, Ixora coccinea and Ixora parviflora Leaves Methanol	Agar well diffusion method	I. Parviflora showed significant antibacterial activity against Salmonella paratyphi, Bacillus subtilis, Salmonella Typhi, and Acinetobacter baumannii while I. chinensis, I. lutea, and I. coccinea did not. The treatment of choice was gentamicin.

5.	Ixora coccinea dwarf, Ixora coccinea red, Ixora coccinea white, and Ixora coccinea yellow) Ethyl acetate	Ethyl acetate extracts from all species show high inhibition.	Ethyl acetate extracts from all species show high inhibition.
6.	The bark of Ixora alba Methanolextract	Antimicrobial activity by agar diffusion method.	I. Alba bark extract has exhibited highly substantial antifungal activity.
7.	Ixora coccinea leaves 50% Aqueous ethanol	To find the antifungal fractions, Ixora coccinea leaf extract was sequentially solvent partitioned. antifungal testing of crude extracts the crude leaf extract's various solvent fractions were tested for antifungal activity.	Botrytis cinereal was shown to be controlled by the diethyl ether fraction.
8.	Ixora coccinea Leaf, flower, stem Methanol	Finding the minimum inhibitory concentration using the Agar disc diffusion method	Strong antibacterial properties can be found in methanolic extracts of leaves and flowers. Terpenoids, flavonoids, coumarins, alkaloids, and phenolic substances were discovered during the phytochemical screening.
9.	Leaves, Ixora coccinea Methanol	Antimicrobial activity by paper disc method	The methanol fraction has more antibacterial activity than the ether fraction.
10.	Ixora coccinea flowers 50% ethanol	Assay of antimicrobial activity, Determination of the effective inhibitory concentration against bacteria	The extract's effective inhibitory concentration was discovered to be 125 ug mL-1.

ANTICANCER ACTIVITY:

On human prostate cancer cell lines, studies into the anti-cancer potential of Ixora coccinea, Ixora singaphorensis, and Ixora javanica were conducted. Ixora coccinea research has been done on soft tissue sarcoma and skin cancer. The fruit of Ixora coccinea has anticancer activity against L N Cap FGC cells, with an IC50 value of 34.09 mg/ml 56. In experiments on Ixora coccinea leaf cell lines57, a concentration of 10-640 g/ml was found to be efficient. Ixora singaphorensis leaves had an IC50 of 26 0.6 g/ml when tested on HeLa cells number 58. 100 mg/kg of the Ixora coccinea flower prevented the growth of papillomas and postponed their onset in mice 59**[31].**

Table: 5 Anticancer activities reported

S. No	Plant and part used/solvent Used	Method	Reported result
1.	Ixora coccinea Flower	In vitro cell line studies	Piper longum (10-630 g/ml), Vitis viniferae (10-640 g/ml), and Ixora coccinea (10-630 g/ml) all inhibit growth by 10-58%, 3-53%, and 1-57%, respectively [33].
2.	Ixora singaphorensis Leaves Chloroform, ethyl acetate, methanol	calculating the total antioxidant capacity, total flavonoid content, and in vitro anticancer activity. MTT assay, or 4-(4, 5-dimethylthiazol- 2-yl)-2, 5-diphenyl tetrazolium bromide, Estimation of Catalase Activity, Antitumor Activity, Total Protein Content, and Anticancer Activity in Vivo	calculated the overall flavonoid and antioxidant content. With an IC50 of 26 0.6 g/ml, EAIS was found to be ineffective against HeLa cells. A corresponding increase in life expectancy of 18.6, 32.56, and 55.81 days was noted with 200, 300, and 500 mg of extract (EAIS). As the concentration of the extract rises, the percentage of viable cells falls.
3.	Ixora coccinea flowers N-hexane	Skin carcinogenesis studies Soft tissue sarcoma studies	Ixora coccinea flower's active component, 100 mg/kg of body weight, applied topically. It used croton oil and 7,12-dimethylbenz(a)anthracene (DMBA) to postpone the onset and stop the growth of papillomas in mice. 3-methyl choline three subcutaneously injected with the active fraction causes soft tissue fibrosarcoma's [31,32].

4.	Ixora javanica Flowers 50% Ethanol	Inhibition of DNA incorporation studies	The antitumor agent from Ixora jauanica lowers exhibits widespread activity against transplantable solid tumors (DLA) in mice, with less activity against Ascites tumors, by inhibiting the growth of tumors and slowing the growth of those that have already formed [33, 34].

IXORA IN POLY HERBAL FORMULATION:

Due to its powerful anti-diabetic properties, Ixora is a key ingredient in many ayurvedic formulations. It was an ingredient in products like fairness cream and disappearing cream. It functions well because it contains strong chemical components that can fend off free radicals.

Table: 7: Poly herbal formulation reported

S. No	The formulation &Species of Ixora usedfor the study	Category of formulation	Composition	Reported result
1.	Nisakathak adiKashaya Ixora coccinea L	Anti- diabetic ayurvedic formulationn	Curcuma longa kataka, IshaTurmericcookin g lodhara, and Ixora the regenerating - symplcos Bhadrika Aerva Lanata Vegetable Sylvestre Mehari Moola- Gymema Wesley Zizanioides	The DPP4 inhibitory potential was demonstrated by in vitro and in silico observations. Pharmacological study revealed how proteins and metabolic pathways interact in diabetes [36,37]. .
2.	Polyherbal Vanishing Cream, and Facewash Ixora coccinea L	Vanishing Cream and Facewash were formulating	Hawaiian geranium Ixora coccinea, Vitex nigundo, Kalmegh, and negundo Andrographis paniculata, Bryophyllum, Pongam, Millettia pinnata, and Kalanchoe pinnata and lemongrass Variegated kachnar Bauhinea and Cymbopogon flexuosus	The prepared vanishing cream's high flavonoid content can protect skin from harm [15]. The fungus C. albicans, gram-positive S. aureus, and gram-negative E. coli were also affected by its antibacterial properties [36].

3.	Hemidesmus indicus (Heen Iramusu), Ixora coccinea (Rathmal) Hibiscus Rosa sinensis (Pokuru Wadamal) and Citrus reticulata (Heen Naran) Ixora coccinea L.	Herbal fairness cream was formulated	Ixora coccinea L	The plant extracts and cream were tested using anti-tyrosinase and antioxidant (DPPH and ABTS) assays.
4.	PANHEAL Dried root of Ixora coccinea L.	Anti- diabetic ayurvedic formulationn	Amalaki (Emblica officinalis)], Haridra (Curcuma longa), Ekanayakam (Salacia reticulata), Parantimoola (Ixora coccinea), Usira (vetiveria Zizanioides) Kiratatikta (Andrographis paniculata), & Katuki (Picrorhiza kurroa)	Prameha's subjective symptoms and blood sugar levels were successfully and safely reduced by the polyherbal medication PANHEAL [30].
5.	Nisha kathakathadhi Ixora coccinea	Nisha kathakath adhi churnam	Strychnos potatorum, Aerva lanata, Ixora coccinea, Symplocos chinensis, Salacia reticulata and Vetiveria Zizanioides	LPO was found to be decreased and the antioxidant enzyme was found to be elevated in the pancreas and heart [40].

RESULTS (SEARCH OUTCOME)

The aim of this paper is to provide a comprehensive analysis of Ixora species at different stages, including Phytochemistry, chemically isolated constituents, antioxidant, antimicrobial, and anticancer effects, pharmacological effects, Nano formulation, and ayurvedic formulation. Data was gathered between 1997 and 2023 from a variety of sources, including Google Scholar, PubChem, Sc finder, Web of Science, SciELO, PubMed, and Science Direct. This article goes into great detail about the Ixora species used in the study, the plant parts used, the extraction solvent, the method used to show drug efficacy, and the successful outcomes of the work. The information gathered revealed that only I. Coccinea had been the subject of a large number of studies; in addition to this species, a small number of anti-oxidant and anti-microbial studies were also conducted on I. Arborea, I. Chinensis, I. alba, and I. Parviflora. There aren't many studies on the Phytochemistry and pharmacology of other species.

CONCLUSION:

The biological diversity of Ixora species is astounding, and there are many different species that can be found all over the world. The results of this review are intended to motivate additional Ixora research. The paper emphasized the variety of chemical components found in Ixora species. The Phytochemistry, antioxidant, anti-microbial, anti-cancer, anti-hypertension, anti-fertility, immune-modulating, anti-arthritic, anti-pyretic, and cardio-protective properties of specific plants have been the subject of numerous studies. The created herbal concoction effectively treats hyperglycaemia. It has also been demonstrated that the Ixora chinensis flower's high flavonoid content creates a nourishing beverage. According to the numerous publications on Ixora species that have been published so far, Ixora coccinea has reportedly been the focus of the majority of research efforts on Ixora species, leaving other species untapped for more in-depth studies. As a result, this in-depth analysis of the Ixora species advances efforts to find phytol lead for facilitating formulation that can be used to treat a variety of illnesses and helps identify knowledge gaps.

ACKNOWLEDGEMENT: Thank you to my family and friends as well.

Funding: None

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