International Journal of Biology Research
ISSN: 2455-6548
Impact Factor: RJIF 5.22
www.biologyjournal.in
Volume 3; Issue 4; October 2018; Page No. 01-05

An over view on: Two ancient plants as a potent Antipsoriatic agent

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Abstract
Psoriasis is an autoimmune disorder characterized by abnormal keratinocyte hyperproliferation. Herbal formulations have been used for decades due to its enhanced activity and lesser side effects for psoriasis treatment. India has a very long, safe and continuous usage of many herbal drugs in the alternative system of health like Ayurveda, yoga, unani, siddha, homeopathy and naturopathy. Millions of Indians use herbal drugs regularly, as spices, home-remedies, health foods etc. Even allopathic system of medicine has adopted a number of plant derived drugs. Plants possess many of the chemical substances with potential therapeutical and pharmacological effects for treatment of many diseases. So there is a need to investigate antipsoriatic herbal drugs for the better patient acceptance. Our study is mainly focused to establish up to date literature on recent ethnomedicinal uses with phytochemical review of two different medicinal plants, i.e., *Wrightia tinctoria* Roxb and *Cassia fistula* Linn and these herbs have been selected on the basis of traditional system and scientific justification with modern methods.

Keywords: psoriasis, *Wrightia tinctoria*, *Cassia fistula*, ethnomedicinal use, treatment

Introduction

Psoriasis is a chronic recurrent inflammatory disease of autoimmune nature that effects mainly on the skin, nails and joints. It will effect 1.5-2% of the population of western countries and 1.3% in general population usually characterized by abnormal keratinocyte hyper proliferation with erythematous plaques, covered by fine silvery scales. The situation is worsened by skin inflammation and itching [1].

The basic principle underlying psoriasis development depends upon the skin infiltration of helper T cell (Th) 1/Th17 cells that stimulate macrophages and dermal dendritic cells and leads to the release of mediators that sustain inflammation and cause abnormal keratinocyte proliferation. The psoriatic plaque is characterized by a marked infiltration of activated CD4+ and CD8+ T-cells. CD4+ T-cells infiltrates mainly the dermis, whereas CD8+ T-cells is present in the epidermis. T-lymphocytes their cytokines, chemo kines will cause the lesion development. Histologically it is characterized by keratinocyte hyper proliferation with para keratosis and elongation or rete ridges, presence of munro microabscesses, increased angiogenesis and dermal infiltration of inflammatory cells, including T cells, neutrophils, macrophages and DCs (dendritic cells). Psoriasis vulgaris or chronic plaque psoriasis, is the most common form of psoriasis other forms of psoriasis include guttate psoriasis, pustular psoriasis, inverse psoriasis, erythrodermic psoriasis, and psoriatic arthritis [2, 3]. There are certain factors cause psoriasis include genetic factors, environmental factors and immune system. The main treatments used to treat psoriasis include topical agents, phototherapies, and systemic treatments including treatment with methotrexate, cyclosporine, retinoid and corticosteroids. But the main problem associated while using these drugs is they may lead to increased side effects. Usually herbal medicines are predominating over allopathic drugs in the treatment of skin diseases due to increased activity and lesser side effects [4].

Wrightia tinctoria

The focus on this review is to provide information on the phytochemicals, Ethno medicinal uses and Pharmacological activities of two medicinal plants (*Wrightia tinctoria*) and (*Cassia fistula*) commonly used in Indian traditional medicine for the treatment of psoriasis.

Wrightia tinctoria is a medium sized tree belonging to the family Apocynaceae commonly called as indrajao. It consists of simple opposite leaves with white flowers. The plant will produce milky white latex. Various parts of the plants like leaves, seeds are used for their anti-psoriatic, anti-helminthic, anti-diabetic, anti-oxidant, anti-cancer, antidiarrheal activities. In Ayurveda and siddha medicine the oil obtained after soaking the leaf in coconut oil is used to treat psoriasis and other skin diseases [5, 6].

Fig 1: *Wrightia tinctoria* Roxb. Plant

Taxonomical classification of *Wrightia tinctoria* Roxb [7]

Kingdom : Plantae
Subkingdom : Tracheobionta – vascular plants.
Super division : Spermatophyta - seed plants Division Angiospermae
Class : Magnoliopsida (Dicotyledonous)
Subclass : Rosidae
Order : Gentianales
Family : Apocynaceae

Vernacular names of *Wrightia tinctoria* Roxb [8]

Language Common names Sanskrit Shwetha kutaja, hyamaraka, stri kutaja English Ivory wood, pala indigo plant, dyer's oleander, Malayalam Dhandappala, ayyapala, vettupala Kannada Ajamara, kodamurki Tamil Vetpala virai, veppalai

Organoleptic characters of *Wrightia tinctoria* Roxb.

Taste: Pungent
Odour: No characteristic odour.
Colour: Pale green
Texture: Smooth

Ethno medicinal review

The oil extracted from the leaves of *Wrightia tinctoria* is mainly used for treating psoriasis. It can also be used to treat dandruff, itching, and scaling. Starting from the wood to flowers, seeds, fruits, bark everything has been used for variety of useful purposes. The indigo yielding glycosides are responsible for the production of blue dye. This blue dye will be formed as a result of soaking the leaf in coconut oil and this blue colored oil oozed out of from it is used in Ayurveda to treat skin diseases mainly psoriasis in decades. Aphrodisiac and anthelmintic properties are reported in the case of seeds. The leaves can be chewed with salt to relieve tooth ache. It also has analgesic, anti-inflammatory, anti-pyretic, anti-diabetic, hepatoprotective, anti-nociceptive, antibacterial, antifungal, antiviral, anti-cancerous, anthelmintic activities [8]. It is also known as jaundice curative tree because of the jaundice healing effect. It can also be used to treat abdominal pain and diarrhea [10, 5].

Phyto chemical review

Wrightia tinctoria mainly contains constituents such as steroids, triterpenoids, flavonoids, isoflavones, saponin etc. Various chemical constituents are isolated from different parts of the plant such as wrightial, cycloartenone, cycloeucalenol, indigotin, indirubin, isatin, rutin, βsitosterol, β-amyrin, wrigatiadione 3,4-seco-lup-20(29)-en-3-oic acid, stigma sterol, lupeol, campetosterol, tryptanthrin, isatin, anthranilate, α-amyrin, 14α-methylzymosterol. Ethanolic extracts from W. tinctoria leaf contains bioactive components such as 3-o-methyl-d-glucose (51.44%), squalene (16.52%), n-hexadecanoic acid (6.17%) phytol (4.47%), and 9,12 octadecadienoyl chloride (Z,Z)-(4.31%), Lupeol and Lupenone triterpenoid. Seeds of the plant contain 9-hydroxy-cis-12 octadecanoic acid (isoricinoleic acid), 9-hydroxy stearic acid, tri-isoricinoleoyl glycerol, di-isoricinoleoylglycerol, tri-isoricinoleoylglycerols, arachidic, linoleic, oleic, myristic, palmitic, and stearic acid, sterols-14-α-methyl zymosterol (1) desmosterol, clerosterol-24-methylene-25methyl-cholesterol, 24dehydropollina stanol, 24-methyl cholesterol, isoflavone-wrightiadione, 24-methylene cholesterol, 24-ethyl cholesterol and isofucosterol. The stem bark of the plant mainly contains constituents such as β-amyrin, lupeol, β-sitosterol, stigma sterol, campesterol and a triterpenoid, flavonoid, steroids, alkaloids and phenolics. The mature powdered pods of *Wrightia tinctoria* contain co-occurrence of β-amyrin, ursolic acid and olianolic acid along with β- sitosterol, terpene and wrightial. The Latex showed the protease - wrightin. The woody stem extract revealed the presence of lupeol, Stigma sterol and Campesterol11. Four uncommon sterols, desmosterol, clerosterol, 24-methylene-25-methylcholesterol, and 24-dehydropollinastanol, were isolated and identified in addition to several more common phytosterols. Tryptanthrin, isatin, anthranilate and rutin were isolated and identified [9, 11, 12, 13].

***Cassia fistula* L.**

Commonly known as Golden Shower Indan Laburnum is a medium sized deciduous plant belonging to the family Caesalpinaceae. It has been used in Ayurvedic system of medicine for various purposes. The main pharmacological activities includes hepatoprotective, anti-inflammatory, antioxidant, antifungal, antimicrobial, larvicidal, antipyretic, hypoglycemic and anti-psoriatic activities. The plant extract is also acclaimed as a pest and disease control agent in India and has a widespread acceptance across all over the world [16, 17].

Fig 2: *Cassia fistula* L. plant

Taxonomical classification of *Cassia fistula* Linn [18]

Kingdom	: Plantae
Subkingdom	: Tracheobionta
Super Division	: Spermatophyta Division Magnoliophyta
Class	: Magnoliopsida
Sub Class	: Rosidae
Order	: Fabales
Family	: Fabaceae
Subfamily	: Caesalpiniaceae
Genus	: Cassia
Species	: fistula

vernacular names of *Cassia fistula* Linn [18] Bengali amultash, sondal, sonali English golden shower, Indian laburnum Gujarati Girmala Hindi Bandarlathi, bharva, suvarnaka Malayalam Tengguli, rajah, konna Sanskrit Saraphala, survanaka, argwadha, rajtaru Tamil kavani, konnai, tirukontai, sarakkonne, Telugu Kakkemara Marathi Bahava Punjabi Amaltaas, Kaniyaar, Girdnale Oriya Sunaari Urdu Amaltaas Trade name Indian laburnum

Organoleptic characters of *Cassia fistula* Linn [19].
Taste: Sweet to astringent
Odor: Aromatic
Color: Yellowish to green
Texture: Smooth

Ethnomedicinal review
The root of the plant is used as astringent, tonic, febrifuge and strong purgative. The roots can also be used in the case of chest pain, joint pain, migraine and blood dysentery. It is also useful in the case of fever, heart diseases and cardiac disorders. It can also be used for various skin diseases. The stem bark can be used against amenorrhea, chest pain, and swellings. The bark also possesses tonic and anti-dysenteric properties. Extract obtained from the fruit and stem bark shows various activities like antipyretic, antioxidant, anti-inflammatory, antidiabetic, hepatoprotective, hypolipidemic, antimicrobial, antitumor, antiulcer etc. The leaves extract is used as laxative, emollient, insect bites, swelling, and rheumatism. The leaves are used in jaundice, piles, rheumatism, ulcers and externally for various skin purposes. The pulp of the fruit acts as mild purgative. The seeds are emetic, used in constipation and have cathartic properties. Seeds can be used for asthma. The drug is used as analgesic and antipyretic. Seed powder is used in amoebiasis. Seeds can also apply in blood poisoning, anthrax, and anti-dysenteric, leprosy and ant diabetic for the removal of abdominal obstruction. Fruits are used in the treatment of diabetes, antipyretic, abortifacient, demulcent lessens inflammation and heat of the body; useful in chest complaints, throat troubles, liver complaints, diseases of eye and gripping. The fruit pulp is used for constipation, colic, chlorosis and urinary disorders. The plant is used as a therapeutic agent in the treatment of hypercholesterolemia particularly their fiber and mucilage content. The plant has reported with its antibacterial action against *Escherichia coli*, *Bacillus mycoides*, *Bacillus subtilis*, and *Mycobacterium smegmatis* [20, 21, 22, 23].

Phytochemical review
Several chemical constituents with valuable medicinal uses are present in *Cassia fistula* plant. The chemical constituent present in seeds of *Cassia fistula* is terpenes, galactomannan, fatty acids, glycosides, aloin, barbaloin, flavone glycosides, anthraquinones, chrysophanein, glycerides metals, amino acids, hydrocarbons, chromones, flavonoids, alkaloids, sterols, alcohols, sucrose and proanthocyanidines. Ethanolic extracts of the plant shows the presence of compounds such as 4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-, 2 Furancarboxalde hyde, 5-(hydroxymethyl)-, 5-Acetoxymethyl-2-furaldehyde, Oleic Acid, Cholesta-4,6-dien-3-ol, (3b')-, Vitamin E, b'-Sitosterol, Cholest-5-en-3-ol, 24-propylidene-, (3b'). Pulp of the pod contains anthraquinone glycosides; sennosides A & B, resin and its glycoside, barbaloin, aloin, formic acid, butyric acid and their ethyl esters and oxalic acid, pectin and tannin is also reported. Seeds give galactomannan free sugars and free amino acids. Flowers show the presence of ceryl alcohol, kaempferol, resin and a bianthraquinone glycoside, fistulin [24, 25].
Leaves gave free resin, its glycosides; sennosides A & B. The pulp contains sugar, tannic matter, albuminous starch, oxalate of calcium and other important constituents. Leaves and flowers contain anthraquinone, tannin, oxy anthraquinone, resin and volatile oils. The plant contains resin glycoside, resin, fistulic acid, sennoside A & B. Aurantiamide acetate, β-sitosterol and its β D glycoside has been isolated from flowers. The roots contain 7methylphyscion, betulinic acid and β-sitosterol. The pulp contains sucrose, fructose, and glucose, and high concentration of potassium. Fruit pulp contained protein and carbohydrates; arginine, leucine, methionine, phenylalanine, tryptophan, aspartic and glutamic acids [25].
N. N. Barthakur *et al*. (1995) reported that the fruit was also a good source of Fe and Mn. Saturated and unsaturated oils are present. The major fatty acids found in the oil were linoleic

acid (42.42%), oleic acid (29.62%), stearic acid (14.33%) and palmitic acid (11.41%). In addition to the above, caprylic acid (0.76%) and myristic acid (1.44%) were also present in minor amounts. Lee *et al*. (2001)reported the presence of long-chain hydrocarbons, 1hexacosanol, 1-octacosanol, palmitic acid, stearic acid, oleic acid, linoleic acid, heptacosyl eicosanate, glyceryl-1-tetraeicosanoate; three sterols, beta -sitosterol, stigmasterol, beta sitosteryl-3-O-D-glucopyranoside; one triterpene, lupeol; eight anthraquinones, chrysophanol, emodin, physcion, citreorosein, rhein, rhein methyl ester, ziganein, 1,4,5- trihydroxyanthraquinone; two coumarins, isoscopoletin, scopoletin; two chromones, 2,5- dimethyl-7-hydroxychromone, 2,5-dimethyl-7-methoxychromone; three aromatic compounds, isovanillic acid, vanillic acid and 2,4 dihydroxybenzaldehyde were isolated and identified from the aril of *Cassia fistula*. O. Tzakou *et al*. (2007) reported the presence of flower oil and leaf oil and the main components of the flower oil were (E)-nerolidol (38.0%), and 2-hexadecanone (17.0%), while the leaf oil consisted mainly of phytol (16.1%). Farooq *et al* (1956) found that c. fistula seed contained certain fatty acids with following percentage like palmitic(16.0%), lignoceric (5.2%), oleic (30.7%) and linoleic(48.1%). El sayyad *et al* (1985) found that c.fistula seed oil is semi-drying in nature and contained too much fattyacids, waxes and hydrocarbons to be used for food. Misra *et al* (1997) isolated a new diterpene 3p-hydroxyl-17-norpimar-8(9)-en-5-one along with 26-methylheptacosanic acid from c.fistula pods. Sen and Shukia (1968) found that *Cassia fistula* stem bark is a potential source of lupeol, β-sitostereol and hexacosano [26, 20].

Conclusion

Psoriasis is a chronic recurrent inflammatory disease of autoimmune nature that will affect 1.5-2% of the population in western countries and 1.3% in general population usually characterized by abnormal keratinocyte hyper proliferation with erythematous plaques, covered by fine silvery scales. The situation is worsened by skin inflammation and itching. In this review article, a comprehensive study on ethno botanical uses, phytochemical constituents and pharmacological activities of two major anti-psoriatic plants namely, *Wrightia tinctoria* Roxb and *Cassia fistula* Linn have been done. This may have supreme importance in pharmacy and ethno herbal utility for psoriatic treatment. Plants and their extracts have immense potential for the management of psoriasis. Herbal medications are considered safer than allopathic medicines which are associated with side effects. These herbs have been selected by the traditional system and scientific justification with modern uses.

Acknowledgement

The authors express their sincere thanks to management and staffs of BCDA College of Pharmacy and Technology for giving all encouragement and valuable support to carry out this work.

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