



SIDDHA HERBAL FORMULATION KAMALAI KIYAZHAM- A DRUG REVIEW

M. Archana¹, T.Kavimani², Sreekala K.S³, S.Shankar⁴, M. D. Saravanadevi⁵

¹PG Scholar, ²PG scholar, ³PG scholar, ⁴Lecturer, ⁵Professor, Department of PG Gunapadam,
Government Siddha Medical College, Arumbakkam, Chennai-106, Tamilnadu, India.

ABSTRACT:

The *Siddha* system of medicine is considered as one of the traditional system in India and closely embedded in south Indian culture. In *Siddha* medicine there are 32 types of internal medicine and 32 types of external medicine. Among these, *Kiyazham* is one of the form of internal medicine. The aim of this drug review is to validate the *Siddha* herbal formulation **Kamalai Kiyazham** with scientific evidences. The medicinal uses and therapeutic actions of each ingredient used in this formulation matched with current research findings from various research publications. The ingredients present in this formulation are effective in the treatment of Kamalai (Jaundice). Based on the evidence on the *Siddha* literature and the modern scientific research studies provide keyhole for resulting the activities such as Hepatoprotective, Anti-inflammatory, Anti-viral, Analgesic that are mostly present in ingredients of *Kamalai Kiyazham* as evident from the review.

KEY WORDS: *Siddha* system, Kamalai kiyazham, Jaundice, Drug review,

1. INTRODUCTION:

The *Siddha* system of medicine is the unique system which contains various types of medicine both externally and internally used for treatment and management. The revival of interest in natural Drugs started in last decade mainly because of the wide spread belief that green medicine is healthier than Synthetic product.⁽¹⁾ Now-a-days, there is manifold increase in medicinal plant-based industries due to the increasing interest in the use of medicinal plants throughout the world which are growing at a rate of 7-15% annually. Despite the major advances in the modern medicine, the development of new drugs from natural products is still considered as important⁽²⁾. This work includes herbal, mineral, Herbo-mineral and metallic compositions used as medicine. Our *Siddha* system of medicine consists of Herbo-mineral medications of different formulations ranging from shorter shelf-life drugs to longer shelf-life drugs and also explains about 32 forms of internal medicines in *Siddha* text⁽³⁾. Kamalai(Jaundice) also known as icterus, is yellowish pigmentation of the skin and sclera due to high bilirubin levels. The most common symptoms of jaundice are yellowish discoloration of skin, tongue and conjunctiva, itchiness, pale faces and dark urine. The mortality rate Liver disease shows 2 million deaths per annum and it accounts for 4% of all deaths (across worldwide 1 out of every 25 deaths); approximately two-third of all liver-related deaths occur in men⁽⁴⁾.

Kiyazham is known with other names like Kudineer, kasayam. Kudineer chooranam is the one form of internal medicine in which drugs were purified and made into coarse powder by pounding method. The life span of Kiyazham is 3 hours, hence it will be effective only at freshly prepared state. Decoctions easily infuse and enter into blood circulation rather than any other medications. In order to prepare decoctions without difficulty in sourcing raw material, premixed coarse powder of the kudineer formulations are available as kudineer chooranam⁽³⁾. **Kamalai kiyazham** is a herbal formulation which contains seven ingredients mentioned in the Siddha Literature of Anubava vaithiya theva ragasiyam, (Page number: 382) for the treatment of **Jaundice** (*Kamalai*). Those 7 ingredients are Kadukkai thol (*Terminalia chebula*), Nellikkai (*Phyllanthus emblica*), Thandrikkai thol (*Terminalia bellarica*), Vembin pattai (*Azadiracta indica*), Nilavembu (*Andrographis paniculata*), Aadadhoda (*Justicia adatoda*), Seenthil kodi (*Tinospora cordifolia*)⁽⁵⁾. This review describes the description of the plant, chemical properties and pharmacological activities of each ingredient used in this formulation.

2.MATERIALS AND METHODS⁽⁵⁾:

Research Design: Literature Review

Literature collected from,

Siddha Literature: Anubava vaithiya theva ragasiyam

Page number: 382

Author: J.Seetharam prasath

Published by: B.Rathna nayakkar & sons, Thirumagal Achagam.

Year of Publication: 1991

Electronic data collection:

Literature searching in electronic databases such as Science Direct, Pub Med, Pub Med Cochrane and Google-Scholar for this study.

Ingredients of drug:

Ingredients of the drug:Table no:1

S.no	Ingredients	Botanical Name	Quantity
1	Kadukkai	<i>Terminalia chebula</i>	35 g
2	Nellikkai	<i>Phyllanthus emblica</i>	35 g
3	Thandrikkai	<i>Terminalia bellarica</i>	35 g
4	Vembin pattai	<i>Azadiracta indica</i>	35 g
5	Nilavembu	<i>Andrographis paniculata</i>	35 g
6	Aadadhoda	<i>Justicia adatoda</i>	35g
7	Seenthilkodi	<i>Tinospora cordifolia</i>	35 g

Drug Preparation⁽⁵⁾

All the drugs were authenticated by the GUNAPADAM experts and Botanist in Government siddha medical college, Chennai. All the drugs were dried and purified according to the classical Siddha literature. Then all the ingredients were coarse powdered (fig :1) and stored in an air tight container. 30g of prepared chooranam will be added with 240ml of water and heated at low flame till the water condensed to 30ml (fig :2).

**Figure:1****Figure :2**

Dosage: 30ml

Adjuvant: Honey

Indication: Kamalai (Jaundice)

3.DRUG REVIEW

3.1 KADUKKAI (*Terminalia chebula*)

**Figure:3** *Terminalia chebula*

Scientific Classification⁽²⁾

Kingdom : Plantae
Division : Phanerogams
Sub Division : Angiosperms
Class : Dicotylidenae
Subclass : Polypetelae
Series : Calyciflorae
Order : Myrtales
Family : Combretaceae
Genus : Terminalia
Species : Chebula

Distribution

Terminalia chebula (Combretaceae), commonly-known as chebulic myrobalan is one of the important Non-Timber Forest Product (NTFP) species which is harvested for its fruits and galls. The species known as the “**KING OF MEDICINES**” which is used widely in Ayurveda, Sidha, Unani and traditional Chinese medicines for curing a wide variety of diseases in Asia and Africa. *Terminalia chebula* is an important ingredient of Triphala along with *Terminalia bellirica* and *Phyllanthus emblica*⁽⁶⁾.

The tree is tall about 50-80 feet in height. It has round crown and spreading branches. The bark is dark brown with some longitudinal cracks. Leaves are ovate and elliptical, with two large glands at the top of the petiole. The flowers are monoecious, dull white to yellow, with a strong unpleasant odour, borne in terminal spikes or short panicles. The flowers appear May-June, the fruits July-December. The fruit or drupe is about 1-2 inches in size. It has five lines or five ribs on the outer skin. Fruit is green when unripe and yellowish grey when ripe. Fruits were collected from January to April, fruit formation started from November to January⁽⁶⁾.

Chemical constituents⁽⁷⁾:

The fruits of *T. Chebula* is rich in tannins (about 32%-34%). A group of researchers found 14 components of hydrolysable tannins (gallic acid, chebulagic acid, punicalagin, chebulanin, corilagin, ellagic acid, chebulinic acid, 1,2,3,4,6- penta-O-galloyl- β -D-glucose, 1,6-di-o-galloyl-D-glucose, 3,4,6-tri-o-galloyl-D-glucose, etc.,) from *T. Chebula* fruits. Flavonol, glycosides, triterpenoids, coumarin conjugated with gallic acids called chebulin as well as other phenolic compounds were also isolated.

Twelve fatty acids were isolated from *T. Chebula* of which palmitic acid, linoleic acid and oleic acid were main constituents. Triterpenoid glycosides such as chebulosides I and II, arjunin, arjunglucoside, 2 α -hydroxyursolic acid and 2 α -hydroxymircic acid also have been reported. The leaves were found to contain polyphenols such as punicalin, punicalagin, terflavins B, C, and D. The plant is found to contain phloroglucimol and pyrogallol, along with phenolic acids such as ferulic, p-coumaric, caffeic and vanillic acids.

Pharmacological activity⁽⁸⁻¹⁵⁾

Table no: 2 Pharmacological activity of *Terminalia chebula*

s.no	Pharmacological activity	Responsible compounds	Extracts	References
1.	Anti-oxidant	Ellagic acid, Ascorbic acid, gallic acid	Aqueous	8,9
2.	Anti-lipid peroxidation	Casuarinin, chebulanin, Chebulinic acid and 1,6-di-O-galloyl- β -D-glucose	Aqueous	10,11
3.	Anti-inflammatory	Chebulagic acid, chebulinic acid	Aqueous	12
4.	Hepatoprotective	chebulinic acid, ellagitannins	Aqueous	13,14
5.	Anti viral	Punicalagin, chebulagic acid, galloyl compounds	Methanolic	15

3.2 NELLIKKAI (*Phyllanthus emblica*)



Fig:4 *Phyllanthus emblica*

Scientific Classification⁽¹⁶⁾

Kingdom	: Plantae
Division	: Magnoliophyta
Class	: Magnoliopsida
Subclass	: Rosidae
Order	: Euphorbiales
Family	: Euphorbiaceae
Genus	: <i>Phyllanthus</i> L.
Species	: <i>Emblica</i>

Distribution

Phyllanthus emblica is widely distributed in most tropical and subtropical countries including India, China, Indonesia, Burma, and on the Malay Peninsula. It is native to tropical southeastern Asia, particularly in central and southern India, Nepal, Pakistan, Bangladesh, Bhutan, Sri Lanka, and the Mascarene Islands.^(16,17)

Amla is a small to medium sized fruity tree and 8-18 meters height with thin light grey bark exfoliating in small thin irregular flakes, leaves are simple, subsessile, closely set along the branchlets, light green having the pinnate appearance. The flowers are greenish yellow, unisexual. The fruit is nearly globose, quite smooth, fleshy and hard on appearance with six vertical stripes or furrows. The fruits ripen in autumn. It is sour, bitter and astringent in taste and quite fibrous.^(18,19)

Chemical constitution⁽²⁰⁾

Hydrolyzable tannins are the major bioactive components of the fruits. Mucic acid gallate, mucic acid lactone gallate, monogalloylglucose, gallic acid, digalloylglucose, putranjivain A, galloyl- HHDP-glucose, elaeocarpusin, and chebulagic acid are the most abundant hydrolyzable tannins.

Phytochemical investigations on *Phyllanthus emblica* have resulted in the isolation of the two new flavonoids, kaempferol-3-O-a-L-(6''-methyl)-rhamnopyranoside (1) and kaempferol-3-O-a-L-(6''-ethyl)-rhamnopyranoside (2). Their structures were determined on the basis of extensive spectroscopic studies including 2D-NMR experiments.

Chemical investigation of the fruits of *Phyllanthus emblica* led to the isolation of one new aryltetralin-type lignan (1), along with twelve known polyphenols (2-13). Their structures were determined via extensive analyses of spectroscopic data and comparison with the reported literature values. Among them, polyphenols 1, 6, 7, and 10 were isolated from the family Euphorbiaceae for the first time.

Pharmacological activity⁽²¹⁻²³⁾

Table no: 3 Pharmacological activity of *Phyllanthus emblica*

S.no	Pharmacological activity	Part used	Responsible compounds	Extracts	References
1.	Analgesic activity	Fruit	Tannins, alkaloids, phenolic compounds	Aqueous	21
2.	Anti- inflammatory	Fruit		Aqueous	22
3.	Anti-oxidant	Fruit		Aqueous	22
4.	Hepato-protective	Fruit		Aqueous	23
5.	Cardioprotective	Fruit		Aqueous	23

3.3 THANDRIKKAI THOL (*terminalia bellarica*)



Figure:5 Terminalia bellarica

Scientific classification⁽²⁴⁾:

Kingdom : Plantae

Order : Myrtales

Family : Combretaceae

Genus : Terminalia

Species : bellirica

Distribution

T. belerica also referred to as, Beleric Myrobalan in English, Bibhitaki in Sanskrit, Locally known as Bahera in India, has been used for centuries in the Ayush, a holistic system of medicine originating from India. The dried fruit used for medicinal purposes. It is found growing wild throughout the Indian subcontinent, Sri Lanka, and SE Asia, upto 1200 meters in elevation, in a wide variety of ecologies. It is a large deciduous tree with a buttressed trunk, a thick brownish gray bark with shallow longitudinal fissures, attaining a height of between 20 and 30 meters. The leaves are crowded around the ends of the branches, alternately arranged margins entire, elliptic to elliptic- obovate, rounded tip or sub acute, midrib prominent, pubescent when young and becoming glabrous with maturity. The flowers are pale greenish yellow with an offensive odor, borne in

axillary spikes longer than the petioles but shorter than leaves. The fruits are ovoid grey drupes, obscurely 5-angled, narrowed into a very short stalk^(24,25,26).

Chemical constitution

Glucoside (bellericanin)⁽²⁷⁾, Gallo-tannic acid, Coloring matter, resins and a greenish yellow oil. Ellargic acid, gallic acid, lignans (termilignan and thanni lignan), 7-hydroxy 3'4' (methylene dioxy) flavone and anolignan B. Tannins, ellargic acid, ethyl gallate, galloyl glucose and chebulaginic acid, phenyllembelin, β -sitosterol, mannitol, glucose, fructose and rhamnose^(28,29)

Pharmacological activity^(30,31,32)

Table no: 4 Pharmacological activity of Terminalia bellarica

S.no	Pharmacological activity	Parts used	Responsible compounds	Extracts	Reference
1.	Hepato-protective	Fruits	Gallic acid	Aqueous	30
2.	Anti-hypertensive	Fruits	Gallic acid	Crude extract	31
3.	Analgesic	Fruits	Gallic acid	Aqueous	32

3.4 VEMBIN PATTAI (*Azadiracta indica*)



Figure:6 *Azadiracta indica*

Scientific classification⁽³³⁾

Kingdom : plantae

Order : Geraniales

Family : Meliaceae

Genus : Azadirachta

Species : A.indica

Distribution

Neem is one of the fast growing and multipurpose medium sized tree, that can reach height upto 30m, with wide spread branches. It is generally evergreen but occasionally shed its leaves during winter season. It has a deep taproot and grey color bark which gets fissured and flakes in old. A sticky, brown orange exudates from old tree trunk in humid climates. The leaves of neem are alternate, petiolate, at the end of branches it is clustur, unsimilar pinnate, glabrous and dark green when mature, 18-42 cm in length and having 8-20 leaflets. The leaflets are 6- 12cm in length and 2-4cm in wide, marginally denticulated. Starting of summer, the tree is usually covered by delightful white color flowers. The flowers are numerous, aromatic and they are commonly more or less drooping panicles which are around 20 cm in length. Neem fruits are spherical, smooth, green in unripe changing to yellow to brown when mature. They have a bitter taste and 1-2 cm diameter in size with a skinny epicarp, a mucilaginous fleshy mesocarp and a strong endocarp. It consists of a number of ovoid oil seeds having 1-2 cm diameter. Oil is collected by compressing kernel in the compressor. It normally starts produce fruit from three to four years^(34,35).

Chemical constituents

Azadirachta indica have loaded sources of several variety of ingredients that shows the therapeutic effect. About sixty different constituents were isolated from neem leaf and most of them are chemically characterized. Among them 35 are biologically active compounds. Among of them some vital active constituents are azadirachtin, nimbinolin, nimbidin, gedunin, nimbidol, quercetin, nimbin, sodium nimbinate, galic acid, salannin, etc. Leaves of neem have ingredients like nimbin, nimbanene, hyperoside, kaempferol, myricetin, chlorogenic acid, scopoletin, valasinin, nimbandiol, nibiol, zafaral, nimbolide, 17-hydroxyazadiradione, ascorbic acid and amino acid, 6-desacetylnimbinene, 7-desacetyl- 7-benzoylazadiradione, n- hexacosanol etc. Nimbin is isolated by indian chemists as a bitter pain reliever from neem oil and later crystalized from neem leaf^(34,36).

Pharmacological activity:

Table no: 5 Pharmacological activity of *Azadirachta indica*

S.No	Pharmacological activity	Part used	Responsible compounds	Extracts	References
1	Hepatoprotective	Stem bark	Azadirachtin ,Flavonoids	Aqueous	37,38
2	Anti cancer activity	Stem bark	Azadirachtin ,Flavonoids	Aqueous	39,40
3	Anti inflammatory	Stem bark	Azadirachtin ,Flavonoids	Aqueous	41
4	Anti oxidant	Stem bark	Azadirachtin ,Flavonoids	Methanolic extract and chloroform extract	42
5	Anti Diabetic	Stem bark	Nimbidin,Nimbolide, Azadirachtin	Methanolic extract and chloroform extract	43

3.5 NILAVEMBU (*Andrographis paniculata*)



Figure:7 *Andrographis paniculata*

Scientific Classification ⁽⁴⁴⁾

Kingdom : Plantae

Division : Angiosperms

Class : Dicotyledonae

Order : Personales

Family : Acanthaceae

Genus : *Andrographis*

Species : *A. Paniculata*

Distribution

It is an annual, branched, herbaceous plant erecting to a height of 30-110 cm in moist shady places with stem acutely quadrangular, much branched, easily broken, fragile texture stem. Leaves are simple, opposite, lanceolate, glabrous, 2-12cm long; 1-3cm wide with margin acute and entire or slightly undulated and upper leaves often bractiform with short petiole. Inflorescence of the plant is characterized as patent, terminal and axillary in panicle, 10-30 mm long; bract small; pedicel short. The flowers possess botanical features of calyx 5-partite, small, linear; corolla tube narrow, about 6 mm long; limb longer than the tube, bilabiate; upper lip oblong, white with yellowish top; lower lip broadly connate, 3-lobed, white with violet markings; stamens 2, inserted in the throat and far exserted; anther basally beared. Superior ovary, 2-celled; style far exserted. Capsule of the plant is erect, linear-oblong, 1-2 cm long and 2-5 mm wide, compressed, longitudinally furrowed on broad faces, acute at both ends, thinly ⁽⁴⁴⁾

Chemical constituents

Chemical investigation of the dichloromethane extracts of *Andrographis paniculata* (Burm. F.) Nees led to the isolation of andrographolide (1), 14- deoxyandrographolide (2), 14-deoxy-12- hydroxyandrographolide (3), a mixture of β - sitosterol (4a) and stigmasterol (4b) in a 3: 1 ratio, and chlorophyll a (5) from the leaves; a mixture of 4a and 4b in a 3: 2 ratio, 5, 2'- dihydroxy-7, 8-dimethoxyflavone or skullcapflavone I (6), and a mixture of long chain trans-cinnamate esters (7a) and β sitosteryl fatty acid esters (7b) from the roots; 4a, monogalactosyl diacylglycerols (8), lupeol (9), and triacylglycerols (10) from the pods; and 2 from the stems⁽⁴⁴⁾.

Pharmacological activity:

Table no: 6 Pharmacological activity of *Andrographis paniculata*

S.no	Pharmacological activity	Part used	Responsible compounds	Extracts	References
1	Anti cancer activity	Whole plant	Azadirachtin, Flavonoids	Methonolic extract	46
2	Immunostimulatory	Whole plant	Azadirachtin, Flavonoids	Methanolic extract	46
3	Anti inflammatory	Whole plant	Nimbidin, Nimbolide	Methanolic extract	47

3.6 JUSTICIA ADHATODA



Figure:8 Justicia adhatoda

Scientific Classification

Kingdom : plantae

Order :Personales

Family :Acanthaceae

Genus : Justicia

Species :J.adhatoda

Plant Description⁽⁴⁸⁾

The plant can be found growing throughout the Indian peninsula up to an elevation of 1300 metres (m), as well as in Nepal, Pakistan, Myanmar, Sri Lanka, and Germany. It typically thrives in waste areas, frequently close to villages, and frequently as a weedy hedge plant. It is a small to medium-sized shrub with opposite ascending branches. The leaves are simple, opposite, and measuring 7-19 cm long by 4-7 cm wide. The blossoms have a distinctive odor and harsh flavor and are either white, pink, or purple. A transverse section of the leaves revealed diacytic stomata and two layers of palisade cells. There are trichomes present on both grandular and nongrandular surfaces of leaves. The flowering season in central India lasts from December to March, and the fruit- bearing season is from January to April.

Temperament: Warm and dry in the first degree

Taste: Bitter taste

Colour: Leaves are dark green above and pale yellow below, flowers are white.

Odour: Unpleasant smell.

Chemical Constituents⁽⁴⁹⁾

It contains phenols, Flavonoids, saponins, tannins, anthraquinones, amino acids, reducing sugars, triterpenes, vasicolinone, vasicol, anisotine, steroids, betaine, 7-hydroxyvasicine, quinazoline, alkaloids vasicine, 3-deoxyvasicine, steroids, carbohydrate and alkanes.

Pharmacological activity

Table no:7 Pharmacological activity of *Justicia adhatoda*

s.no	Pharmacological activity	Part used	Responsible compounds	Extracts	References
1	Anti cancer activity	Leaves	vasicolinone, vasicol	Methanolic extract	50
2	Immunity booster	Leaves	vasicolinone, vasicol	Methanolic extract	48
3	Anti oxidant	Leaves	Anisotine	Methanolic extract	51

3.7 SEENTHIL KODI (*Tinospora cordifolia*)



Figure :9 *Tinospora cordifolia*

Scientific Classification⁽⁵²⁾

Kingdom: Plantae

Division: Spermatophyta

Class: Magnoliopsia

Order: Ranales

Family: Menispermaceae

Genus: *Tinospora*

Species: cordifolia

Plant distribution⁽⁵²⁾:

The plant is distributed throughout the tropical and subtropical regions of India. It is indigenous to areas of India, Sri Lanka, China, Myanmar, Thailand, Philippines, Indonesia, Malaysia, Vietnam, Bangladesh and South Africa. The plant is very rigid and it can be grown in almost all climates but prefer warm climate. Planting is usually done during rainy season (July-August). It can be successfully grown in all variety of soils. For cultivation purpose medium black or red soil can prefer. *Tinospora cordifolia* is a large, deciduous, extensively spreading and climbing shrub with several elongated twining branches.

Chemical Constituents⁽⁵³⁾

Tinospora cordifolia belong to different classes of constituents such as alkaloids, diterpenoid, lactones, glycosides, steroids, sesquiterpenoid, phenolics, aliphatic compounds and polysaccharides etc.

Pharmacological activity

Table no :8 Pharmacological activity of *Tinospora corifolia*

S.no	Pharmacological activity	Part used	Responsible compounds	Extracts	References
1	Hepatoprotective	Climber\ Root stem	syringin cordial	Aqueous	54
2	Hypolipidemic activity	Climber\ Root stem	syringin cordial	Aqueous	54

4. RESULT AND CONCLUSION

Through this extensive review on recent research reports maximum scientific validation has been carried out on various pharmacological actions and therapeutic benefits of each ingredient of Kamalai kiyazham. The ingredients present in this formulation have effective in the treatment of Jaundice(kamalai). Based on the evidence of Siddha literature and the modern scientific research studies also provide keyhole which results in hepatoprotective, anti-inflammatory, Anti-viral, Anti-cancer, Analgesic activities that are mostly present in the ingredient of Kamalai kiyazham as evident from the current review. Thus further research publications on preclinical and clinical evaluation is the need of the hour for their wide spread acceptance among public and scientific community.

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