

INTERNATIONAL JOURNAL OF CURRENT RESEARCH IN CHEMISTRY AND PHARMACEUTICAL SCIENCES

(p-ISSN: 2348-5213; e-ISSN: 2348-5221)

www.ijcrpcps.com

DOI: 10.22192/ijcrpcps

Coden: IJCROO(USA)

Volume 6, Issue 5 - 2019

Review Article

DOI: <http://dx.doi.org/10.22192/ijcrpcps.2019.06.05.004>

Therapeutic Efficacy of Siddha formulation Gandhi Mathirai – A Drug Review

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Abstract

Siddha system is a traditional medicine originated from south India. In this system medicines are predominantly prepared from herbs, mineral, hydro chemicals, arsenic, animal products. Gandhi mathirai is a herbomineral formulation prescribed in siddha System of medicine. Gandhi mathirai has mineral and different herbs, which possess therapeutic efficacy and numerous chemical constituents like phenols, tannin, and flavonoid. Most of the constituents have wound healing property, Anti-inflammatory, Anti-diabetic activity etc. This review is aimed to reveal the scientific validation and pharmacological activities of the constituents of *Gandhi mathirai*.

Keywords: Gandhi mathirai, Wound healing, Anti-inflammatory, Anti-diabetic.

Introduction

Siddha medicine appears as a part of Tamil culture noticed in ancient Tamil literature. The Siddha system of medicine is a complex system of science as it has treatises on medicine, alchemy and an extensive set of pharmacopoeia. It has its own fundamental principles of therapy and pharmaceuticals with specialization in iatrochemistry well before the development of modern science.^[1] *Gandhi mathirai* is a herbo mineral preparation, mentioned in various siddha texts with different preparation methods. This

preparation is referred from siddha text *Agathiya Vaithya Sindhamani* and indicated for Viranam (ulcer). Ingredients of Gandhi mathirai are *Ganthagam* (Sulphur), *Kadukkai* (*Terminalia chebula*), *Karunei kizhangu* (*Typhonium trilobatum*), *Kaatu pagal* (*Momordica dioica*) and *Sembai* (*Sesbania sesban*). This review article focuses on scientific evidence of each drug has wound healing, Anti-inflammatory activity and anti-diabetic activity. The anti-diabetic activity of the drug was reviewed as the author has used this medicine in the management of diabetic ulcer in the clinical study.

Standard operative procedure for Gandhi mathirai

Table-1 Ingredients of Gandhi mathirai^[2]

S. No	Ingredients	Parts used	Quantity
1.	Ganthagam	-	10 gms
2.	Kaatu Pagal	Fruit	10 gms
3.	Kadukkai	Fruit	10 gms
4.	Karunai Kizhangu	Tuber	10 gms
5.	Sembai	Leaf juice	100 ml

Table - 2 Information of Gandhi mathirai

S. No	Botanical name	Family	Tamil name	English name	Hindi name	Sanskrit name
1.	<i>Momordica dioica</i>	Cucurbitaceae	Kaatu pagal	Bitter gourd	Dhar-karela	Kagi-gala
2.	<i>Terminalia chebula</i>	Combretaceae	Kadukkai	Ink nut/chebulic myrobalan	Pile hara	Pathya, sudha, bhishak, priya, haritaki etc.
3.	<i>Typhonium trilobatum</i>	Araceae	Karunei kizhangu	Elephant foot yam	Jangli suran	Arsoghna-kunda
4.	<i>Sesbania sesban</i>	Fabaceae	Sembai	Egyptian river hemp	Jetrasin	Jayantika

Table-3 Chemical constituents of Gandhi mathirai

S. No	Ingredients	Botanical name	Chemical constituents/phyto chemical
1.	Ganthagam	-	-
2.	Kaatu Pagal	<i>Momordica dioica</i>	Calcium, iron, zinc, manganese, iodine, chromium, phytic acid, total phenolic compound, alkaloids, flavonoids, steroids, triterpenoids, saponins, riboflavin, niacin, Lectins, -sitosterol, saponin glycosides, ursolic acid
3.	Kadukkai	<i>Terminalia chebula</i>	palmitic acid, stearic acid, oleic acid, linoleic acid and anthroquinone derivatives, tannic acid, gallic acid, Gallic acid, chebulanin. chebulic acid, chebulanin, chebuloside II, terminolic acid,
4.	Karunai Kizhangu	<i>Typhonium trilobatum</i>	proteins and inorganic substance Ca, P, I, Fe, Na, K; thiamine, niacin, carotene, folic acid sterols and beta sitosterol
5.	Sembai	<i>Sesbania sesban</i>	Oleanolic acid, beta-D-galactopyranoside, saponin, anthocyanidins. triterpenoids, starches, vitamins, amino acids, proteins, tannins, saponins glycosides and steroids. Blossoms contain cyanidin Alpha-ketoglutaric, oxaloacetic and pyruvic acids. ampesterol cholesterol, beta-sitosterol, triterpenoids, proteins and tannins glucose, fructose, erythryol, arabinitol, myo-inositol.

Collection and authentication of herbal drugs

The mineral raw drugs were identified and authenticated by Lecturer, Department of Gunapadam, National Institute of Siddha. The Herbal raw drugs were identified and authenticated by Assistant professor, botanist, National Institute of Siddha.

Purification Of Raw Drugs

All the ingredients are purified as per Siddha literature.^[3]

Preparation of the drug:

All the mineral and herbal raw drugs were purified separately and grind together with *sembai* leaf juice. The mixture was made into small pills of 65 mg each.

Gandhagam

English name : Sulphur

Other name : *Kaarizhain natham, Parai veeriyam, Athitha piragasam, Selvi vinthu, Sakthi, sakthipeesam, Senthooranthathi, Thanam, Deviuram, Natham, Parai natham, Ponvarni, Rasa suronitham.*^[4]

Organoleptic character

Taste	: Kaippu, Thuvarpu
Potency	: Veppam, Thatpam
Action	: Cholagogue, laxative, alterative, diaphoretic, anti-septic

Pharmacological activities of Gandhi Mathirai

Momordica dioica

The antioxidant activities of methanol and aqueous extract of fruits were analyzed and the presence of phenolic compounds, flavonoids, sterol, alkaloids, amino acids, and so forth, were found.^[5] Among those compounds, due to the presence of flavonoids, its fruit was reported as a potent antioxidant.^[6] Anti-diabetic specifically oral hypoglycemic effects of *Momordica dioica* in rat model was screened by Fernandopulle et al.^[7] Gupta et al. investigated the antidiabetic and renal protective effect of *Momordica dioica* methanolic extract (MDMtE) in streptozotocin-treated diabetic rats. Evaluated hexane and methanolic extract of fruit pulp mediated, anti-inflammatory activities.^[8] Reddy et al. and Singh et al. showed aqueous, chloroform, ethyl acetate and ethanolic extract of fruit mediated anti-diabetic activity in alloxan induced experimental rats.^[9,10] Iango et al. evaluated both hexane extract and methanolic extract of fruit pulp mediated anti-inflammatory activities.^[11] The anti-inflammatory effect of the alcoholic extract of root was evaluated during CCl₄ induced hepatotoxicity.^[12]

Typhonium trilobatum

Ethanol extract of *Typhonium trilobatum* roots has antioxidant activity. Xylene-induced ear edema in rats was used to assess anti-inflammatory activity of the plant extract.^[13] The ethanolic leaf extract of *T. trilobatum* shows analgesic activity using acetic acid-induced writhing method.^[14] Tithi et al. showed methanolic extract of *Typhonium trilobatum* has maximum DPPH free radical scavenging capacity.^[15] Sourav kanti roy et al, showed methanolic, ethyl acetate were found greater wound healing activity than chloroform extracts in terms of breaking strength in incision model.^[16]

Terminalia chebula

The extract of *Terminalia chebula* shows broad spectrum activity.^[17] Ethanolic extract of *Terminalia chebula* showed antimicrobial activity against methicillin-resistant *Staphylococcus aureus*.^[18] It has stronger antioxidant activity than alpha-tocopherol.

HPLC analysis with diode array detection indicated the presence of hydroxybenzoic acid derivatives, hydroxycinnamic acid derivatives, flavonol aglycones and their glycosides, as main phenolic compounds.^[19] The chloroform extract of *Terminalia chebula* seeds produced dose-dependent reduction in blood glucose of diabetic rats compared with standard drug glibenclamide in both short and long term study.^[20] *T. chebula* showed improvement to stimulate fibroblast function, enhance synthesis of glycosaminoglycans and deposition of collagen. Thus, it offers a distinct advantage to wound healing.^[21]

Sesbania sesban

The antioxidant activity of the *Sesbania sesban* acidified methanol extract showed high scavenging activity of 84% at lower concentration (1mg) along with the standard BHT (37.65%) and Ascorbic acid is considered as the positive control.^[22] The aqueous leaves extract of *Sesbania sesban* was evaluated for its anti-diabetic potential on normal and streptozotocin (STZ)-induced diabetic rats. Anthocyanins from *Sesbania sesban* flower petals exhibited a dose dependent free-radical scavenging activity against DPPH radical, superoxide anions and hydroxyl radical.^[23] Rajpal et al., 2006 Powdered leaves of *Sesbania sesban* was extracted by successive extraction in Soxhlet apparatus using petroleum ether and methanol as a solvent. The solvent was removed under vacuum by rotary evaporation, producing dry extracts. The methanol extract was further fractionated with butanol: water (1:1) proportion to get butanol extract which was precipitated in solvent ether to get crude saponins (SAP). Payal R. Dande et al shows the effect of crude saponin gel formulation (1% and 2%) with respect to positive and negative control. It was found that the crude saponin gel at a concentration of 2% has shown significant decrease in the paw volume when compared to control group. The percent decrease in paw volume shown by saponin gel 2% was comparable to the standard drug.^[24]

Conclusion

From this literature review it is evident that the ingredients of *Gandhi mathirai* has pharmacological activities like anti-bacterial, analgesic and anti-inflammatory activity, anti-oxidant activity, anti-diabetic activity which are responsible for its therapeutic potency claimed in siddha literatures.

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Quick Response Code	
DOI: 10.22192/ijcrcps.2019.06.05.004	

How to cite this article:

R. Vidhya, V. Mahalakshmi, N. J. Muthukumar. (2019). Therapeutic Efficacy of Siddha formulation Gandhi Mathirai – A Drug Review. Int. J. Curr. Res. Chem. Pharm. Sci. 6(5): 13-17.
DOI: <http://dx.doi.org/10.22192/ijcrcps.2019.06.05.004>