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REVIEW ARTICLE

An In-Depth Literary Review on the Role of *Sigru* in Ayurveda

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ABSTRACT

Introduction: *Sigru* (*Moringa oleifera* Lam., family Moringaceae) is the most accepted and beneficial medicinal plant in the traditional system of medicine for the treatment of various critical diseases and disorders and commonly found in Asian countries. Therefore, the detailed literature review of *Sigru* and its formulations mentioned in Ayurvedic classics is crucial in present era.

Aims: The aim of the study was to evaluate the therapeutic potential of *Sigru* by assimilating ancient and modern medical knowledge.

Materials and Methods: All information is collected from various classical Ayurvedic textbooks, including *Samhitas* and *Nighantus,* as well as various other literature and publications.

Results and Discussion: Different literatures revealed that this plant has numerous health benefits and is traditionally used in the treatment of various diseases. From different studies, we found that different parts of *Sigru* contain numerous phytoconstituents (Moringine, moringinine, indole acetic acid, sterols, terpenes, amino acids, glutamic acid, etc.) and have anti-oxidant, anti-inflammatory, anti-microbial, metabolic and hypolipidemic effects.

Conclusion: As we got detail information regarding *Sigru* form various classical literatures, we can come into conclusion that *Sigru* is one of the most effective drug use to treat various different human disorders, which is also supported by various modern literatures based on research.

1. INTRODUCTION

The traditional system of medicine is based on presumptions, beliefs, and experiences to protect health problems. The traditional health system uses plant-based medicines which are easily available, safe, cost-effective, and efficient, with fewer side effects. The present global demand toward the use of safe, effective, and cheaper plant based medicine for the treatment of various diseases and health problems has increased, which creates a tremendous need for an up to date and accurate information on the properties, uses, efficacy, safety and quality of medicinal plant products. Therefore, the detailed literature review of *Sigru* and its formulations mentioned in Ayurvedic classics is crucial in the present era. *Sigru* is the most accepted and beneficial medicinal plant in the traditional system of medicine for the treatment of various critical diseases and disorders. It has anti-inflammatory, and has been used in Swelling, pain, and joint discomfort. It has also been used for the treatment of various diseases like inflammation, joint pain, skin disorders, worm infestation, and to maintain good health. Photographs are provided for easy identification of this important plant in the field.

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1.1. Aim

The aim of this study is to evaluate the therapeutic potential of *Sigru* by assimilating ancient and modern medical knowledge.

2. MATERIALS AND METHODS

All information regarding *Sigru* is collected from various classical Ayurvedic textbooks, including *Samhitas* and *Nighantus,* as well as various other literatures and publications.

2.1. Botanical Name[1]

Moringa oleifera Lam.

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2.2. Family

Moringaceae.

2.3. Vernacular Names

Sanskrit: *Sobhanjana*, *Bahola*, *Sakhapatra*

Bengali: *Sajina*, *Sajne*

English: Horse Radish Tree, Drum-stick Tree

Gujrati: *Saragava*

Hindi: *Sahijana*

Kannada: *Nugge*, *Nuggemara*, *Nuggekoyimara*

Malayalam: *Muringya*, *Murinna*

Marathi: *Shewga*

Punjabi: *Sohajana*

Tamil: *Murungai*

Telugu: *Munaga chettu*, *Mulaya chetta*

Urdu: *Sahajan*, *Sohanjana.*

Table 1 represents the various synonyms given by different *Acharyas* in Different *Nighantus* belonging to different time periods. Some of the most common synonyms used by the *Acharyas* are *Sobhanjan*, *Tikshnagandha,* and *Tikshnamula*. The maximum number (total 13) of synonyms was mentioned by "*Raj Nighantu*" (Table 2).

2.4. Botanical Description

A small or medium-sized tree, growing up to 10 m. Bark- corky, soft, thick, deeply fissured. Wood is soft. Leaves- tripinnate, 30.5–61.0 cm long; leaflets ellipticits flowers are bisexual, irregular, fragranted, white, and find in large panicles. Fruits- pod, triangular, ribbed, pendulous, greenish, 22.5–50.00 cm or more in length. Seeds – trigonous, winged (flowers in February-March and fruits in March- April), Figure 1.

2.4.1. Distribution

Indigenous to northwest India. Frequently cultivated all over India.

2.5. Part Used

Root, bark, leaf, and seed.

2.6. Chemical Constituents

The plant contains 4. hydroxymellein, vanillin, moringine, moringinine, bayrenol, indole acetic acid, indole acetonitrile, benzylisothiocyanate, pterygospermin, carotene, known flavonoids, polysaccharide, protein components, various essential amino acids, minerals and vitamins, fatty acids, and spirochin. Pterygospermin was found to be an antibiotic principle.

2.7. Ayurvedic Properties

Rasa: *Katu*, *Tikta*

Guna: *Laghu*, *Ruksha*, *Tikshna Vipak*: *Katu*

Virya: *Ushna.*

Summarizing the *Rasapanchak* mentioned by the various *Nighantukaras,* it can be concluded that Sigru has *Katu*, *Tikta rasa*, *Laghu*, *Ruksha gunas*, *Ushna virya,* and *Katu Vipaka* (Table 3).

2.8. *Matra*

Bark juice- 10–20 mL; Leaf juice- 10–20 mL; Seed powder- 1–3 g.

2.9. *Karma*[2]

Dosakarma: Kapha-vata shamak

Sharirakarma: Dipan, *Pachan*, *Vidahi*, *Grahi*, *Sulaprasaman*, *Krimighna*, *Artav jannan*, *Vishaghna*, *Swedajanan*, *Kusthaghna*, *Jwaraghna*

Vyadhikarma: Aruchi, *Agimandya*, *Udarsula*, *Gulma*, *Krimiroga*, *Medoroga*, *Sandhivata*, *Amavata*, *Kasa*, *Mutrakrichha*, *Charma roga*, *Shita jwar*, *Pakshaghat*, *Ardita.*

2.10. Indications

Digestive, carminative, anthelmintic, constipating, anti-inflammatory, diuretic, ophthalmic, expectorant, hematinic, antilithic, dyspepsia, anorexia, diarrhea, colic, flatulence, otalgia, paralysis, inflammations, amenorrhea, dysmenorrhea, fever, cough, asthma, bronchitis, pectoral diseases, splenomegaly, epilepsy.

2.11. Pharmacological Activities

The plant *M. oleifera* possesses broad pharmacological activities. Some of them are discussed below.

2.11.1. Antioxidant activity[3]

Aqueous and alcoholic extracts (methanolic and ethanolic) of leaves and roots of *M. oleifera* exhibit strong *in vitro* anti-oxidant and radical scavenging activity. Its leaves are rich source of antioxidant compounds; they could protect animals against diseases induced by oxidative stress. Administration of *M. oleifera* leaves extract seems to prevent oxidative damage caused by a high-fat diet.

2.11.2. Antiepileptic activity[4]

Methanolic extract of *M. oleifera* leaves exhibits potent anti-convulsant activity against pentylenetetrazole and maximal electroshock-induced convulsions at the dose levels of 200 mg/kg and 400 mg/kg administered intraperitoneally. Diazepam and phenytoin were used as reference standard. Methanolic extract significantly delayed the onset of seizures in Ptz-induced convulsions and significantly reduced the duration of hind limb extension in the Maximal Electroshock (MES) test at both dose levels. This may be because of the presence of alkaloids, flavonoids and tannins present in the extract.

2.11.3. Anti-diabetic activity[5]

Aqueous extract of *M. oleifera* leaves shows anti-diabetic activity and controls diabetes and thus exhibits glycemic control.

The investigation of *in vitro* antioxidant and *in vivo* antidiabetic effects of methanol extracts of *M. oleifera* pods in streptozotocin (STZ)-induced diabetic albino rats was performed. Diabetic rats were treated with 150 or 300 mg/kg of extract for 21 days, and the antidiabetic effects were evaluated by measuring changes in biochemical parameters in serum and pancreatic tissue. The progression of diabetes was significantly reduced after treatment with the extract. In treated rats, both doses of extract induced a significant reduction in serum glucose and nitric oxide, with concomitant increases in serum insulin and protein levels.

The antidiabetic activity of two doses of *Moringa* seed powder 50 and 100 mg/kg on STZ induced diabetes male rats was investigated. The diabetic positive control group showed increased Interleukin-6,

increased lipid peroxide, and decreased antioxidant enzyme in the serum and kidney tissue homogenate compared with that of the negative control group.

2.11.4. Cardiovascular activity[6]

Ethanolic extract of *M. oleifera* leaves showed prominent antihypertensive or hypotensive activity. The *in vivo* activity was done in an animal's heart, and it was found that thiocarbamate and isothiocyanate glycosides were responsible for this powerful hypotensive activity.

2.11.5. Anti-fertility activity

Aqueous extract of *M. oleifera* roots was found to be effective as anti-fertility in presence or absence of estradiol dipropionate and progesterone. The *in vivo* antifertility activity and histopathology study was done using aqueous extract to investigate the effect on histoarchitecture of the uterus during pre- and post–implantation stages.

2.11.6. Antiurolithiatic activity

The *in vitro* anti-urolithiatic activity was performed in aqueous and alcoholic extracts of bark of *M. oleifera*. It showed a reduction in the weight of stones produced using ethylene glycol-induced urothiasis. It also possesses both preventive and curative property.

2.11.7. Anti-asthmatic activity

A study was carried out to investigate the usefulness of *M. oleifera* seed kernel in patients of bronchial asthma. The patients of either sex with mild-to-moderate asthma were treated with finely powdered dried seed kernels in a dose of 3 g for 3 weeks. The clinical efficacy was assessed using a spirometer prior to and at the end of the treatment. The majority of patients showed an increase in hemoglobin values and a reduction in Erythrocyte sedimentation rate. Improvement was also observed in symptom score and severity of asthmatic attacks. After 3 weeks of treatment in asthmatic subjects, the drug produced significant improvement in forced vital capacity, forced expiratory volume in 1 s, and peak expiratory flow rate values by 32.97 ± 6.03%, 30.05 ± 8.12%, and 32.09 ± 11.75%, respectively.

Alcoholic extracts of *M. oleifera* seed kernels were found spasmolytic in acetylcholine, histamine, Bcl-2, and 5HT-induced bronchospasm.

2.11.8. Hepatoprotective activity[7]

In vivo hepatoprotective activity of ethanolic extract of leaves and alcoholic extract of seed of *M. oleifera* was estimated against isoniazid, rifampicin, and pyrazinamide-induced liver damage. Hematological along with hepatorenal functions of methanolic extract of *M. oleifera* roots, doses of the crude extract on liver and kidney functions were also reported.

2.11.9. Anti–cancer activity

Ethanolic extracts of leaves and seeds of *M. oleifera* show potent anti–tumor activity. Thiocarbamate- and isothiocyanate-related compounds were isolated, which act as inhibitors of tumor promoter. The *in vivo* antitumor potential was due the presence of three known thiocarbamate- and isothiocyanate-related compounds, which act as inhibitors of tumor promoters, teleocidin B-4-induced Epstein–barr virus, interestingly.

2.11.10. Anti-inflammatory activity[6]

Methanolic and aqueous extracts of root and bark, methanolic extract of leaves and flowers, and ethanolic extract of seeds of *M. oleifera* possess anti-inflammatory activity. *In vitro* anti-inflammatory activity from the hot water infusions of flowers, leaves, roots, seeds, and stalks or bark of *M. oleifera* using carrageenan-induced and the extract was pharmacologically evaluated.

2.11.11. Anti-microbial activity

Leaves, roots, bark and seeds of *M. oleifera* show anti-microbial activity against bacteria and fungi. The plant shows *in vitro* activity against bacteria, yeast, dermatophytes, and helminths by the disc diffusion method. The fresh leaves and aqueous extract from the seeds inhibit the growth of *Pseudomonas aeruginosa* and *Staphylococcus aureus*.

2.11.12. Anthelmintic activity[8]

In vitro study assessed the efficacy of macerated and infused aqueous extract as well as ethanolic extract of *M. oleifera* against fresh eggs, embryonated eggs, L_1 and L_2 larvae of Hemonchus contortus. Five different concentrations of extracts were prepared (0.625, 1.25, 2.5, 3.75 and 5 mg/mL). Fresh eggs were exposed to these different concentrations for 48 h, while embryonated eggs and larvae were exposed for 6 and 24 h, respectively. Distilled water and 1.5% Dimethyl sulfoxide were used as negative control. Results revealed that ethanolic leaf extract of *M. oleifera* was most efficient on eggs by inhibiting 60.3 ± 8.2% and 92.8 ± 6.2% of egg embryonation at 3.75 and 5 mg/mL, respectively.

Different concentrations of ethanolic extracts of *M. oleifera* and *Vitex negundo* were assessed for antihelminthic activity against *Pheretima posthuma*. Piperazine citrate (10 mg/mL) was used as a reference standard, and distilled water served as a control group. The results were expressed in were expressed in terms of time for paralysis and time for death of worms. *M. oleifera* shows more activity as compared to *V. negundo* in a dose-dependent manner.

2.11.13. CNS activity

M. oleifera leaves extract restores monoamine levels of brain, which may be useful in Alzheimer's disease. *In vitro* anticonvulsant activity from the aqueous extract of *M. oleifera* roots and ethanolic extract of leaves was studied on penicillin induced convulsion, locomotor behavior, brain serotonin (5-HT), dopamine and norepinephrine level and evaluated.

2.12. Therapeutic Uses

- *Pratisyaya* - Root of *Sigru* should be taken with ghee and oil as *anupana*
- *Krimi* - Decoction of *Sigru* stem bark is given with *vidanga* and honey
- *Netragoga* - Eyes are cleansed with the juice *Sigru* leaves
- *Dadru kustha* - *Sigru* root bark past is applied locally.

2.13. Formulations and Preparations

Shobhanjanadi lepa, *Manikya rasa*, *Sigru pusparasayana*, *Kalkuta rasa*, *Shyamadi churna.*

3. DISCUSSION

In this review, an attempt was made to compile all available historical, botanical, phytochemical, and toxicological data on *Sigru*, a medicinal plant used in Ayurveda. *Sigru* has anti-inflammatory and has been used in Swelling, pain, and joint discomfort activities due to the presence of various phytochemical compounds such Moringine, moringinine, indole acetic acid, sterols, terpenes, amino acids, glutamic acid, etc., and thus used in traditional, pharmaceutical, and clinical applications for its proven efficacy. This review will definitely help in understanding

this plant and its optimal application in clinical practice, research, and the pharmaceutical sector.

4. CONCLUSION

As we got detailed information regarding *Sigru* form various classical literatures, we can come into conclusion that *Sigru* is one of the most effective drug use to treat various different human disorders, which is also supported by various modern literatures based on research.

5. ACKNOWLEDGMENT

Nil.

6. AUTHORS' CONTRIBUTIONS

All the authors contributed equally in design and execution of the article.

7. FUNDING

Nil.

8. ETHICAL APPROVALS

This study is not required ethical clearance as it is a review study.

9. CONFLICTS OF INTERESTS

The authors declare no conflicts of interest regarding the publication of this paper.

10. DATA AVAILABILITY STATEMENT

The data analyzed in this review were obtained from publicly available sources, including peer-reviewed articles, observational studies, and surveys accessible through databases.

11. DISCLAIMER/VIEW AND OPINIONS

The opinions expressed in this article are solely those of the authors and do not reflect the views of the International Research Journal of Ayurveda and Yoga or its editorial board.

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Table 1: Synonyms of *Sigru* according to various *Nighantus*

Sr. No.	Synonyms	*DN*	*RN*	*MPN*	*BPN*	*KN*	*SN*	*PN*	*NA*
1.	*Sobhanjan*	+	−	−	+	+	+	+	+
2.	*Krishnagandha*	−	−	+	−	+	−	−	+
3.	*Murangi*	−	−	−	−	+	−	−	−
4.	*Shalnaksham*	−	−	−	−	+	−	−	−
5.	*Ghanachhad*	−	−	−	−	+	−	−	−
6.	*Tikshnagandha*	+	−	−	+	+	+	−	−
7.	*Mochak*	−	−	−	+	+	−	−	−
8.	*Bahalchhad*	−	−	−	−	+	−	−	−
9.	*Abadamsha*	−	−	−	−	+	−	−	−
10.	*Mulaparni*	−	−	−	−	+	−	−	−
11.	*Mukhabhag*	−	−	−	−	+	−	−	−
12.	*Harichhad*	−	−	−	−	+	−	−	−
13.	*Subhanjan*	−	−	−	−	+	+	−	−
14.	*Vidradhighna*	−	−	−	−	+	−	−	−
15.	*Akshiva*	−	−	−	+	+	+	−	+
16.	*Mulakchhad*	−	−	−	−	+	−	−	−
17.	*Sakapatra*	−	+	−	−	−	−	−	−
18.	*Updamsa*	−	+	−	−	−	−	−	−
19.	*Komal-patraka*	−	+	−	−	−	−	−	−
20.	*Damsamula*	−	+	−	−	−	−	−	−
21.	*Haritsaka*	+	+	−	−	−	−	−	−
22.	*Supatraka*	−	+	−	−	−	−	−	−
23.	*Kshamadamsa*	−	+	−	−	−	−	−	−
24.	*Tikshnamula*	−	+	−	−	−	−	−	−
25.	*Soubhanjana*	−	−	+	−	−	−	−	−
26.	*Bahulacchada*	−	−	+	−	−	−	−	−
27.	*Laghupatrak*	+	−	−	−	−	−	−	−
28.	*Damsa*	+	−	−	−	−	−	−	−
29.	*Mukhabhanga*	+	−	−	−	−	−	−	−
30.	*Mulakparni*	+	−	−	−	−	−	−	−

"+" denotes same name was mentioned in various *Nighantu*. "−" denotes this name was not mentioned

Table 2: Categorization of *Sigru* in *Samhitas and Nighantus*

Sr. No.	Text	VARGA/GANA
1.	*Charak samhita*	• *Swedapoga* • *Krimighna* • *Shirovirechanapaga* • *Katukaskandha* • *Haritaka varga*
2.	*Sushruta samhita*	• *Varunadi varga* • *Shirovirechan varga*
3.	*Bhavaprakash nighantu*	• *Guduchyadi varga*
4.	*Madanpal nighantu*	• *Saka varga*
5.	*Kaidev nighantu*	• *Ausadhi varga*
6.	*Saligram nighantu*	• *Guduchyadi varga*
7.	*Raj nighantu*	• *Mulakadi varga*
8.	*Priya nighantu*	• *Haritakyadi varga*
9.	*Dhavantari nighantu*	• *Karavadi varga*
10.	*Nighantu adarsha*	• *Sigruadi varga*

Table 3: The predominant *Rasas* of *Sigru* as mentioned in *Nighantus*

Rasapanchak	Text							
	DN	*RN*	*MPN*	*BPN*	*KN*	*SN*	*PN*	*NA*
Rasa								
Madhur	−	−	+	−	+	+	−	−
Amla	−	−	−	−	−	−	−	−
Lavan	−	−	−	−	−	−	−	−
Katu	+	+	−	+	+	+	+	+
Tikta	+	+	−	−	+	−	+	+
Kasaya	−	−	+	−	−	−	−	−
Guna								
Ushna	+	+	+	+	−	+	−	+
Laghu	−	−	+	−	+	+	−	−
Ruksha	−	−	−	−	+	−	−	−
Tikshna	−	+	+	+	+	+	−	+
Vipak								
Katu	−	+	−	−	+	+	−	+
Virya								
Ushna	+	+	+	+	+	+	+	+

"+" denotes same name was mentioned in various *Nighantu*. "−" denotes this name was not mentioned



Figure 1: Different parts of *sigru*