



Review Article

A REVIEW ON ANTI-HELMINTHIC HERBS IN SIDDHA

S.Bhavani *

Siddha Central Research Institute, Chennai, Arumbakkam, India

*Corresponding Author Email: msbhavani@hotmail.com

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ABSTRACT

Anti-helminthic drugs are that expel or kill internal parasites from the body without causing any significant harm to the host. Though the advancement in the pharmacologically active molecules, the parasites develop resistance from time to time and poses a major issue to get rid of infestation. The resistance of the parasite is measured by the faecal egg count reduction value which differs in helminths. Siddha system of medicine, has to its wealth of herbs which exhibit are highly significant in treating helminthic infection both in adults and children. Here in this review article scientific validation of these herbs are looked into to emphasis their potential.

Keywords: Helminthiasis, anti-helminthic herbs, pharmacological. Study, Siddha medicine

INTRODUCTION

Helminthiasis means worm infection, is any macro parasitic disease of humans, in which a part of the body is infected with parasitic worms (helminths). These parasites are broadly classified into roundworms hookworms, flukes and tapeworms. They often live in the gastrointestinal tract of their hosts, but may also burrow into other organs, where they induce physiological damage. Helminthiasis is more common in developing countries with poorer personal and environmental hygiene. Parasitic worms (helminths) can be found in the human intestinal tract, urinary tract or bloodstream. The WHO estimates that more than 2 billion of the world's population is infected with soil-transmitted helminths (STH). Even moderate intensity STH infection may result in delayed physical growth and impaired cognitive development, particularly in children. Chronic infection with hookworms causes anaemia especially among children & pregnant women. Helminthiasis is rarely fatal, but is a major cause of ill-health. Pharmacologically, orally effective, inexpensive, wide margin of safety with highest toxicity to worms but lesser toxic to the host is the need of the hour to treat helminthic infections. Anti-helminthics are drugs that either kill (vermicide) or expel (vermifuge) infecting helminths. In Siddha system of medicine, there are plenty of herbs mentioned with anti-helminthic property. Here, few medicinal plants with potential source of pharmacologically active components for formulating newer drugs are screened.

1. *Cassia alata*¹

Family: Fabaceae

The leaves of *Cassia alata* against cestode *Hymenolepis diminuta* showed a decrease in motility and with an increase in concentrations complete immobilization of worm in lesser time compared to control drug praziquantel. In another study, the flower extract was found to produce significant ($p > 0.05$) and dose-dependent increase in faecal output showing laxative activity; the 200 mg/kg dose being more potent. The extract was also found to paralyze and cause death of earthworms; showing significant anthelmintic activity. Chemical analysis of extracts from *Cassia alata* yields phenolics, fatty acids, terpenoids and anthroquinones.

2. *Butea monosperma*²

Family: Fabaceae

Seeds of *Butea monosperma* administered as crude powder (CP) at doses of 1, 2 and 3 g/kg to sheep naturally infected with mixed species of gastrointestinal nematodes exhibited a dose and a time-dependent anthelmintic effect. The maximum reduction of 78.4% in eggs per gram of faeces (EPG) was recorded on day 10 after treatment with 3 g/kg. Levamisole (7.5 mg/kg), a standard anthelmintic agent, exhibited 99.1% reduction in EPG. The seeds contain Butin, monospermicide, allophanic acid, amyryl and flavonoids.

Antihelminthic activity against Ascariasis³

Palasonin, a compound obtained from seeds have shown the anthelmintic activity against *Ascaris lumbricoides* in human. Water extract of the seeds possesses anthelmintic activity against *Ascaris*. Crude powder of seeds administered at doses of 1, 2 & 3g/kg to sheep naturally infected with mixed sps of gastrointestinal nematodes. The methanol extract of seeds, tested in vitro showed significant anthelmintic activity.

3. *Vernonia antihelminthica*⁴

Family: Asteraceae

In vitro studies revealed higher anti-helminthic effects of crude methanol extract as compared with crude aqueous extract of *vernonia antihelminthica* seeds against Trichostrongylid nematodes of sheep. In vivo, maximum reduction (73.9%) in faecal egg counts per gram was recorded in sheep treated with *Vernonia antihelminthica* seeds crude aqueous extract.

4. *Plumbago zeylanica*⁵

Family: Plumbaginaceae

Methanolic and aqueous extracts of *Plumbago zeylanica* roots were shown anti-helminthic activity against Indian earthworms (*Pheretima posthuma*). Preliminary phytochemical screening of methanolic extract revealed the presence of reducing sugars, monosaccharides, proteins, tyrosine & anthroquinone glycosides. While water extract revealed the presence of reducing sugars and anthroquinone glycosides.

5. *Acalypha indica*⁶

Family: Euphorbiaceae

Phytochemical screening of the crude extracts revealed the presence of flavonoids and alkaloids like Acalyphus & Acalyphine as the major constituents. The leaves extract contains terpenoids, flavonoids and polyphenols shows anti-helminthic activity. Its leaves extract showed significant anti-helminthic activity against worms in a dose dependent manner. Both ethanolic (EE) & aqueous extract (AE) caused paralysis 29 min & 32 min of worms respectively as well as death comparable to piperazine citrate especially at higher concentration of 100mg/ml.

6. *Sesbania grandiflora*⁷

Family: Fabaceae

The aqueous extracts of the leaves and fruits of *Sesbania grandiflora* exhibited a definite anthelmintic activity against *A.galli*. The phytochemical analysis revealed the presence of flavonoid, phenol, tannin, saponin and acid in the aqueous extract of *Sesbania* leaves. Steroids and triterpenoids were also present.

7. *Solanum torvum*⁸

Family: Solanaceae

The aqueous extracts of fruits of *Solanum torvum* exhibited a definitive anthelmintic activity against *A.galli*. The phytochemical analysis revealed the presence of flavonoid, phenol, tannin, saponin and acid in aqueous extracts of *Solanum torvum* fruits. The aqueous extract of *Solanum torvum* fruit is found to be more effective as it is fatal to the parasite in a liver concentration after 36 hrs of the aqueous extract of *Sesbania grandiflora* leaves.

8. *Allium sativum*⁹

Family: Alliaceae

The alcoholic extract of bulb of *Allium sativum* has also shown moderate in vitro anti-helminthic activity against the human *Ascaris lumbricoides*. *Allium sativum* also known for its effectiveness in the dysentery and acts as vermifuge. Oil of *Allium sativum* has been reported to possess anti-helminthic activity. The best source of selenium is said to be the garlic. The sulphur compounds allicin, produced by crushing and chewing fresh garlic, in turn produces other sulphur compounds such as ajoene, allyl sulphides and vinyl dithiols.

9. *Curcuma longa*¹⁰: Family- Zingiberaceae &

10. *Zingiber officinale*¹¹: Family- Zingiberaceae

The preliminary phytochemical analysis showed the analysis of alkaloids, saponins, terpenes and steroids in the extracts of *C.longa* and *Zingiber officinale*. *Curcuma longa* extract at the concentration of 10mg/ml showed the time of paralysis & death at 10.4 min & 32 min respectively. While the *Zingiber officinale* extract at the concentration of 10mg/ml, the time & paralysis of death was found to be 11.2 & 31.2 respectively. It was observed that both turmeric & ginger hydro-alcoholic extract showed significant anti-helminthic potential against helminths.

11. *Croton tiglium*¹²

Family: Euphorbiaceae

In vitro anti-helminthic assay of petroleum ether & aqueous extracts showed paralysis & death of Indian earthworms. The effect was dose dependent & found the aqueous extract at 25 & 50 mg/ml concentration showed better results than peketh extract at same concentration & reference drug albendazole.

12. *Cyperus rotundus*¹³

Family: Cyperaceae

The methanol extract of its rhizome, given orally (250 & 500 mg/ml) showed significant anti-diarrhoeal activity in castor oil induced

diarrhoea in mice. The decoction of tubers showed anti-giardial activity, reduced bacterial adherence to & invasion of Hep-2 cells.

13. *Embelia ribes*¹⁴

Family: Myrsinaceae

The ethanolic extract of the seeds of *Embelia ribes* (10-200g/ml) exhibited potent anthelmintic activity against the free living roundworm *Rhabditis pseudoelongate* strain as mean ED50-96.4 g/ml compared to the reference standard drug & Levamisole mean ED50 3.9 g/ml & Ivermectin mean ED50 2.7 g/ml respectively. Preliminary phytochemical screening shows the presence of glycosides & tannins reported to show anti-helminthic property by several investigations.

14. *Evolvulus alsinoides*¹⁵

Family: Convolvulaceae

The anthelmintic activity was evaluated on adult Indian earthworm, *Pheretima posthuma* due to its anatomical & physiological resemblance with the intestinal roundworm parasites of human being. The ethanolic extract is more potent than the reference control piperazine citrate. *Evolvulus alsinoides* caused paralysis followed by death of the worms at all tested dose levels.

15. *Holorrhena anti-dysenterica*¹⁶

Family: Apocyanaceae

The bark ethanolic extract revealed the presence of steroids, alkaloids, terpenoids, saponins, tannins, flavonoids. Bark aqueous extract revealed the presence of carbohydrates, proteins, flavonoids, saponins, glycosides and amino acids. The anti-helminthic assay of alcoholic & aqueous bark extracts showed paralysis & death of worms. The effect was dose dependent & shortest time taken for paralysis & death was 25 & 47.50 respectively in case of alcoholic extract at 40mg/ml concentration with potent activity against Indian healthworms. This is potentially more effective as compared with aqueous extract and standard reference drug albendazole.

16. *Murraya koenigii*¹⁷

Family: Rutaceae

The methanolic extract of *Murraya* exhibited anthelmintic activity. In dose dependent manner giving shortest time of paralysis & death with 100g/ml concentration. The methanolic extract caused paralysis at 18 min & the time of death at 45 min. against earthworm.

ANTI-HELMINTHIC SIDDHA FORMULATIONS

Murrukkan vithu Mathirai -(2) [17]

Siddhathi ennai (11,8)[17]

Thengai leghiyam (4,10)[20]

Meni ennai (6)[18]

Kudarkirumi nasini Leghiyam (2,13)[20]

Dasa theetchai Kuzhambu (10)[18]

Nakkupoochi ennai[17][18]

Ilaneer nei (10)[18]

Elisevi kudineer (13)[18]

Nayuruvi nei (5,9,10)[18]

Sirupeelai nei (8,9,10)[18]

Paagal ennai (8,9)[18]

Purasam vidhai kudineer (2)[18]

Chundaivatral choornam (7,16)[21]

Thayirchundi choornam (10)[21]

Kariveppilai choornam (10,16)

Karivepilai vadagam (10,16)[21]

Naakupoochi kudineer (2,13)[21]

Vaivilanga choornam (13)[20]

Nilavagai choornam (13) [20]

Note:No. in parantheses indicate the corresponding herb mentioned under the serial .

Table 1: Anti-helminthic herbs and their Siddha aspect

S.NO	Botanical name	Tamil name	Taste	Actions
1	Cassia alata	Seemai agathi	Sweet	Anti-fungal, anti-helminthic
2	Butea monosperma	Palasu	Bitter	Laxative, Anti-helminthic
3	Vernonia anthelmintica	Kaatu seeragam	Bitter	Anti-helminthic, Stomachic, Tonic, Diuretic, Anti-periodic, Alterative
4	Plumbago zeylanica	Chithiramoolam	Pungent	Anti-periodic, Diaphoretic
5	Acalypha indica	Kuppaimeni	Bitter	Anti-helminthic, Purgative, Diuretic, Emetic
6	Sesbania grandiflora	Agathi	Bitter	Antidote, Refrigerant, Laxative, Vermifuge
7	Solanum torvum	Sundai	Bitter	Stomachic, Expectorant, Germicidal
8	Allium sativum	Vellai poondu	Pungent	Anti-helminthic, Carminative, Expectorant, Stimulant, Diuretic
9	Curcuma longa	Manjal	Pungent, Bitter	Carminative, Stimulant, Hepatic tonic
10	Zingiber officinale	Chukku	Pungent	Stimulant, Stomachic, Carminative
11	Croton tiglium	Nervalam	Bitter & nauseative	Purgative, Rubefacient
12	Cyperus rotundus	Korai kizhangu	Bitter, astringent	Vermifuge, Astringent, Diuretic, Demulcent, Emmenagogue
13	Embelia ribes	Vaivilangam	Bitter	Anti-helminthic, Carminative, Stomachic, Stimulant
14	Evolvulus alsinoides	Vishnugrandhi	Bitter, little pungent	Antihelminthic, Febrifuge, Expectorant, Diaphoretic, Tonic, Alterative
15	Holorrhena anti-dysenterica	Kudasapalai	Astringent, little bitter	Antihelminthic, Expectorant, Lithontripti, Aphrodisiac, Febrifuge
16	Murraya koenigii	Kariveppilai	Little bitter	Tonic, Stimulant

Table 2: Anti-helminthic herbs and the common method of use

S.NO	Herb	Parts used	Method of administration
1	Cassia alata	Leaf	Commonly external application only. Not given alone.
2	Butea monosperma	Kernel of seed	Powder with honey t.d.s. for 3 days. On 4 th day castor oil is given, expels worms.[19]
3	Vernonia anthelmintica	Seeds	Powder about 3 gm. with honey or ghee b.d. then give for purgation, expels worms.[19]
4	Plumbago zeylanica	Root	Only given as compound medicine.
5	Acalypha indica	Leaf	Dried leaf powder about 2gm. with honey .[19]
6	Sesbania grandiflora	Leaves	Cooked & eaten as one of the greens in once a month as a food.[17]
7	Solanum torvum	Fruits	Cooked & eaten as raw or as dried fruits which are soaked & processed in buttermilk, which is then fried in oil and consumed as a part of diet.[17]
8	Allium sativum	Bulb	4 to 5 pods are boiled in milk and consumed in empty stomach. Also used extensively in regular diet.[19]
9	Curcuma longa	Rhizome	Dried powder is used regularly food preparations both as colouring & flavouring agent.
10	Zingiber officinale	Rhizome	Dried powder is used regularly food preparations both as flavouring agent.
11	Croton tiglium	Seed	After purification process is done, used in prepared formulations.
12	Cyperus rotundus	Root tuber	Only in compound herbal formulations.
13	Embelia ribes	Dried fruits	2 to 4 gm. with honey b.d or t.d.s for one day. On next day give castor oil, worms expelled [19].
14	Evolvulus alsinoides	Whole plant	As a decoction .[17]
15	Holorrhena anti-dysenterica	Bark	As a decoction 15 to 30 ml.[19]
16	Murraya koenigii	Leaf	Fresh or dried as part of food regularly.

CONCLUSION

Above said all the plants are those which have been in therapeutic use in Siddha and other alternative systems of medicine from ancient times. This review article could pave the way to look retrospectively and to develop newer, most effective, more specific & highly tolerant antihelminthic generation.

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