IJP (2018), Vol. 5, Issue 7 **(Review Article)**

Received on 03 March 2018; received in revised form, 24 March 2018; accepted, 30 March 2018; published 01 July 2018

NATURAL ANTHELMINTIC MEDICINE: A MINI REVIEW

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Keywords:

Helminth,
Anthelmintic, Helminthiasis

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ABSTRACT: Helminthiasis is prevalent globally, but is more common in developing countries with poorer personal and environmental hygiene. In the human body gastrointestinal tract is the abode of many helminths, but some also live in tissue. They harm the host by depriving him of food, causing blood loss, injury to organs, intestinal or lymphatic obstruction. It is estimated that hundreds of millions of people harbor parasitic worms and one-third of the almost three billion people that live below the poverty line in developing regions of Sub-Saharan Africa, Asia, and the Americas are infected with one or more helminth. This review gives an overview of symptoms, diagnosis, treatment, prevalence, and herbs used in helminthiasis.

INTRODUCTION: The word Helminths is derived from the Greek meaning worms and may be defined as multicellular eukaryotic animals that generally possess digestive, circulatory, nervous, excretory, and reproductive systems. Some are free-living in soil and water [1, 2]. Helminths are divided into two major phyla that are nematodes and platyhelminths. Nematodes (roundworms) include the major intestinal worms and the filarial worms and onchocerciasis. Platyhelminths (flatworms) include the flukes (trematodes) and the tapeworms (cestodes) [2]. As per WHO Lymphatic filariasis, Onchocerciasis, Schistosomiasis, Soil-transmitted helminthiasis is the most common infections in human being produced by helminth. Lymphatic filariasis caused by infection with the nematodes *Wuchereria bancrofti*, *Brugia malayi* and *B. timori*.

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DOI:
10.13040/IJPSR.0975-8232.IJP.5(7).396-98

The article can be accessed online on
www.ijpjournal.com

DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.5(7).396-98

Onchocerciasis caused by infection with the nematode *Onchocerca volvulus*. Intestinal schistosomiasis caused by infection with the trematodes *Schistosoma mansoni*, *S. mekongi*, *S. japonicum*, and *S. intercalatum*, and urinary schistosomiasis caused by infection with *S. haematobium*. Soil - transmitted helminthiasis caused by infection with the nematodes *Ascaris lumbricoides* (roundworm), *A. duodenale* and *Necator americanus* (hookworm), and *Trichuris trichiura* (whipworm) [3].

Diagnosis: Helminthiasis mostly affect in gastrointestinal tract thus local symptoms like epigastric pain, diarrhea, malabsorption states, appendicitis, right iliac fossa pain, rectal prolapse, bowel obstruction (volvulus), biliary obstruction (cholangitis) are mostly used for diagnosis along with systemic symptoms like anemia, eosinophilia, fever, bronchospasm, pneumonitis, septicemia, epilepsy, dermatological manifestations *etc*. Based on local and systemic symptoms identification of worm done by microscopically stool examination for ova, cysts and parasites, and a full blood count for eosinophilia. Radiology, biopsy, and Proctoscopy may also be used for diagnosis where

identification of parasite is difficult by stool examination [4].

Treatment: Early and regular administration of the anthelminthic drugs recommended by WHO such albendazole, mebendazole, diethylcarbamazine (citrate), ivermectin, levamisole, praziquantel, pyrantel reduces the occurrence, extent, severity and long-term consequences of morbidity, and in certain epidemiological conditions contributes to sustained reduction in transmission [3] generally wide range of chemical compound are used as Anthelmintics which is classified as under [5].

- Benzimidazole: Mebendazole, Albendazole, Thiabendazole
- Quinolines and Isoquinolines: Oxamniquine, Praziquentel
- Piperazine: Piperazine citrates, Diethyl carbamazine
- Vinyl pyrimidines: Pyrantel Pamoate
- Amides: Niclosamide
- Imidazothiazoles: Levamisol
- Organophosphates Metrifonate

Prevalence: It is estimated that hundreds of millions of people harbor parasitic worms **Table 1** and one-third of the almost three billion people that live below the poverty line in developing regions of sub-Saharan Africa, Asia, and the Americas are infected with one or more helminth [1].

Plants having Anthelmintic Activity: The plants have anthelmintic activity mainly due to their phytoconstituents such as phenolic compounds, flavonoids, tannins, and alkaloids. They may act jointly or separately by inhibition of tubulin polymerization and blocking glucose uptake which produces damage to the mucopolysaccharide membrane of worms will expose the outer layer restricting their movement which finally may cause paralysis and ultimately death of parasite [6].

A number of plants have shown anthelmintic activity against various helminths **Table 2** contains a list of plants with anthelmintic activity identified recently.

TABLE 1: GLOBAL PREVALENCE OF HELMINTHIASIS

S. no.	Disease	Major etiologic agent	Global prevalence
		Soil-transmitted nematodes	
1	Ascariasis	*Ascariasis lumbricoides* (roundworm)	807 million
2	Trichuriasis	*Trichuris trichiura* (whipworm)	604 million
3	Hookworm	*Necator americanus*; *Ancylostoma duodenale*	576 million
4	Strongyloidiasis	*Strongyloides stercoralis* (threadworm)	30–100 million
		Filarial nematodes	
1	LF	*Wuchereria bancrofti*; *Brugia malayi*	120 million
2	Onchocerciasis (river blindness)	*Onchocerca volvulus*	37 million
3	Loiasis	*Loa loa*	13 million
4	Dracunculiasis (guinea worm)	*Dracunculus medinensis*	0.01 million
		Platyhelminth flukes	
1	Schistosomiasis	*Schistosoma haematobium, Schistosoma mansoni Schistosoma japonicum* (blood flukes)	207 million
2	Food-borne trematodiases	*Clonorchis sinensis* (liver fluke); *Opisthorchis viverinni* (liver fluke); *Paragonimus spp.* (lung flukes); *Fasciolopsis buski* (intestinal fluke); *Fasciola hepatica* (intestinal fluke)	>40 million
		Platyhelminth tapeworms	
1	Cysticercosis	*Taenia solium* (pork tapeworm)	0.4 million

TABLE 2: LIST OF PLANTS WITH ANTHELMINTIC ACTIVITY

S. no.	Botanical name	Parts of plant	Active Phytochemical
1	*Acacia suma* Fabaceae	Bark	Gallo-catechin
2	*Acalypha fructicosa* Euphorbiaceae	Whole Plant	Tannins, flavonoids
3	*Acalypha indica* Euphorbiaceae	Leaves	Alkaloids, saponins
4	*Aegle marmelos* Rutaceae	Fruits	Tannins
5	*Ailanthus excelsa* Simaroubaceae	Bark	Alkaloids, flavonoids
6	*Anemone vitifolia* Ranunculaceae	Root	Glycosides, alkaloids

7	*Barringto nia acutangula* Lecythidaceae	Leaves	Terpenoids, tannins
8	*Bauhinia purpurea* Fabaceae	Whole Plant	Leutin
9	*Bauhinia racemosa* Fabaceae	Whole Plant	Kaempferol, coumarins, steroids
10	*Caesalpania pulcherrima* Leguminaceae	Flowers	Di-terpenoids
11	*Cassia tora* Fabaceae	Leaves	Alkaloids, saponins
12	*Cissamp elospareira* Menispermaceae	Leaves	Alkaloids, saponins
13	*Citrus acurantium* Rutaceae	Fruit juice	Alkaloids, steroids
14	*Cymbopogon Martinii* Poaceae	Leaves	Geraniol
15	*Cymbapogon schoenanthus* Poaceae	Leaves	Geraniol
16	*Clerodendrum phlomidis* Verbanecaea	Aerial parts	Tannins, flavonoids, terpenoids
17	*Corallocarpus epigaeus* Cucurbitaceae	Roots, rhizomes	Ketod iol, carpenoyl ester
18	*Clitoria ternatea* Fabaceae	Leaves	Alkaloids, amino acids
19	*Ficus bengalensis* Moraceae	Fruits	Alkaloids, flavonoids
20	*Gymnema sylvestre* Asclepiadaceae	Leaves	Triterpenoids
21	*Jalan sregia* Juglandacaeae	Leaves	Tannins, saponins
22	*Lawsonia inermis* Lythraceae	Leaves	Lawsone
23	*Leptadenia pyrotechnica* Asclepiadaceae	Stem	Flavonoids, glycosides
24	*Maduca indica* Sapotaceae	Flowers	Alkaloids
25	*Manihot esculenta* Euphorbiaceae	Leaves	Glycosides
26	*Murraya koengil* Rutaceae	Leaves	Girinimbine
27	*Neolamarckia cadamba* Rubiaceae	Bark	Indole alkaloids
28	*Pandanus fascicularis* Pandanaceae	Leaves	Tannins, saponins
29	Parkia Biglobosa Fabaceae	Leaves	Alkaloids, saponins
30	*Prosopis* cineraria Mimosaceae	Bark	Fixed oils
31	*Sapindus trifoliatus* Sapindaceae	Seeds	Saponins, flavonoids
32	*Saraca indica* Caesalpinaceae	Leaves	Tannins, glycosides
33	*Sesbania grandiflora* Fabaceae	Bark	Alkaloids, tannins
34	Symplocos racemosa Symplocaceae	Bark	Glycosides

CONCLUSION: The review on natural anthelmintic medicine might be useful to supplement the information regarding symptoms identification, diagnosis, treatment, prevalence and herbs used in helminthiasis.

This article also motivates researchers and helps them during the screening of medicinal plants.

ACKNOWLEDGEMENT: Authors are thankful to Dr. G. J. Khan and Maulana G. M. Vastanvi for valuable guidance, motivation, and direction which helped us all the times during writing this article.

CONFLICT OF INTEREST: Authors declares that there is no conflict of interest.

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How to cite this article:
Qazi MA and Molvi KI: Natural anthelmintic medicine: a mini review. Int J Pharmacognosy 2018; 5(7): 396-98. doi link: http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.5(7).396-98.

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