

## ANTHELMINTHIC STUDIES AND MEDICINAL HERBS – AN OVERVIEW

\*R.Ramasubramaniraja<sup>1</sup> and M. Niranjan Babu<sup>2</sup>

<sup>1</sup>Lecturer, Department of Pharmacognosy, Seven Hills College of Pharmacy, Tirupathi, A.P, India.

<sup>2</sup>Principal, Seven Hills College of Pharmacy, Tirupathi, A.P, India.

\*Corresponding author's E-mail: [rsmr\\_raj@yahoo.co.in](mailto:rsmr_raj@yahoo.co.in)

Received on: 22-10-2010; Finalized on: 14-12-2010.

### ABSTRACT

Anthelmintics are drugs that expel parasitic worms from the body by killing them. Parasitic worms such as pinworms, roundworms, hookworms, threadworms, tape worms and filarial worms. The number of people suffering from worm infestation in developing countries runs in to millions. The medicinal herbs are used for helminthiasis are *Artemisia absinthium*, *Adiantumcapillus*, *Cedrus deodara*, *Nerium indicum*, *Cassia angustifolia* and etc., Some of the allopathic drugs also screened to treat the helminthiasis these are Albendazole, Mebendazole, Piperazine, Levamisole, Diethyl carbamazine.

**Keywords:** Helminthiasis, *Artemisia absinthium*, *Adiantumcapillus*, *Cedrus deodara* Albendazole, Mebendazole.

### INTRODUCTION

The word "anthelmintic" is derived from the Greek "anti" means "against" and "helminis" meaning "worm"- which in effect means "to kill or destroy worms or parasites." Anthelmintics or anthelmintics are drugs that expel parasitic worms (helminthes) from the body by either stunning or killing them. They may also be called vermifuges (stunning) or vermicides (killing). Vermicides means Kill a number of parasites including worms and protozoa found in the gut or elsewhere, including some found in the liver, spinal and cranial fluids. Vermifuges called as Expel the dead parasites and any associated debris, including fungal infections which may be caused by the die-off of the parasites from the body. Helminthiasis is a macro parasitic disease of humans and animals in which a part of the body is infested with parasitic worms such as pinworms, roundworms, hookworms, threadworms, tape worms and filarial worms. Typically the worms reside in the gastrointestinal tract but may also burrow in to the liver or other organs. Worm infestation is one of the major global public health problems, more so in tropical countries. Besides the environmental conditions peculiar to tropics poverty, illiteracy, lack of adequate sanitary facilities and of pure water supply make total eradication of this problem is very difficult. In the case of schistosomiasis, enhancing the agricultural productivity by developing and expanding water conservation schemes, as created ideal breeding places for snails, the intermediate host, thus increase in the prevalence of schistosomiasis in the population. The number of people suffering from worm infestation in developing countries runs in to millions. The helminthes are multicellular organisms possessing three germ layers and exhibiting a bilateral symmetry. They are classified into two major phyla. Phylum Nematelminthes (Roundworms: Nematodes), Phylum Platyhelminthes (Flatworms: Cestodes and Termatodes).

### Signs and Symptoms of Helminthiasis:<sup>1</sup>

Abdominal pain, Diarrhoea, Fever, Fatigue, Enlarged Liver, Enlarged Spleen, Cough, Eosinophilia, Gastro intestinal inflammation, Malabsorption, Bowel obstruction, Anemia, dehydration, Skin symptoms, Chest Pain, Vomiting, Constipation, Itchy skin, Eye symptoms, malaise, Headache, Neurological problems, Irritability.

### Causes:

The primary cause of helminthiasis is the result of transmission of an infectious disease. Some subtypes of this disease contagious spread easily between people. While other subtypes are infectious transmitted by a pathogenic organism.

### Causes of broader categories of Helminthiasis:

Parasitic diseases: There are many different sizes of parasites including single cell protozoa and multicelled parasites like worms, flukes and even insects. Some other small parasitic creatures are called Filaria, richattsiias and spirochetes. Fungi and yeasts are parasitic plants. Conditions Involving a Pathogen: Medical condition involving some type of pathogens such as viruses or bacteria.

### Treatment:

Anthelmintics are drugs used in treatment of helminthiasis.

- The efficacy of the new drug can be gauged by counting the ova or eggs present in the stools.
- The efficacy of a drug against can only be judged by the appearance of the scolex in the stools.
- Patients suffering from multiple parasitic infestations are ideal for investigating a new anthelmintic drug claimed to have a broad spectrum of action.



- In endemic areas, the main aim of antihelminthic treatment should be to reduce the load of infection below the level of clinical significance.
- Complete parasitological cure is unnecessary and often not possible in achieving this safety and economic considerations must determine the choice of the drug is Mass Therapy.

**Table 1:** Common Forms of Helminthiasis and Drugs Used In Their Treatment<sup>1</sup>

Helminth	Common Name	Drug of Choice	Alternative Drugs
<b>NEMATODES (Intestinal)</b>			
<i>Ascaris lumbricoides</i>	Roundworms	Albendazole, Mebendazole	Pyrantel, Piperazine
<i>Ancylostoma duodenale</i>	Hookworms	Albendazole, Mebendazole	Pyrantel, Thiabendazole
<i>Enterobius vermicularis</i>	Pinworm	Albendazole, Mebendazole	Pyrantel, Piperazine
<i>Trichinella spiralis</i>	porkroundworm	Albendazole	Thiabendazole, Mebendazole
<b>NEMATODES (Somatic)</b>			
<i>Wucheraria bancrofti</i>	Lymphatic filarial worm	Diethylcarbamazine	Ivermectin
<i>Oncocerca volvulus</i>	Oculodermal filarial worm	Ivermectin	Diethylcarbamazine
<i>Oncocerca loaloa</i>	Oculodermal filarial worm	Ivermectin	Diethylcarbamazine
<i>Dracuncula medinensis</i>	Guinea worm	Metronidazole	Mebendazole
<b>TREMATODES</b>			
<i>Schistosoma hematobium</i>	Bloodflukes	Praziquantel	Metrifonate
<i>Schistosoma mansoni</i>	Bloodflukes	Praziquantel	Oxamniquin
<i>Schistosoma japonicum</i>	Bloodflukes	Praziquantel	
<b>CESTODES</b>			
<i>Tenia saginata</i>	Beef tape worm	Praziquantel	Niclosamide
<i>Tenia solium</i>	Porktape worm	Praziquantel	Niclosamide
<i>cysticercus cellulosae</i>	Larva of tenia solium	Albendazole	Praziquantel
<i>Diphyllobothrium latum</i>	Fish tapeworm	Praziquantel	Niclosamide
<i>Hymenolepis hana</i>	Drawft tape worm	Praziquantel	Niclosamide
<i>Echinococcus granulosus</i>	Hydatid larva	Albendazole	Mebendazole
<b>FLUKES</b>			
<i>Fasciola hepatica</i>	liver fluke	praziquantel	Niclosamide
<i>Clonorchis sinensis</i>	Chinese liverfluke	Praziquantel	Niclosamide
<i>Fasciola busci</i>	Giant intestinal fluke	Praziquantel	Niclosamide
<i>Paragonimus Westermani</i>	Lung fluke	Praziquantel	Niclosamide

**Table 2:** Mechanism of action of common antihelminthics

DRUGS	SITE	MECHANISM
<b>Neuromuscular transmission</b>		
Levamisole, pyrantel palmoate	A) Ganglionic nicotonic Ach receptors at neuro muscular junction	Stimulation produces persistent depolarisation resulting in muscular contracture/paralysis
Piperazine	B) GABA receptors at neuromuscular junction	GABA against causing hyperpolarisation and flaccid paralysis
Ivermectin	C) Glutamate-gated chloride channel at neuromuscular junction in invertebrates	causes tonic paralysis of microfilariae which are then immobilized and phagocytosed by RECELLS
Metrifonate	Acetyl cholinesterase	inhibition, causing muscular contracture
praziquantel	Cell membrane	increase the calcium influx leading to muscular contracture
benzimidazole, mebendazole, albendazole, thiabendazole	microtubules in cytoskeleton	Block the transport secretory granules and movements of other sub-cellular organelles.
Niclosamide	mitochondria	inhibition of anaerobic phosphorylation of ADP leading to death

Drug therapy of worms (Allopathic)<sup>2</sup>

Drug Therapy of Round Worms:



**Piperazine:**

This drug is used in therapy of ascariasis and enterobiasis.

Adverse reactions: Piperazine has wide margin of safety. Adverse effects are rare and they include nausea, vomiting, diarrhea, urticaria. Neurotoxic effects have been observed rarely they include vertigo, muscular incoordination, hypotonic, ataxia. Convulsions are very rare. This drug appears to be safe during pregnancy.

**Mebendazole:**

It is a benzimidazole derivative and a broad spectrum antihelminthic. It is effective in ascariasis, enterobiasis, trichuriasis and hook worm infestation. It is effective in vivo against the larvae of trichinella spiralis and exerts lethal effects on the germinal membrane of the larva of echinococcus granulosus (hydatid worm). It also has some action against s.stercoralis

Adverse Reactions: It causes abdominal pain, nausea and diarrhea. Very large doses may cause vertigo, dizziness, and headache. It should be avoided in pregnancy.

**Albendazole:**

It is a broad spectrum benzimidazole derivative. It is effective in hydatid diseases, ascariasis, trichuriasis and ankylostomias. Its major advantage is effective against many common intestinal worm.

Adverse Reactions: Reactions are mild mainly GI disturbances. When used in hydatid disease for long time therapy. It may cause alopecia, liver damage and bone marrow depression.

**Pyrantel Pamoate:**

It is highly effective against Round worms and E.vermicularis and less effective against hook worms.

Adverse Reactions: They include Anorexia, nausea, Vomiting, Diarrhoea, Headache, Abdominal pain.

**Levamisole:**

It has immunostimulant properties. It is effective in ascariasis, hookworms. It is also effective against Tricho-Strongyliasis.

Adverse Reactions: They are usually mild and includes nausea, vomiting, abdominal pain, drowsiness.

**Drug Therapy of Hook Worms:**

A duodenale infestation is extremely common in tropical countries and represents an important cause of iron deficiency anemia. The infestation often exists along with ascariasis. In such situations, it is preferable to treat ascariasis first, as drug used solely against ancylostomiasis may irritate the round worms causing their migration or their aggregation into ball like masses. The former may lead to invasion of the bile duct and the liver. Hence the drug effective against both the roundworms and hook worms are to be preferred.

**Bephenium Hydroxy Naphthoate:**

It is effective in removing round worms and hook worms of the species Ancylostomaduodenale. It is less effective against Necator Americans. The drug has moderate effect against whipworms and trichostrongylus orientalis.

Adverse Reactions: It includes Nausea, vomiting and Diarrhoea.

**Drug therapy of Strongyloidiasis:****Thiabendazole:**

The drug is benzimidazole derivative and it has broad spectrum of activity. It is effective against round worms and Hook worms, pin worms and strongyloid worms.

Adverse Reactions: They include skin reactions, anorexia, nausea, vomiting, fever and epigastric distress. Other effects are hypoglycemia, liver damage and crystalluria.

**Drug Therapy of Trichuriasis (Whip Worm):**

Trichuriasis caused by Trichuristrichura is frequently encountered along with round worms and hook worms. Trichuriasis is acquired after consumption of food contaminated with parasite eggs. Children are usually susceptible and develop anemia. Rarely, the worms may lodge in the appendix or may penetrate the bowel wall and cause peritonitis. The drugs preferred to treat Trichuriasis are Albendazole and Mebendazole.

**Drug Therapy of Filariasis:****DiethylCarbamazine:**

The drug is Piperazine derivative, inactive invitro, leads to a rapid disappearance of microfilariae of wucherariabancrofti, b.malayi and loalaoa from the human peripheral blood. The microfilariae of wucherariabancrofti in a hydrocoele, however are not affected. The drug kills the adult worms of b.malayi and loalaoa and possibly those of Wucherariabancrofti. The drug has no action against the adult worms of o.volvulus and it has some action in ascariasis.

Adverse Reactions: They include nausea, anorexia, vomiting, headache and drowsiness, allergic reactions, fever, muscular pains, skin rashes and tachycardia.

**Ivermectin:**

It was originally obtained from streptomycsavermittilis found in the soil sample of a Japanese, golf course. This macrocyclic lactone has been found to be highly effective against a broad range of parasites and arthropods and is extensively used in veterinary medicine. It is the drug of choice in onchocerciasis. The drug has no lethal effect against adult worms.

Adverse Reactions: It causes less severe and fewer systemic and ocular adverse reactions. These are mostly due to the death of microfilariae which causes ocular inflammation that may lead to blindness. Commonly it may cause itching, skin edema, arthralgia, headache and fever.

**Drug Therapy of Guinea worm:**

*Dracunculus medinensis* infestation is transmitted by drinking of water containing infected Cyclops (water flea). The adult female usually remains in the subcutaneous tissue and may come out through a small ulcer, usually on the foot. Metronidazole has been shown to be effective in this condition. The important treatment of arecontesis, as in any other worm infestation, is preventive. This is very simple as the intermediate host, Cyclops can easily be filtered out from the drinking water by using a piece of cloth.

#### Drug Therapy of Tape Worms:

This infestation is transmitted by ingestion of infected beef or pork and can be prevented by avoiding the ingestion of suspected meat or by its through cooking.

#### Niclosamide:

This drug is effective in *Tenia saginata*, *Tenia solium*, *D. latum*, and *H. nana* infestations. Niclosamide is a vermifugal drug. The segments of the worm which are voided after its administration are partially digested by the action of the intestinal proteolytic enzymes; this makes the identification of the scolex impossible. Identification of the scolex is important when treating *Tenia solium* infestation, as cysticercosis, that is harboring of the larval forms (cysticerci) in the tissues of the host may develop if the infestation is completely eradicated. Niclosamide is not effective against cysticercosis. Hence in the treatment of infestation with *Tenia solium* praziquantel is preferred.

#### Praziquantel:

It is the drug of choice in teniasis and it is highly effective against intestinal teniasis, *Tenia saginata*, *Tenia solium*, *D. latum* infestations in humans, as well as in cysticercosis of the brain.

#### Drug therapy of Schistosomiasis:

Schistosomiasis is caused by blood flukes that parasitize the venous channels of the definitive host. The three common species are *S. hematobium*, *S. mansoni*, *S. japonicum*. Man and domestic animals acts as a host for schistosomes.

#### Praziquantel:

It is effective against all species of Schistosomes found in man at all ages and in all areas. It is effective against liver, lung and intestinal flukes as well as against cestodes causing teniasis and cysticercosis.

Adverse Reactions: They are usually mild such as headache, anorexia, drowsiness and allergic reactions. Rarely may it cause hallucinations, excitement or psychotic symptoms, particularly in the Japanese. Experimental evidences indicate that it has no mutagenic, carcinogenic, embryo toxic or teratogenic effect.

**Oxamiquine:** It is effective against only *S. mansoni* (African) infestation.

Adverse reactions: It includes dizziness, somnolence, and abdominal pain. Rarely does it cause hallucinations and seizures.

#### Metrifonate:

It is effective only in *S. hematobium* infestations.

Adverse Reactions: They are usually mild and transient. They consist of GI disturbances, weakness, dizziness, and vertigo.

#### Drug therapy of Flukes:

##### Praziquantel:

This drug has revolutionized the treatment of infestation with these parasites. It is highly effective against liver, lung and intestinal flukes.

##### Thiabendazole:

It is also useful for liver and lung flukes.

#### Drug Therapy of Pin worms:

*E. vermicularis* is a common parasite found in the caecum and the vermiform appendix. The infestation is more common in children. The gravid female worm deposits eggs on the perianal skin leading to intense itching. Scratching of this region may lead to auto infection by ingestion of ova carried under the nails. To prevent this, patients should be advised to trim the nails and wash the hands thoroughly before the meals. Symptomatically, an antihistaminic cream applied around the anus relieves itching. Infection can also occurred through under clothing, bed linen, lavatory contamination and water contamination. Besides the drug therapy, additional measures are desirable in resistant cases. At nights the patients should wear pants under the pyjamas, and gloves which can be boiled. Mebendazole, albendazole, piperazine are the drugs used for the treatment of pinworms.

#### DESCRIPTION OF ANTIHELMINTHICS MEDICINAL HERBS: 3, 4, 5

##### *Adiantum capillus:*



Synonym: maidenhair fern, lady fern.

Botanical name: *Adiantum capillus*

Scientific Classification:

Kingdom- Plantae

Division- Pteridophyta

Class- Pteridales

Family- Adiantaceae

Genus- Adiantum

Species- *A. capillus-veneris*

Plant description: Maidenhair is small creeper, slender, branched and having entirely marginal with single broad tooth near base. The leaves are green fronds segmented into pinnae 5 -10mm long and wide. This shorter creeper grows to 20-70cms tall in height.

Chemical constituents: Adiantone, Adiantoxide, Carotenes, Coumaric acid, Quercetins, Quinic acid, Rutin, Caffeic acids.

Parts used: Leaves and Rhizomes



#### **Artemisia absinthium:**



Synonym: Wormwood, Wermut.

Botanical Name: *Artemisia absinthium*

Scientific Classification:

Kingdom- Planate

Order- Asterales

Family- Asteraceae

Genus- Artemisia

Species-*A. absinthium*

Plant description: Wormwood is herbaceous perennial plant having hard rhizome the stem of wormwood plant is erect growing to 1.5m tall. The leaves are arranged spirally with upper part green and lower part white in colour. The leaves are covered with silver white trichomes, growing up to 25cm long and have bipinnate or tripinnate petioles. The flowers are pale yellow bearing in cluster in spherical bent down heads.

Chemical constituents: Volatile oil which contains Thujone, Alcohol, Pinene, Phellandrene.

Parts used: Dried leaves.

#### **Cinnamomum camphor:**

Synonym: Camphor tree, Gum camphor, camphor laurel.

Botanical name: *Cinnamomum camphor*

Scientific Classification:

Kingdom- Planate

Subkingdom- Tracheobionta

Superdivision- Spermatophyta

Division- Magnoliophyta

Class- Magnoliopsida

Subclass -Magnoliidae

Order- Laurales

Family- Lauraceae

Genus- Cinnamomum

Species- *Cinnamomum verum*

Plant description: Cinnamon is from a tropical ever green tree of the laurel family growing up to 7m(56feet) in its wild state. It has thick scabrous bark, strong branches, young shoots, speckled greeny orange. The bark is smooth and yellowish. The leaves are ovate, petiolate, deeply veined leaves that are dark green on top, light green underneath. They become leathery when mature upper side shiny green, under side lighter. When brushed they smell spicy and have a hot taste. The flowers are yellowish white with disagreeable odour that bears dark berries. The fruit is an oval berry like an acron in its receptical is bluish when ripe with white spots on it, bigger than a blackberry.

Chemical constituents: Cinnamaldehyde, mannitol, coumarins, gum, tannins, essential oils (aldehyde, eugenol, pinene).

Parts used: Roots, wood.

#### **Cedrus deodara:**



Synonym: Deodar, Devdar, Himalayan deodar.

Botanical Name: *Cedrus deodara*

Scientific Classification:

Kingdom- Plantae

Division- Pinophyta

Class- Pinopsida

Order- Pinales

Family- Pinaceae

Genus- *Cedrus deodara*

Plant description: It belongs to pine family and are conical in shape growing to height of 30-40 feet having scanted wood, thick ridged bark and broad branches. The leaves of cedar are evergreen appearing needle like 80-50mm long, arranged on shoots in bright green to dark green colour. The seeds and cones are barrel shaped in green-grayish colour, 6-12cm long and 3-9cm broad. The seeds of cedar are 10-14mm long having numerous resin blisters and contain resin like substances.

Chemical constituents: Alkaloids, Oils, resins, tannins, phosphorus, calcium.

Parts used: Woods and Leaves.

#### **Gmelina arborea:**



Synonym: Gmelina.

Botanical Name: *Gmelina arborea*

Scientific classification:

Kingdom- Plantae

Order- Asterales

Family- Lamiales

Genus- *Gmelina*

Species- *G. arborea*

Plant description: Gmelina is deciduous tree growing to 3cm tall in height having chlorophyll layer on the outer bark. The leaves of this tree are found to be 4-9 inches long and 2-5 inch broad with opposite petioles and broadly ovate blade at the base. The flowers are in racemes, tubular, two lipped and yellow to brownish with four stamens. The fruit is yellow fleshy ovate berry of 3cm long and 25cm wider.

Chemical constituents: Oils, resins, alkaloids, benzoic acid, tartaric acid, butyric acid.

Parts used: Roots, fruits, leaves and flowers.

#### **Mallotus philipensis:**



Synonym: kamala, kamala tree.

Botanical Name: *Mallotus philipensis*

Kingdom- Plantae

Division- Magnoliophyta

Class- Magnoliopsida

Order- Malpighiales

Family- Euphorbiaceae

Subfamily- Acalyphoideae

Tribe- Acalypheae

Genus- *Mallotus*

Species- *M. philipensis*

Plant description: The height reaches up to 10m and the leaves are 1-2inches long, alternate, ovate. The branches are straight slender with pale bark and flowers are diecious arranged in male and female together in the axils of small bracts. The plants also consists of trilobed small capsule of peasize having minute glands and bearing small hairs. The capsules are odour less, tasteless but used in various purposes.

Chemical constituents: Rottlerin, gum, volatile oil, tannic acid, wax, yellow and red resins.

Parts used: leaves, seeds and bark.

#### **Nerium indicum:**



Synonym: Indian oleander, excise tree.

Botanical Name: *Nerium indicum*

Scientific Classification:

Kingdom- Planate

Division- Tracheophyta

Class- Magnoliopsida

Order- Gentianales

Family- Apocynaceae

Genus- Nerium

Species- N. indicum

Plant description: Nerium is evergreen shrub that grows up to the height of 4m and bearing leaves all the year around. The leaves are long, linear, lanceolate, 10-15cm in length with horizontal nerves. Flowers are hermaphrodite, white, pink or red in colour, sweet smelled and 4-5cm in diameter. Fruits of nerium are long about 15-20cm, cylindrical and paired growing with the stem. Seeds contained in fruits are numerous, compressed and white in colour having smooth hair.

Chemical constituents: Glycosides, Tannin, Oleandrin, Neriin, Volatile oil, phytosterin, Neriodorin, Neriodorein.

Parts used: Roots, leaves.

#### **Oxalis corniculata:**



Synonym: yellow wood sorrel, Indian sorrel.

Botanical Name: *Oxalis corniculata*

Scientific Classification:

Kingdom- Planate

Subkingdom- Tracheobionta

Division- Magnoliophyta

Class- Magnoliopsida

Subclass- Rosidae

Order- Geraniales

Family- Oxalidaceae

Genus- Oxalis

Species- O. corniculata

Plant description: The branches of wood sorrel are erect, creeping about 30cm long borne with small hairs while the roots are fibrous and branch. The leaves are small, slightly ovate and about 4-12m long and 10-20mm broad.

The flowers are inflorescence yellow growing in clusters of 1-6 petals are 6-7m long.

Chemical constituents: Water, fat, protein, iron, niacin, carbohydrates, betacarotene, Vitamin C, phosphorous.

Parts used: Flowers, leaves.

#### **Pongamiapinnata:**



Synonym: Indian beech, pongam oil tree.

Botanical Name: *Pongamiapinnata*

Scientific Classification:

Kingdom- Planate

Division- Magnoliophyta

Class- Magnoliopsida

Order- Fabales

Family- Fabaceae

Genus- Pongamia

Species- P. pinnata

Plant description: *Pongamiapinnata* is deciduous legume tree growing to 15 to 18 feet in height with widely diffused canopy. The leaves of Indian beach tree are soft and lustrous. While the colour changes to green when it matures. The flowers are white, pink or purple born in clusters throughout the year on the branches. This is a potent nitrogen fixation plant having dense roots and thick tap root which promotes nitrogen fixation.

Chemical constituents: Glabrin, Pongamol, alkaloids, kanjone, Saponin, Pinnatin, Neoglabrin parts used.

Parts used: Roots, leaves, Bark, flowers, Seed oil.

#### **Cassia angustifolia**



Synonym: Indian senna, senna.  
 Botanical Name: *Cassia angustifolia*  
 Scientific Classification:  
 Kingdom- Plantae  
 Division- Angiosperma  
 Order- Fabales  
 Family- Fabaceae  
 Subfamily- Caesalpinioideae  
 Tribe- Cassieae  
 Subtribe- Cassiinae

Genus- Cassia  
 Species- *c.angustifolia*

Plant description: It is small shrub while in some species, senna grows into small tree and the leaves are lanceolate, compounds and leaflets are opposite. The flowers are yellow and white in colour having five petals similar to each other.

Chemical constituents: Sennacrol, senapicrin, rhein, aloe-emodin, glucoside, chrysophonic acid.

Parts used: Dried leaves, pods.

**Table 3:** List of Medicinal Herbs Used For Antihelminthics<sup>6</sup>

S.No	Common Name	Botanical Name	Family	Chemical Constituents	Parts used
1	Barbadosaloe, Commonaloe, yellowaloe	Alovera	Asphodeceae	Pectic Acid, Anthrones, Glucomonnans, Anthroquinones	Leaves
2	Garlic	Alliumsativum	Alliaceae	Pungent, essential volatileoils, allicin, diallyldisulphide	Bulb
3	Abutilon, Indian mallow	Abutilon indicum	Malvaceae		Whole plant
4	Dill, Dillweed, garden dill	Anethum graveolems	Apiaceae		Fruits, leaves
5	Gaintswallow wort, Milkweed	Calotropisprocera	Asctepiadaceae	Yellowbitter resin, black acid resin,calotropin	Barks, roots and whole plant
6	Coffeesenna, Coffeeweed, Foetid cassia	Cassiaoccidentalis	Fabaceae	Aloe-emodin, anthrones, Apigenin, linolenic acid, mannitol	Roots, seeds, leaves
7	Abuta, velvet leaf	Cissampelospaireira	Menispermaceae	Arachidic acid, Bebeerine, cissamine, bulbocapnine	Roots, barks, leaves
8	Cucumber	Cucumis sativus	Cucurbitaceae	Water, linoleic acid, palmitic acid, Oleic acid	Fruits, seeds, Leaves
9	Velvety beauty berry, Bastra	Callicarpama crophylla	Verbenaceae		Fruits, seeds, Leaves, Wood
10	Embelia, Falseblackpepper	Embeliaribes	Myrsinaceae		Barks, Berries Leaves, Roots
11	Gentian, bitter root, Butterwort	Gentianaverna	gerntianaceae	Glycosides, gentiopicrin, Amarogentin	Roots, leaves
12	Clove-tongue, Christmas palnt	Helleborusniger	Ranunculaceae	Helleborin, Helleborcin, resin, Fat and starch	Dried, Rhizomes
13	EastIndian Scredtree, Nutleaved scred tree	Helicteresisora	Sterculiaceae		Roots, barks, fruits
14	Black walnut	Juglansnigra	Juglandaceae	Tannins,volatile oil, vitamin c, Betacarotene, omega- 3-fatty acids	Wood, barks, fruits
15	Moringa, horseradish tree, drumstick tree	Moringa oleifera	Moringaceae	Palmatic acid, Stearic acid, Moringine, Moringinine	Fruits, Seeds, leaves
16	Bulletwood tree, indianmedaller	mimusopshengi	Sapotaceae		Barks, flowers, seeds, fruits
17	Chirpina, three leaved pine	Pinusroxburghi	Pinaceae	Oleoresin, oil	Wood
18	Indianpodophyllum, Himalayan may apple	Podophyllum emodi	Berberidaceae		Rhizomes, roots, fruits
19	Cloves	Syzygiumaromaticum	Myrtaceae	Eugenol, triterpene, oleanolicacid	Whole clove
20	Groundsel, simson, Ragwort	Seneciovulgaris	Asteraceae	Senecin and seniocine	Dried herbs
21	Tansy, mugwort	Tanacetum vulgare	Asteraceae	Thujone, Bitter glycosides, Terpenoids, Sesquiterpene	Aerial parts
22	Thyme	Thymusvulgaris	Labiatae	Phenols, thymol, Cineol, cymene, Borneol, esters, carvacrol	Dried leaves and stem
23	Fennel, fenkel, sweet fennel	Foeniculum vulgare	Apiaceae	Limonene, fenchone, seeds also contain fibre and complex carbohydrates	Seeds, Leaves, Roots, oil



**CONCLUSION**

Anthelmintics or anthelmintics are drugs that expel parasitic worms (helminthes) from the body by either stunning or killing them. They may also be called vermifuges (stunning) or vermicides (killing). The worms causing helminthiasis are Round worms, Hook worms, Tape worms, Pin worms, Whip worms e.t.c. The medicinal herbs used for helminthiasis are Artemisia absinthium, Adiantumcapillus, Cedrus deodara, Nerium indicum, Cassia angustifolia e.t.c. Some of the allopathic drugs used to treat helminthiasis are Albendazole, Mebendazole, Piperazine, Levamisole, Diethyl carbamazine.

**REFERENCES**

1. R.S.Satoskar, S.D.Bhandarkar, Nirmala.N.Rege  
Pharmacology and Pharmacotherapeutics Text  
book, 12<sup>th</sup> Edition, Reprinted (2008) Page No:708-  
809.
2. The Merck index, (1996) 12<sup>th</sup> Edition, page no1119:  
Entry 6611 Nicotine, Merck &co.
3. V.A. Zamureenko, N.A. Klyuev, B.V.Bocharov, V.S.  
Kabanov and A.M. Zakharov, "A Chemistry of the  
Component Composition of the Essential Oil of  
Monarda Fistulosa".
4. Arnold, M.D Harry L. (1968). Poisonous Plants of  
Hawaii. Tokyo, Japan: Charles E.\Tuttle Co., PP.51.
5. British Herbal Medicine Association's Scientific  
Committee.(1983) British Herbal Pharmacopoeia.  
BHMA, Bournemouth.
6. Felter HW, Lloyd JU. King's American Dispensatory.  
18th Ed, 3rd revision, Volume 1. First published  
1983 Quinlan MB, Quinlan RJ, Nolan JM. J  
Ethnopharmacol 2002; 80(1): 75-83.

\*\*\*\*\*

