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KEYWORDS: beef tapeworm, pork tapeworm, fish tapeworm, Dwarf tapeworm

A REVIEW ON MODES OF ACTION OF ANTHELMINTIC DRUGS



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OF PURE MEDICAL RESEARCH**ABSTRACT**

Helminthic infections are among the most widespread diseases in the world, depressing many people around the world. Usually, the worm lives in the GI tract and in the liver. The pathogenic infection causes a serious risk of death and other complications that could not be controlled due to the anthelmintic resistance formed in the host body. Medicinal plants were a powerful source of many medicinal uses. In addition, anthelmintic action plants have gained great interest due to the plant's ability and its therapeutic potential to cause significant economic losses and reduce livestock production for livestock owners. Illegal drugs do not work well in the treatment of disease but have no side effects. So this review focuses on helminthic, a different type of caterpillar, a variety of plants.

INTRODUCTION

Anthelmintics or antihelminthics are a group of anti-depressant drugs that repel worms (helminths) and other internal organs by surprising or killing them and without causing significant damage to the host. The contamination of Helminthes, known as Helminthiasis, is one of the most serious diseases in the world and is likely to cause more panic, financial and social hardship, among humans and creatures, than any single parasites, which severely disrupts the population. Helminthiasis (STHs) transmitted by the soil has a typical effect on 24% of the population, worldwide. Hermmenthiasis (STH) transmitted by the soil is a group of intestinal infections caused by tick-borne parasites that are usually transmitted by the soil. STH is the most common tropical disease and is responsible for significant illnesses and, indirectly, deaths in poor developing countries. STH contributes to general weakness, malnutrition, iron deficiency anemia, and physical and mental disabilities in school children. Helminthiasis brings great misfortune to touch / livestock. Anthelmintics are drugs that can show up locally to get rid of worms in the GIT or basically eliminate growth hats or developmental frames that attack organs and tissues. Insect-borne diseases are the most common cause of the disease in people in remote areas. Gastro-intestinal helminthes are resistant to available anthelmintic drugs and are therefore a major problem in the treatment of helminthes. There is therefore a growing need for natural anthelmintics.

TYPES OF WORM PARASITES

1. Roundworms (Nemathelminthes)
2. Flatworms (Platyhelminthes)

1) ROUNDWORMS:- The roundworms essentially comprise of the following seven species which shall be discussed briefly vis-à-vis the disease they produce in humans in the section that follows:

- a) Hookworms:-these are two type, namely
 - 1) American variety:Necatoramericanus and,
 - 2) European variety.Ancylostomaduodenum
- b) Roundworm
- c) Whipworm
- d) Pinworm
- e) Strongyloidsstercoralis
- f) Trichinellaspirails
- g) Wuchereriabancroft
- h) Flatworms:-The Flatworms Are Normally Of Two Kinds, Namely
- i) Segmented (Cestodes);And B) Nonsegmented (Trematodes)
- j) Cestode
 - 1) beef tapeworm (Taeniasaginata)
 - 2) pork tapeworm (Taeniasolium)
 - 3) fish tapeworm(Diphyllobothriumlatum)
 - 4) Dwarf tapeworm (Hymenolepis nana).
- b) Trematodes

1.Acacia nilotica

Family: Fabaceae

Chemical Ingredients: Flavonoid, Tannins Cyanogenic Glucosides, Free Amino Acids, Labdane Diterpenes and Proanthocyanidins and other Phenolics.

Functional Plant Part: Bark and leaves

The experiment was completed to test the anaclintic activity of Acacia nilotica bark on top, leaving extracts from various solvent. Adult motility tests, egg tests and egg count reduction tests were passed to assess anthelmintic activity. Impact of plant extraction on both leaves and bark of A. nilotica depended on the dose. Significant mortality of worms was observed 12 hours after exposure to 25 mg / ml. Leaf concentrates were stronger than bark extracts. Ethyl acetate releases both bark and, the leaves have a higher anthelmintic effects compared to chloroform, petroleum air and water-soluble compounds. The extraction of crude aqueous methanol (CAME) bark (LC50 = 201.0032 µg / ml) had higher inhibitory effects compared to that of the leaves (LC50 = 769.2485 µg / ml) in the incubating egg. In addition, the components of chloroform and ethyl acetic acid found in A. nilotica bark showed high ovidical movements. In vivo, the largest decrease (72.01%) in the wild egg count was recorded for CAME bark followed by leaf CAME (63.44%) at 8 g / kg on the day after 12 treatments. The results suggest a

lipophilic nature of dynamic levels with anthelmintic effect on *A. nilotica* bark and leaves.

2. *Acalypha fruticosa*

Family: Euphorbiaceae

Chemical Properties: Flavonoids, Alkaloids, Tannins, Phenols and Steroids

Functional Plant: The whole plant

In the present study, In vitro experiments were conducted on older Indianworms (*Pheretima posthuma*) to detect the unimaginable anthelmintic activity of crude methanol concentrate *Acalypha fruticosa*. Methanol concentration of two plants with various modifications (25, 50, 100, 200mg / ml) showed dose-dependent drug trials and the results were reported as a good chance of death and a time of deworming. Piperazine citrate has been used as a standard observation method between 10 mg / ml. Current research has shown that both plants have a greater anthelmintic activity compared to Piperazine.

3. *Ajania nubigena*

Family: Asteraceae

Chemical Properties: (3R, 6R) -Linalool Oxide Acetate, (E) - Spiroether, Luteolin and Luteolin-7-O-B-D-Glucopyranoside

Functional Plant Part: Aerial component

Here the plant is considered to be the four most important chemicals from *A. nubigena* for its anthelmintic properties against nematode whipworm *Trichuris muris* and platyhelminth in the blood risk *Schistosoma mansoni* using the xWORM test process. Of the four experimental chemicals, two mixtures - luteolin (3) and (3R, 6R) - linalool oxide acetic acid derivation (1) - showed double anthelmintic action against *S. mansoni* (IC₅₀ range = 5.8-36.9 µg / mL) and *T. muris* (IC₅₀ range = 9.7- 20.4 µg / mL).). Using electron microscopy scans, it was determined that luteolin was the strongest compound compared to the two parasites and was found to force against schistosomula, an infectious S-component. *mansoni* (IC₅₀ = 13.3 µg / mL). Luteolin induced primary injury to *S. mansoni* also affected finger skin, bacillary groups and T-bacillary organs. *muris*. Among the four tested compounds, luteolin has shown excellent wide-action action against two different helminths - *T. muris* no *S. mansoni* - and we were working on the fight against child schistosomes, the antitrust class of current high-tech drugs, praziquantel

4. *Allium fistulosum*

Family: Amaryllidaceae

Chemical Constituents: Alkaloids, Saponins, Flavonoids, Steroids and Triterpenoids

Plant Part Indicating Activity: Leaves

The present investigation was to evaluate the anthelmintic action of ethanolic and aqueous concentrates of *Allium fistulosum* leaves utilizing *Ascaris lumbricoides* as test worm. Three concentrations of the ethanolic and aqueous concentrates of *A. fistulosum* leaves (50, 100, and 200 mg/ml) were independently tried against *A. lumbricoides* at room temperature for 7 hours. The results were communicated as far as an ideal opportunity to paralysis and time to death of the worms. Pyrantel pamoate was utilized as positive control, sodium chloride and carboxymethyl cellulose were filled in as negative and vehicle control, separately. Time to paralysis and time to death of the worms were dose dependent way. Both ethanolic and aqueous concentrates of *A. fistulosum* leaves have anthelmintic movement against roundworm *A. lumbricoides*.

5. *Alpinia galangal*

Family: Zingiberaceae

Chemical Constituents: Flavonoids such as kaempferol, kaempferide, galangin and alpinin

Plant Part Indicating Activity: Rhizomes

The ethanolic extracts from the rhizome of *Alpinia galanga* were thought about for their anthelmintic activity, in view of customary cases. *Pheritima posthuma* and *Ascaridia galli* were utilized as the appropriate in vitro models; the time which was taken for paralysis (P) and death (D) were utilized as the boundaries to survey their anthelmintic exercises, with Albendazole 50mg/ml as the norm. *Alpinia galangal* displayed a strong movement in a portion subordinate way which was similar to that of the norm, albendazole 23.00 + 2.60(P), 63.33 + 2.33(D) at a 100mg/ml focus against *Ascaridia galli* at minutes 32.83 + 4.07(P) and 69.33 + 3.93.

6. *Antigonon leptopus*

Family: Chemical Properties of Polygonaceae: 2 - Anthocyanins, Pelargonin, Malvin Quercetin, Rhamnetin and Quercetin -3 -O -B -D - Glucopyranoside

Active Plant Section: Roots and Rhizomes

The results showed that ethyl acetate and methanol concentrate of *Antigonon leptopus* completely showed dosage deficits (10, 20, 40 and 80mg / ml) and also caused worm deaths especially in the high 80mg / ml group compared to conventional drugs. Methanolic concentrate of *Antigonon leptopus* was more potent than its ethyl acetate.

7. *Areca catechu*

Family: Arecaceae

Chemical Properties: Carbohydrates, Glycosides, Saponins, Tannins, Alkaloids, Phenolic Chemicals and Flavonoids

Active Plant Part: Seeds

Different concentrations (25, 50, 100 mg / mL) of the *Areca catechu* plant were diluted with 3% Tween 80 in common saline and used for anthelmintic action. Albendazole has been used as a common and common type of saline and has been treated as a control. The result was notified about the time in minutes to report the time of disability and the time of caterpillar death. Ethanol concentrates of plant parts have shown the lower part of the unrestricted motility for example Earthworms defects. The 100mg / mL refill showed an important anti-worm effect. The ethanolic concentration of the plant showed significant anthelmintic activity.

8. *Artemisia absinthium*

Family: Asteraceae

Chemical Constituents: Volatile oil is rich in thujone

Plant Part Indicating Activity: Aerial parts

The target of this investigation was to assess the anthelmintic efficacy of crude aqueous extract (CAE) and crude ethanolic extract (CEE) of the aerial parts of *A. absinthium* in contrast with albendazole against the gastrointestinal (GI) nematodes of sheep. To satisfy the objectives, the worm motility inhibition assay was used so as to explore the immediate impacts of plant extracts on the survival of the adult nematodes under in vitro conditions and fecal egg counts reduction assay to explore the consequences for fecal egg output of GI nematodes under in vivo conditions. Critical anthelmintic impacts of CAE and CEE on live adult *Haemonchus contortus* worms (P < 0.005) were

seen in terms of the paralysis or potentially death of the worms at various hours post-treatment (PT), in any case, CEE were more effective than CAE. The consequences of the current investigation recommend that *A. absinthium* extricates are a promising option in contrast to the industrially accessible anthelmintics for the treatment of GI nematodes of sheep.

9. *Berberis lycium*

Family: Berberidaceae

Chemical Constituents: Berberine, Palmatine, Palmatine chloroform, Berbamine, Aromoline, Oxyacanthine, Umbellatine, β -sitosterole, Punjabine, Balochistanamine, Oxyberberine, Berberine chloroform.

PlantPart Indicating Activity: Roots

The current examination was directed to assess *Berberis lycium* pull bark for its anthelmintic potential. During this examination, in vitro anthelmintic impacts were evaluated in both fluid *Berberis lycium* root bark separates for example decoction and infusion. Three fixations, for example 25, 50 and 100 mg/ml of infusion and decoction were assessed in anthelmintic bioassay, which incorporate the estimation of paralysis and death time of adult earthworm for example *Pheretima posthuma*. Both aqueous extracts indicated impressive anthelmintic action at a most extreme convergence of concentrates for example 100 mg/ml; both the paralysis and death occasions taken by decoction are lesser than infusion demonstrating its better efficacy. The reference standard Piperazine Citrate and control normal saline were utilized in a similar focus as that of concentrates.

10. *Brassica nigra*

Family: Brassicaceae

Chemical Constituents: Tannins

PlantPart Indicating Activity: Seeds

In the present examination, in vitro tries were directed to decide the conceivable anthelmintic impacts of crude aqueous and methanolic concentrates of *Brassica nigra* (seeds) in a portion of 20 and 40mg/ml against Eritrean grown-up night crawler *Pheretima posthuma* to legitimize the customary case utilizing mebendazole as a kind of perspective norm. From the outcomes, the paralysis and death time of worms in all concentrates was seen as dose dependent and the strong anthelmintic action was seen in aqueous concentrates in contrast with methanolic extract. All the qualities were seen as measurably noteworthy with P estimation of 0.00 utilizing one way ANOVA.

11. *Calamus leptospadix*

Family: Arecaceae

Chemical Constituents: Alkaloids, Fats & Oils, Carbohydrates, Glycosides, Steroids, Saponins and Tannins

PlantPart Indicating Activity: Shoots

A thorough examination was conveyed out so as to prove the helpful capability of the plant as far as its anthelmintic activity against *Pheretima posthuma* utilizing Albendazole as a kind of perspective norm. 0.9% w/v of ordinary saline arrangement, 25mg/ml, 50mg/ml, and 100mg/ml every one of standard medication Albendazole and Methanolic, Ethanolic and Aqueous concentrates of *Calamus leptospadix*. Were newly arranged. Forty eight Indian Adult Earthworms were gathered, isolated into twelve gatherings containing four worms in each group. Time for paralysis and time for death were recorded for each

group. All the three concentrates with concentration of 25mg/ml, 50mg/ml, 100mg/ml delivered dose dependent paralysis. Methanolic concentrate of *Calamus leptospadix*. Gave briefest paralysis and death time at 100mg/ml when contrasted with that of standard and other two concentrates. Results are communicated as Mean \pm SEM ($P < 0.05$) of 4 worms in each group. From the examination, conclusion can be drawn that *Calamus leptospadix*. (Arecaceae) utilized by the individuals of Assam generally to treat intestinal worm diseases, has huge anthelmintic activity.

12. *Capparis sepiaria*

Family: Capparaceae

Chemical Constituents: Reducing Sugar, Flavonoids, Steroids, Tannins, Glycosides, Alkaloids, Gums, Resins, Amino Acids, Proteins and Anthraquinones

PlantPart Indicating Activity: Root bark

The investigation reports anthelmintic action of the petroleum ether (60- 80 °C) and ethanol extract got from plant *Capparis sepiaria*. Extract indicated noteworthy effect and dose dependant action contrast with standard medication albendazole. Among them ethanol concentration of *Capparis sepiaria* (40 mg/mL) indicated better action.

13. *Cassia tora*

Family: Leguminosae

Chemical Properties: Flavonoids and Tannins and Anthraquinones.

Functional Plant Part: Leaves

Methanolic concentrate and ethyl acetic acid division of *Cassia tora* L. leaves have been tested as an anthelmintic substance using the model Indian earthworm (*Pheretima posthuma*). Between the worms was the ethyl acetic acid division. The results were compared with a standard drug, albendazole. Phytochemical experiments of these two compounds revealed the presence of phenolics such as flavonoids and tannins as anthraquinones, which may be active ingredients. Current experiments confirm the ethno-medicinal report of the plant as an anthelmintic drug.

14. *Cissus quadrangularis*

Family: Vitaceae

Chemicals: Alkaloid and Tannin and Flavonoids

Functional Plant Part: Aerial component

Investigations are expected to examine the anthelmintic activity of crude methanolic concentrate of *Cissus quadrangularis* aerial components against *H. Contortus*. Adult motility tests and egg implantation were used to look for in vitro effects in adults and to fertilize eggs. High doses of extracts (10 and 5 mg / ml) had a more lethal effect (< 0.05) compared with poor control and low concentration levels, which had been compared with albendazole. Current experiments confirm that the extraction of raw methanolic plant has promising results in killing and hatching an egg in *H. Contortus*.

15. *Citrus limetta*

Family: Rutaceae

Chemical Constituents: Tannins, Phlobatannins, Terpenoid, Alkaloid, Phenols and Flavonoids

PlantPart Indicating Activity: Leaves

The current article outlines the Anthelmintic movement of

crude ethanolic concentrates of Citrus limetta leaves. The anthelmintic test was done on Indian adult worms (*Pheretima Posthuma*), according to the technique for Ajaiyeoba et al., (2001) with slight alterations. The base time for paralysis/death of the worms, was recorded in the ethanolic concentrate of Citrus limetta leaves. The test confirmations have shown critical anthelmintic action of ethanolic concentrates of Citrus limetta leaves, at selected advanced fixation and portion extent combination.

16. *Cleome Rutidosperma*

Family: Cleomaceae

Chemical Constituents: Alkaloids, Flavonoids, Tannins, Glycosides, Reducing Sugar, Saponins, and Steroids

Plant Part Indicating Activity: Aerial part

The point of the examination to explore the in-vitro anthelmintic action of aqueous concentrates *C. rutidosperma* (AECR) leaves against *H. contortus*. In-vitro anthelmintic measure, the AECR at the portions of 25; 50 and 100mg/mL fundamentally ($p < 0.01$) and ($p < 0.001$) incapacitated and caused the death of *H. contortus* in a dose dependent way. Reference standard medication Albendazole (15 mg/mL) applies practically same impact as AECR.

17. *Cloris barbata*

Family: Poaceae

Chemical Constituents: Alkaloids, Flavonoids, Carbohydrate, Glycosides, Tannins, And Saponin

Plant Part Indicating Activity: Leaves

The current investigation was focused on the assessment of in vitro anthelmintic action of ethanolic leaf concentrate of *Cloris barbata* against Indian earthworm *Pheretima posthuma*. Three fixations (25 mg/ml, 50 mg/ml, and 75 mg/ml) were tried and results were communicated in wording of time for paralysis and time of death of worms. In this investigation Albendazole was utilized as a standard medication. Ethanolic leaf concentrate of *C. barbata* indicated progressively huge movement at higher fixations when contrasted with standard group (Albendazole).

18. *Coleus aromaticus*

Family: Lamiaceae

Chemical Constituents: Flavonoids, Terpenoids, Alkaloid, Polyphenolic Compounds and Tannins

Plant Part Indicating Activity: Roots

All the investigational extracts procured the anthelmintic movement at insignificant portion of 10 mg/ml. its critical action ($P < 0.05$) at 10 mg/ml for time taken to paralysis and death when contrasted with the standard medications Piperazine citrate utilized at 10 mg/ml individually. Ends: Herbal medications and synthetic drugs have similarly viable in helminth infestations yet methanolic extract has the most extreme anthelmintic action potential than other root concentrate of *Coleus aromaticus*.

19. *Curcuma amada*

Family: Zingiberaceae

Chemical Constituents: Glycoside, Saponins, Phytosterol and Resins

Plant Part Indicating Activity: Rhizomes

In the current examination, four concentrates viz. petroleum

ether, Dichloromethane, ethanol and aqueous concentrate of rhizomes of *C. amada* were examined for anthelmintic action at three distinct concentrations. Three fixations (50mg/ml, 100mg/ml and 150mg/ml) of each concentrate were contemplated which incorporated the assurance of paralysis time and time of death of earthworm. Piperazine citrate (10mg/ml) was utilized as standard medication and distilled water containing 2% Tween 80 was utilized as control. All the concentrates of both the plants showed dose dependant movement. The outcomes demonstrated that the ethanol separate (150mg/ml) and DCM extricate (150mg/ml) of *Curcuma amada* were powerful in causing death of worms.

20. *Curcuma caesia*

Family: Zingiberaceae

Chemical Constituents: Carbohydrates, Glycoside, Saponins, Resins and Flavonoids

Plant Part Indicating Activity: Rhizome

In the current examination, four concentrates viz. petroleum ether, Dichloromethane, ethanol and aqueous concentrate of rhizomes of *C. caesia* were examined for anthelmintic action at three distinct concentrations. Three fixations (50mg/ml, 100mg/ml and 150mg/ml) of each concentrate were contemplated which incorporated the assurance of paralysis time and time of death of earthworm. Piperazine citrate (10mg/ml) was utilized as standard medication and distilled water containing 2% Tween 80 was utilized as control. All the concentrates of both the plants showed dose dependant movement. The results indicated that ethanol extract (150 mg/ml) of *Curcuma caesia* was most effective in causing paralysis of earthworms.

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