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Research Article

A STUDY ON ANTHELMINTIC ACTIVITY OF KUDAL PUZHU MATHIRAI

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ABSTRACT

Helminthic infections are the most common intestinal parasitic infections of human beings. Because of High prevalence, multidrug resistance, recurrence in nature it has been a challenge to completely eradicate the helminthic infection as of today. Ancient History reveals that many of herbals are used to cure the intestinal Helminthic infections. Hence the herbal preparation of drugs has built confidence among the modern people of today.

Kudal puzhu Mathirai is a Siddha poly herbal formulation used for the treatment of worm infection. Most of the ingredients of KPM have anthelmintic, antispasmodic, anti-inflammatory & stomachic action. The aqueous extract of *Kudal puzhu Mathirai* [KPM] was investigated for anthelmintic activity using Adult earthworm (*Eicinia fetida*). Various concentration of KPM (200 mg/ml, 400mg/ml) were tested in the bioassay. *Piperazine citrate* (50mg/ml) was used as reference standard. Determination of paralysis time and death time of worms were recorded. The result showed that the Aqueous extract of KPM exhibited anthelmintic activity in dose-dependent manner taking shortest time for paralysis (P) =24 Min and death (D) =46 Min with 400mg /ml concentration.

KEYWORDS: *Kudal puzhu Mathirai*, Anthelmintic activity, *Eicinia fetida, Piperazine citrate.*

INTRODUCTION

The helminthes which infect the intestine are cestodes e.g Tape worms *(Taenia solium),* nematode hook worm *(Ancylostoma duodenale),* round worms *(Ascaris lumbricoids)* and trematodes or flukes *(Schistosoma mansoni)* and *(schistosoma haematobium).* Among this Ascariasis infection is a most common infection in human beings affecting a large proportion of the worlds population particularly in developing countries like India they pose a large threat to public health and contribute to the prevalence of anemia, malnutrition, eosinophilia and pneumonia[1] A number of features account for its high prevalence including a wide spread distribution, the durability of eggs under a variety of environmental conditions, the high number of eggs produced per parasite under poor socio economic conditions that facilitate its spread. According to the WHO only a few drugs are used in treatment of these parasite infections. Globally over 3.5 Billion people are infected with intestinal worms of which children between 5-15 years account for the highest infection rate of about 400 million cases of worm burden that are mainly attributed to poor sanitation and hygiene[2]. Ideally an anthelmintic drug should have broad spectrum of action, high percentage of cure, free from toxicity to the host and should be cost effective. None of the synthetic drugs meet this requirement. Even the most common drug like piperazine salts have been shown to have side effects like nausea, intestinal disturbance and giddiness[3]. In the recent years the importance of herbal drugs have tremendously increased because of their

safety, consequently the demand for the herbal formulation is increasing day by day. Siddha system is an ancient Indian system of medicine which has got enormous herbal medicinal values to cure various diseases without any side effects. *Kudal puzhu Mathirai* is one of the simple herbal preparation mentioned in the Siddha literature[4] for curing helminthic infections. The ingredients of the trail drug KPM are (*Azadirachta indica, Vitex negundo, Carum copticum, Piper nigrum, Allium satiuvum, Zingiber officinale, Murraya koenigi, Foeniculum vulgare, Alpinia officinarum* and common salt. The leafs of *Azadirachta indica*[5], *Vitex negundo*[6], *Murraya koenigi*[7], *seeds of Carum copticum*[8], *Piper nigrum*[9], Pulp of *Allium satiuvum*[10], & Rhizome of *Zingiber officinale*[11] have been proved for their Anthelmintic activity.

MATERIALS AND METHOD

Plant material

The raw drugs were obtained from a country drug shop Ramasami chetty at Chennai –Tamil Nadu authenticated by the experts of department of Gunapadam (Pharmacology), Government Siddha Medical College Chennai. The above drugs were subjected to undergo purification process as per Siddha classical text[12].

Method of Purification

Fresh tender leaves of *Vitex negundo, Azadirachta indica & Murraya koenigi* were washed with water. The outer layer of the *Allium satiuvum* was removed. The Outer layer of *Zingiber officinale & Alpinia officinarum* were removed and shallow fried along with *Carum copticum & Foeniculum vulgare, Piper nigrum.*

Table 1: Ingredients of *Kudal Puzhu Mathirai*

S. No.	Drug name	Botanical Name	Part Used	Proportion
1	*Vepan Kozhundhu*	Azadirachta indica	Leafs	One part
2	*Nochi Kozhundhu*	Vitex negundo	Leafs	One part
3	*Omam*	Carum copticum	Seed	One part
4	*Milagu*	Piper nigrum	Seed	One part
5	*Poondu*	Allium satiuvum	Pulp	One part
6	*Chukku*	Zingiber officinale	Rhizome	One part
7	*Kariveppilai*	Murraya koenigi	Leafs	One part
8	*Sombu*	Foeniculum vulgare	Seed	One part
9	*Chitrarathai*	Alpinia officinarum	Rhizome	One part

All the above raw drugs were made into fine powder along with One part common salt and ground by adding the fresh leaves. When these turned to a form of paste and the same is made into pills of size 130 mg.

Trial Drug Kpm

Preliminary phytochemicals analysis

The phytochemical screening of aqueous extract of KPM revealed the presence of Phenol, Sapponins, Ouinones, Terpenoids, Steroids, Flavinoids, Cardiac glycosides, coumarin and beeta cyanin.

Experimental animals

Adult earth worms Eicinia fetida of size 4-6 cm in length and 0.1-0.2 cm in width were used to evaluate anthelmintic activity in vitro. The earthworms were collected from moist soil and washed with normal saline to remove all fecal matter were used for anthelmintic study. The worms were acclimatized to the laboratory condition before experimentation. All test solutions & standard drug solution were prepared freshly before starting the experiments,

observations were made for the time take to paralyze or death of individual worm.

The present study was conducted at C.L.Baid Metha College of Pharmacy Chennai-600097 & the same was approved by the Institutional Animal Ethical Committee (IAEC with the Approval No-IAEC/XXXIX/16/CLBMCP/2013 Dated 29.06.2013.

Anthelmintic assay

The Anthelmintic assay was carried out as per the method of Ajaiyeoba et al with minor modifications[13]. The assay was performed on adult earthworm *(Eicinia fetida)* owing to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings. Easy availability of earthworms prompts their extensive use for preliminary in vitro evaluation of anthelmintic compounds. Three groups of earthworms each group consist of 3 earth worm of approximately equal size were released in to 25 ml solutions of two different concentrations in petri dishes containing solutions of test drug. *Piperazine citrate* was used as reference and as standard control. Determination of time of paralysis and time of death of the worm were done. Time for paralysis was noted when no movement was observed when the worms were shaken vigorously. Time for death of worms was recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water at (50˚C) followed with fading away of their body colours.

Experimental design

The animals were divided into three groups each group contains three animals.

Group-I Worms exposed to 200 mg/ml concentration of KPM

Group-II Worms exposed to 400 mg/ml concentration of KPM

Group-III Worms exposed to Piperazine citrate 50mg/ml concentration

RESULTS & DISCUSSION

The Aqueous extract of KPM exhibited anthelmintic activity in dose-dependent manner taking shortest time for paralysis (P) and death (D) with 400mg /ml concentration. Hence KPM in its different concentration exhibited anthelmintic activity. It shows the shortest time of paralysis (p=24 Min) and death (D=46 Min) in 400mg/ml concentration while the time of paralysis & death will increase in 200mg/ml concentration (p=46 Min &D=90Min) respectively as compared to Piperazine citrate 50mg/ml concentration.

The herbal plants have the anthelmintic activity mainly due to their phyto chemical constituents. These phyto constituents jointly or separately may act by inhibition of tubulin polymerization and blocking glucose uptake. The phenols interface with energy generation and uncoupling the oxidative phosporylation thus interfere with glycoprotein of cell surface may cause paralysis and death of the parasites[14]. Since the trial drug KPM has got high phenolic content it may act as per the above said method.

Table 2: Anthelmintic potency of KPM

Group	Concentration In Mg/ml	Time for Paralysis (Min) (Mean ± S.D)	Time for Death (Min) (Mean ± S.D)
Group I Low dose KPM	200	46.66 ± 7.55	90.34 ± 3.5
Group II Highdose KPM	400	24.22 ± 6.11	46.1 ± 6.5
Group III Standard Piperazine citrate	50	11 ± 2.6	15 ± 2.5

(each value represents mean ± SEM (N=3) P< 0.01

CONCLUSION

From the result it is concluded that the KPM at 400mg/ml concentration showed significant anthelmintic activity when compared with the standard anthelmintic drug. This study reveals that the herbal

preparation is as effective as modern synthetic medicines in treating the helminthic infection. The drug needs to be studied elaborately for phytochemical constituents and their mode of action in anthelmintic activity

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