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ANTHELMINTIC ACTIVITY OF WATER EXTRACTS OF TRIKATU CHURNA AND ITS INDIVIDUAL INGREDIENTS ON INDIAN EARTHWORMS

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ABSTRACT

The Trikatu churna is one of the classical Ayurvedic preparations which is also called as “Three pungents”. It is prepared by mixing equal proportional mixture of powdered fruits of *Piper nigrum L*. i.e. maricha *(Piperaceae), Piper longum L.* i.e. pimpli *(Piperaceae),* & dried rhizomes of *Zingiber officinale Roscoe* i.e. ginger (*Zingiberaceae)*.The present study was aimed to find out the anthelmintic activity of Trikatu churna & its individual ingredients on *Pheritima postuma* i.e. earthworms along with its preliminary phytochemical study. Powdered trikatu & its each component were extracted with water by the process of Maceration. The Albendazole suspension was used as standard. The time required for the paralysis & death was noted. It was found that all the samples possess good Anthelmintic activity at their highest concentrations.

KEY WORDS

Trikatu churna, Ayurvedic preparation, Anthelmintic activity, *Pheritima postuma*, phytochemical study
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INTRODUCTION

Trikatu is an ancient polyherbal blend of *Piper nigrum L. (Piperaceae), Piper longum L.(Piperaceae).& Zingiber officinale Roscoe. (Zingiberaceae)* in the ratio of (1:1:1)

All these plant materials are used worldwide as spices. They are also used as important ingredient in folklore medicines in many Asian countries. However, these spices, when taken, exerts several health beneficial effects, by virtue of their innumerable therapeutic potentials such as fever, asthma, cold, cough and other general health disorders. These three ingredients form a powerful, energizing tonic. Trikatu is highly effective as a digestive aid, boosting metabolism and enhancing elimination of some critical components to maintain whole body health.In equal proportions, it is a common amalgamation used to stimulate and maintain the digestive and respiratory system of the body. This is done by reducing Kapha and increasing Pitta through the rejuvenation of low Agni (fire), and eradicating away the Ama (toxins). There are several benefits of Trikatu churna like; Trikatu ignites digestive fire, it helps in maintaining diabetes mellitus. It removes extra fats from the body. Also Trikatu rejuvenates the skin.etc.

MATERIALS AND METHODS

The anthelmintic activity of water extracts of Trikatu churna and its individual components such as pimpli (*Piper longum),* maricha *(Piper nigrum)* and ginger *(Zingiber officinale)* were tested on adult Indian earth worms i.e. *Pheritima postuma*. The water extracts are made in various concentrations and they were able to show anthelmintic activity at 8mg/ml concentration. The activities were comparable with the standard drug albendazole. The crude extracts of Trikatu churna and its ingredients were also screened for preliminary phytochemical studies to find out the secondary metabolites present in the extracts.

(1) Preparation of Trikatu churna:

The Trikatu churna is fine powder of dried drugs. It is prepared by mixing equal quantities of *Piper longum, Piper nigrum* and *Zingiber officinale* and then sieved through muslin cloth. It is then stored in tightly closed container.

(2)Preparation of extract:

Powdered Trikatu churna and its each ingredient were extracted with distilled water by the process of maceration for seven days and the crude extracts were obtained, then dried and yield is measured. Various dilutions were made in concentrations of 100mg/50ml, 200mg/50ml, 300mg/50ml and 400mg/50ml of water.

(3)Biological study:

Healthy adult Indian earthworms (*Pheritima postuma*) due to its anatomical and physiological resemblance with the intestinal round worm parasites of human beings were used in the present study. All earth worms were of approximately equal size. They were collected from local place and washed with normal saline solution to remove the adherent material if any and used for further studies.

(4)Preparation of standard solution:

The Trikatu churna and its individual component were tested for anthelmintic activity and compared with that of the standard drug Albendazole.

(5)Preliminary phytochemical screening:

The Trikatu churna and its each ingredient were tested for preliminary phytochemical screening by applying general chemical tests for

alkaloids, tannins, steroids, terpenoids, phenols, flavonoids, saponins, etc.

(6) Anthelmintic activity:

Indian adult earthworm i.e. *Pheritima postuma* was collected from the local place and washed thoroughly with normal saline solution to remove out the adhering material, if any. Clean beakers of equal sizes were collected & 50 ml of standard albendazole solutions of various concentrations like 100mg/50ml, 200mg/50ml, 300mg/50ml and 400mg/50ml were poured in four beakers previously labeled as per concentrations. Similarly water extracts of trikatu churna and its individual ingredients were also prepared in concentrations as given above and poured in previously labeled beakers. Then two earthworms of nearly equal sizes are placed in each beaker. Then the time taken for induction of paralysis i.e. motionlessness and the same for complete death was noted.

RESULTS AND DISCUSSION

The anthelmintic activity of trikatu churna and its each ingredient is done and the results are noted. This result shows that, aqueous extracts of trikatu churna and its ingredients possess potent anthelmintic activity in dose dependent manner. The activity shown by aqueous extract is of considerable importance. The extract of trikatu churna shows highest activity which is almost equal to the effects shown by standard albendazole solution. The time taken for the induction of paralysis and death in both albendazole and trikatu churna was almost same but the significant difference was observed in the case of comparison between albendazole and ingredients of trikatu churna alone. The extent of activity shown by crude extracts was found to be dose dependent. The results are elaborated in the table given here under-

Table 1.
Anthelmintic activity of trikatu churna and its each ingredient.

Treatment	Concentration in mg/50ml	Paralysis time (min)	Death time (min)
1.Albendazole solution	100	42	140
	200	37	126
	300	32	110
	400	28	92
2. Piper longum Linn.	100	142	253
	200	137	237
	300	129	229
	400	115	210
3. Piper nigrum Linn.	100	95	282
	200	89	274
	300	82	261
	400	75	245
4. Zingiber officinale R.	100	70	273
	200	66	268
	300	59	253
	400	50	237
5. Trikatu churna	100	50	147
	200	42	131
	300	35	113
	400	30	100

Aqueous extracts of Trikatu churna and its ingredients were subjected to preliminary phytochemical screening to determine the presence of secondary metabolites. Results of this study clearly indicate the presence of alkaloids, tannins, phenols, flavonoids, steroids, lignin and saponins in trikatu churna. But steroids are absent in black peppr , lignin is absent in ginger while saponins and tannins are absent in pimpli. As trikatu churna extract shows all tests positive, it indicates that, it is a mixture of all these phytoconstituents.

The anthelmintic activity of aqueous extract was compared with that of standard drug; albendazole. Mechanism of action of albendazole is generally by paralyzing the parasites. This allows host body to easily remove out the harmful organisms. These standard drugs like albendazole, piperazine citrate shows some undesirable effects like gastrointestinal disturbances, bronchospasm, dizziness, vertigo and noncoordination. These drugs are also contraindicated in pregnancy and in disturbed renal and hepatic function.

But herbal formulations generally do not cause any unwanted effects, because such formulations are safe, natural and have little or no side effects. Also raw materials required for the formulation are easily available with low cost. Thus, if we formulate anthelmintic drug from trikatu churna, then it will be beneficial to human beings. Albendazole acts by inhibiting neuromuscular transmission in worm may be by acting like GABA; the inhibitory neurotransmitter in nematodes. Flaccid paralysis of worms followed by death occurs. The fact that water extracts of trikatu churna also shows paralysis in worms followed by death suggests that it may act like albendazole.

CONCLUSION

From the above study it could be concluded that aqueous extract of trikatu churna is having potent anthelmintic activity compared to the standard drug albendazole which shows a significant result, i.e. Trikatu churna was found to possess higher rate of phytoconstituents and promising anthelmintic activity. Also it was found that, this spicy preparation fights against parasites and enhances natural immune system in human beings.

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