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PHYTOCHEMICAL AND ANTHELMINTIC EVALUATION OF *LANTANA CAMARA* (L.) VAR. ACULEATE LEAVES AGAINST *PHERETIMA POSTHUMA*

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Abstract:

Lantana camara Linn. (Verbenaceae) is a hardy, evergreen, straggling shrub with characteristic odour, it grows up to 3 m height, with or without minute prickles on the branches. It is among top ten invasive weeds on the earth. It is a perennial shrub found growing up to 2000 m altitude in tropical, sub tropical and temperate parts of the world. The plant is spread widely over Himachal Pradesh, Uttarakhand, Uttar Pradesh and north-eastern States of India. Successive extracts from the leaves of *Lantana camara Linn* (Verbanaceae) were investigated for their anthelmintic activity against *Pheretima posthuma* and three concentrations (10, 50 and 100 mg/ml) of each extracts were studied in activity, which involved the determination of time of paralysis and time of death of the worm. Ethanolic extract exhibited significant anthelmintic activity at highest concentration of 100 mg/ml. Piperazine citrate in 10 mg/ml concentration as that of extract was included as standard reference and 1% Gum acacia in

normal saline as control. The anthelmintic activity of Ethanolic extract was significant followed by hydroalcoholic extract of *Lantana camara.*

Keywords: Anthelmintic Activity, Phytochemical Evaluation, *Lantana Camara*, Ethanol Extract.

Introduction:

Helminth infections are among the most common infections in man, affecting a large proportion of population all over the world. In developing countries they pose a large threat to public health and contribute to the prevalence of malnutrition, anaemia, eosinophilia and pneumonia. Although the majority of infections due to worms are generally limited to tropical regions [1]. Parasitoses have been of concern to the medical field for centuries and the helminths still cause considerable problems for human beings and animals. During the past few decades, despite numerous advances made in understanding the mode of transmission and the treatment of these parasites, there are still no efficient products to control certain helminths and the indiscriminate use of some drugs has generated several cases of resistance [2, 3, 4]. Furthermore, it has been recognized recently that anthelmintic substances having considerable toxicity to human beings are present in foods derived from livestock, posing a serious threat to human health [5, 6].

Lantana camara Linn. (Verbenaceae) is a hardy, evergreen, straggling shrub with characteristic odour, it grows up to 3 m height, with or without minute prickles on the branches. It is among top ten invasive weeds on the earth[7]. It is a perennial shrub found growing up to 2000 m altitude in tropical, sub tropical and temperate parts of the world. The plant is spread widely over Himachal Pradesh, Uttarakhand, Uttar Pradesh and north-eastern States of India [8, 9]. All parts of this plant have been used traditionally for several ailments throughout the world. The leaves of this plant were used as an antitumeral, antibacterial, and antihypertensive agent[10], roots for the treatment of malaria, rheumatism, and skin rashes[11]. Several tri- terpenoids, flavonoids, alkaloids, and glycosides isolated from this plant are known to exert diverse biological activities[8]. Extract from the leaves of *L. camara* possessed larvicidal activity[12] while extract from flowers of the plant showed repellent activity against mosquitoes[13, 14.]

Traditionally *Lantana camara* is considered antiseptic, antispasmodic, carminative and diphoretic. Antiinfflamatory, antipyretic and analgesic properties of extracts of *Lantana camara* leaves has been reported. *Lantana camara* is used in herbal medicine for the treatment of skin itches, as an antiseptic for wounds, and externally for leprosy and scabies. Major natural products investigated in *Lantana camara* belong to the group of triterpinoides, flavonoides and other compounds. In herbal medicine, infusions of the leaves and other plant parts are used as an anti-inflammatory [15], a tonic and expectorant, and added to baths as an antirhumatic. Lantana extracts have also been shown to be a powerful febrifuge [16]. Because the leaves and some other parts of lantana are poisonous, care must be taken when it is used medicinally. The ripe fruit is benign and heavily consumed by birds and frequently eaten by humans in some countries [17]. Extracts of lantana leaves have shown strong insecticidal and antimicrobial activity in numerous experiments. Storing potatoes with lantana leaves nearly eliminates damage by *Phthorimaea operculella* Zeller, the potato tuber moth [18].

MATERIAL AND METHODS

Plant Material:

Leaves of *Lantana camara* was collected from local area of Mangalpally(V),Ibrahimpatnam(M),RR District,(A.P.) India. It was identified and authenticated by Mr. Kartik Charan Lenka, Scientist (Taxonomy, Biodiversity & Ethno botany of Eastern ghat) Jeypore, at Bijju Patnaik Plant Garden & Research Center M. S. Swaminathan Research Foundation Jeypor, Orissa. A voucher specimen in deposited in Department of Pharmacognosy.

Preparation of Extracts:

The Leaves was collected in the month of October 2008, shade dried and powdered. 250gm of powder was subjected to successive soxhlet extraction by various solvent such as petroleum ether, chloroform, ethanol and hydroalcohol (40%). The solvent was then removed under reduced pressure the yield obtained was petroleum ether (3.8%), chloroform (3.5%), ethanol (5.2%) and hydroalcohol (4.1%) w/w with respect to dried powder. which were used for anthelmintic activity.

Phytochemical investigation:

The individual extracts like petroleum ether, methanol and water were subjected to qualitative chemical in-vestigation for the identification of different phyto-constituents like sterols, glycosides, saponins, carbo-hydrates, alkaloids, flavonoids, tannins, proteins, tri-terpenoids[19, 20].

Anthelmintic Bioassay:

Healthy adult Indian earthworms, *Pheretima postuma,* (Annelida, Megescolecidae) due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings[21, 22], were used in the present study. All earthworms were of approximately equal size. They were collected from local place, washed and kept in water.

Assessment of Anthelmintic Activity:

Anthelmintic activity was assessed using earthworms by the reported methods with slight modification[23]. Samples for anthelmintic activity were prepared by dissolving 2.5 gm dried crude extracts in 25 mL 1% gum acacia solution prepared in normal saline (vehicle). To obtain a stock solution, different working solutions were prepared to get a concentration range of 10, 50 and 100 mg/mL. The anthelmintic activity was evaluated on adult Indian earthworm, *Pheretima posthuma* due to its anatomical and physiological resemblance with the intestinal round worm parasites of human being [24]. The anthelmintic activity of successive extract Leaves of *Lantana camara* was determined by using the method of Mathew et al [25]. Six groups of approximately equal size Indian earthworms consisting of six earthworms in each group were used for the study. Each group was treated with one of the following.

Group-I - Vehicle (1% Gum acacia in normal saline)

Group-II - Piperazine citrate (15 mg/ml)

Group-III- Petroelum ether extract (10, 50,100 mg/ml.)

Group- IV- Chloroform extract (10, 50,100 mg/ml.)

Group- V- Ethanolic extract (10, 50,100 mg/ml.)

Group- VI- Hydroalcoholic extract (10, 50,100 mg/ml.)

Observations were made for the time taken to paralyze and / or death of individual worms. Paralysis was said to occur when the worms do not review even in normal saline. Death was concluded when the worms lost their motility followed with fading away of their body colour[26, 27].

Statistical analysis:

The data on biological studies were reported as mean ± Standard deviation (n = 6). For determining the statistical significance, standard error mean and analysis of variance (ANOVA) at 5 % level significance was employed. $P < 0.05$ were considered significant.

Results and Discussion:

Successive extract of leaves of *Lantana camara* showed significant anthelmintic activity on selected worms. Ethanolic extract found to be more active as compared to remaining extracts. The Ethanolic extract demonstrated paralysis as well as death of worms in a less time as compared to piperazine citrate especially at higher concentration of 10 mg/ml in case of *Pheretima posthuma*. The results are shown in Table -1. Phytochemical analysis of the sucessive extracts leaves of *Lantana camara* revealed presence of saponin, steroids, alkaloids, tannins, polyphenols, terpenoids and flavonoids as are the chemical constituents. Results are shown in Table.-2.

Tannins are polyphenolic compounds[28]. Some synthetic phenolic anthelmintics, e.g. niclosamide, oxyclozanide, bithionol, nitroxynil, etc, are shown to interfere with energy generation in helminth parasites by uncoupling oxidative phosphorylation[29]. It is possible that tannins contained in the extract of *Lantana camara* produced similar effects. In another study, polyphenols from bryophytes were shown to have anthelmintic activity against Nippostrongylus brasiliensis[30]. Another possible anthelmintic effect of tannins is that they can bind to free proteins in the gastrointestinal tract of host animal [31] or glycoprotein on the cuticle of the parasite [32] and cause death. Several authors have reported that an increase in the supply of digestible protein does improve the resilience and resistance of sheep to gastrointestinal nematodes[33, 34, 35]. Tannin containing plants increase the supply and absorption of digestible protein by

animals[36]. This is achieved by formation of protein complexes in the rumen by tannins, which later dissociate at low pH in the abomasum to release more protein for metabolism in the small intestines of ruminant animals[37]. In addition, tannins or their metabolites have a direct effect on the viability of the preparasitic stages of helminths. Other phytochemicals reported to have an anthelmintic effect include essential oils[38], fl avonoids and Terpenoids [39].

Table 1: Anthelmintic activity of Leaves of *Lantana camara***.**

Group	Treatment	Concentration(mg/ml)	Paralysis Time* (min.)	Death rate * (min.)
1	Vehicle	-	-	-
2	Piperazine citrate	10	23.3±0.6	27.3±0.5
3	Petroleum ether	10	123.21±0.5	138.11±0.3
		50	118.32±0.0	123.31±0.2
		100	102.03±0.4	106.81±0.2
4	Chloroform	10	111.12±0.5	152.11±0.3
		50	102.44±0.4	128.14±0.2
		100	75.0±0.4	97.48±0.1
5	Ethanolic	10	72.17±0.2	90.76±0.0
		50	45.89±0.3	55.47±0.0
		100	31.75±0.5	42.13±0.9
6	Hydroalcoholic extract	10	86.3±0.5	98.9±0.5
		50	66.22±0.5	79.4±0.2
		100	52.12±0.3	68.18±0.1

*Results are expressed as mean ± S.E.M. (n=6) for each group; significance at $p< 0.05$, as compared to Standard.

Table 2: Data showing preliminary Phytochemical screening of the leaf extracts of *Lantana camara* Linn.

Sl.No.	Tested group	Petroleum ether	Chloroform	Ethanolic	Hydroalcoholic extract
1.	Alkaloids	+++	---	+++	---
2.	Saponins	---	+++	+++	---
3.	Glycosides	---	+++	+++	---
4.	Carbohydrate	---	+++	+++	+++
5.	Tannins	+++	+++	+++	+++
6.	Flavonoids	---	+++	+++	+++
7.	Steroids	+++	+++	+++	+++
8.	Triterpenoids	+++	+++	---	+++
9.	Fixed oil and fates	---	---	---	---

+++ Positive, --- Negative

CONCLUSION:

From the above results, it is concluded that Ethanolic extracts of leaves of *Lantana camara* showed significant anthelmintic activity. *Lantana camara* was used by tribals traditionally to treat intestinal worm infections. The experimental evidence obtained in the laboratory model could provide a rationale for the traditional use of this plant as anthelmintic. The plant may be further explored for isolation of the active constituent accountable for anthelmintic activity.

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