Research Article

Investigations on *Drosera regia* and *Schleichera oleosa* leaves for anthelmintic activity

Rama Shankar Dubey¹, Rajesh Shukla², Vikas Pandey², Ajay Kumar Shukla^{3*}

¹Department of Chemistry and Pharmacy, NRI Institute of Pharmacy, Bhopal, India

²Department of Pharmaceutical Science, Guru Ramdas Khalsa Institute of Science & Technology Pharmacy, Jabalpur, India

³Department of Pharmaceutical Science, ITM College of Pharmacy, Gida Gorakhpur, India

Received: 11 July 2019

Revised: 2 August 2019

Accepted: 17 August 2019

Abstract

Objective: The aim of this study was to investigate anthelmintic efficacy of *D. regia* and *S. oleosa* leaves. **Material and methods:** Firstly plant leaves material was defatted with petroleum ether and prepared hydro-alcoholic extracts. Hydroalcoholic extract taken and was evaluated separately for anthelmintic activity on adult Indian earthworm *Pheretima posthuma*, using Albendazole as reference standard, paralysis and death time was noted. **Results and Conclusion:** The results represented that the hydroalcoholic extract of *D. regia* was more potent than *S. oleosa* extract. Conclude that *S. oleosa* leaves could be used for development of novel anthelmintic treatment.

Keywords: *Drosera regia*, anthelmintic, *Pheretima posthuma*, earthworm, Albendazole

Introduction

Only a handful of anthelmintic compounds are currently available; these are classified into several families that such as benzimidazoles, macrocyclic lactones, imidazothiazoles, and cyclic Octadepsipeptides etc. Various studies recently have been showed the presence of gastrointestinal nematodes that are resistant to the main marketed available anthelmintic drugs on cattle farms. These drugs having various side effects, consequently, we believe the research of herbal plants species that could have antiparasitic activity, because many of these herbal plants have been used as traditional medicine in the olden days (Rajeshwari et al., 2014). Medicinal plants were the potent source of several pharmacological activities. Hence, the need for the investigation of the plants for the treatment has attained a great interest and in present investigation our objective was to investigate anthelmintic efficacy of *D. regia* and *S. oleosa* leaves.

Drosera regia (Gulmohar) tree is a class of the family

Fabaceae. It is an ornament plant also called as flame tree. It is commonly known for its beautiful flowers. But it also has some pharmacological properties such as anti-diabetic activity, anti-bacterial activity, anti-diarrheal property, hepatoprotective/cytotoxic property, anti-microbial activity and antiinflammatory activity. It belongs to the family of Leguminosae. The phytochemically gulmohar contains sterols, phenolic compounds, triterpenoids, and flavonoids. Its flowers yielded saponins, flavonoids, carotenoids, tannins, steroids, alkaloids, and sterols. The bark of plant has sitosterol, carotene, hydrocarbons phytotoxins, saponins, alkaloids, and flavonoids. The stem bark of plant four triterpenes contains like as sitosterol, stigmasterol, lupeol, epilupeol, and an aromatic compound p-methoxybenzaldehyde. Their leaf contains sitosterol and lupeol (Shuhane et al., 2016).

Schleichera oleosa (Kusum) is well recognized tree of medicinal significance in India. All parts of this plant are using in Indian traditional healing. Kusum based natural formulations are very popular among the healers of current generation. *Schleichera oleosa*, belonging to the Sapindaceae family, has been reported to possess antimicrobial, antioxidant, anticancer activity, and can be used for the making of biodiesel. The plant contains low tannin levels therefore it can be used as fodder for

*Address for Corresponding Author:

Ajay Kumar Shukla
Department of Pharmaceutical Science,
ITM College of Pharmacy, Gida Gorakhpur (U.P.), India
Email: ashukla1007@gmail.com

DOI: <https://doi.org/10.31024/apj.2019.4.4.1>

2456-1436/Copyright © 2019, N.S. Memorial Scientific Research and Education Society. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

livestock. This species contains important phytochemicals such as terpenoids, betulin, betulinic acid etc. Most of literature reveals that this medicinal plant can be used as a substitute to synthetic compounds for use in preventing and treating numerous diseases (Anuragi et al., 2017).

Materials and Methods

Plant Material

The plant leaves of *D. regia* and *S. oleosa* leaves were obtained from Botanical garden of Rani Durgavati University, Jabalpur MP, India, during the month of January. The standard drug, Albendazole was purchased from local market of Bhopal, Madhya Pradesh, India and test sample. All the other reagents were purchased of analytical reagent grade and used.

Preparation of plant extracts

Dried and powdered leaves of *D. regia* and *S. oleosa* were defatted firstly to remove fatty material, using petroleum ether solvent. The marc of plant material was kept for 1 week into ethanol and water mixture solvent (70:30). Then after 1 week filtered, evaporated and concentrated to dry residue. The residue was dried at desiccators. Finally the marc was macerated with distilled water (3 days) to obtain aqueous extract.

Evaluation of anthelmintic activity

Earth-worm *Pheretima postuma* was taken from Jawaharlal Nehru Krishi Vishwavidyalaya (JNKVV), Jabalpur Madhya Pradesh India. All earthworms were having equal size (4-7cm approximately). The anthelmintic activity was performed in-vitro by using adult *Pheretima postuma* worms owing to their physiological and anatomical similarity with the intestinal round worms. The anthelmintic activity was investigated on adult

Indian earthworm suitable to its anatomical and physiological similarity like the intestinal roundworm parasites of human beings. Eighteen groups, each consisting of six earthworms of about equal size were released in to 10 ml of suspension. Each group was treated with one of the following: vehicle standard albendazole (25 mg/ml, 50 mg/ml and 100 mg/ml), Hydroalcoholic extract of *D. regia* and *S. oleosa*. Observations were finished for the time taken to paralysis and death of individual worms. The death time was concluded when the worms lost totally their motility followed with fading away of their body colour (Tiwari et al., 2016; Gupta et al., 2015).

Results and Discussion

In vitro investigation results indicated that the hydroalcoholic extract of *D. regia* and *S. oleosa* leaves of plant extract at 100 mg/ml inhibited almost completely the mobility of isolated worms which is comparable with the reference standard drug albendazole. The present investigation, therefore, reveals that the hydroalcoholic extract *D. regia* was more potent than the *S. oleosa* at the doses of 25, 50 and 100 mg/ml. The results of anthelmintic activity reveal concentration dependent nature of different extracts. Potency of the herbal extracts was found to be inversely proportional to the time taken for paralysis and death of the worms. The phenolic compounds of both of plant leaves to produce anthelmintic activities (Gupta et al., 2013).

Conclusion

In conclusion, the traditional use of stem of *D. regia* and *S. oleosa* plant extract as an anthelmintic drug has been

Table 1. Anthelmintic activity of plant extracts

Extract (min) and standard drug (Albendazole 20 mg/ml)	Time taken for paralysis (min)	Time taken for death
25 mg/ml	53.8 ± 1.22	55.0 ± 1.20
50 mg/ml	40.6 ± 0.92	42.5 ± 1.25
100 mg/ml	33.2 ± 0.31	62.6 ± 0.98
<i>D. regia</i>		
25 mg/ml	91.5 ± 1.22	95.0 ± 1.63
50 mg/ml	77.1 ± 0.11	82.0 ± 1.71
100 mg/ml	60.0 ± 0.90	68.0 ± 0.23
<i>S. oleosa</i>		
25 mg/ml	113.8 ± 1.64	81.0 ± 1.26
50 mg/ml	84.6 ± 0.82	100 ± 1.33
100 mg/ml	71.2 ± 0.23	79 ± 1.28

All values are represent Mean ± SEM; N=6 in each group; ** P<0.001

confirmed in our study. Further, it would be interesting to isolate the possible phytochemical constituents who might be responsible for the anthelmintic activity possible mechanism (s) of action can be elucidated. It might have some other antimicrobial activity.

Conflicts of interest: Not declared.

References

- Anuragi JL, Mishra RP. 2017. Ethnomedicinal study of *Schleichera oleosa* among the tribals of Satna (M.P). International Journal of Applied Research, 3(3): 672-674.
- Gupta M, Lodhi S, Shukla A. 2015. Preliminary phytochemical analysis and in vitro anti-helminthic activity of *Martynia annua* Linn and *Permotrema reticulatum* Asian Journal of Biomaterial Research, 1(2):72-74.
- Gupta R, Sharma P, Garg A, Shukla A, Jain AP. 2013. Investigation of in vitro anthelmintic activity of *Ficus elastica* leaves. Journal of Drug Discovery and Therapeutics, 1(5): 01-03.
- Rajeswari VD. 2014. Anthelmintic Activity of Plants: A Review. Research Journal of Phytochemistry, 8: 57-63.
- Suhane N, Shrivastava RR, Singh M. 2016. Gulmohar an ornamental plant with medicinal uses. Journal of Pharmacognosy and Phytochemistry, 5(6): 245-248.
- Tiwari J, Shukla A. 2016. Investigations on *Calliandra haematocephala* flowers extract for in-vitro anthelmintic activity Advance Pharmaceutical Journal, 1(1):17-20.