



In vitro* anthelmintic activity of *Sansevieria trifasciata* leaves extract against *Fasciola hepatica

Wambugu F. Karomo and Waweru W. Rwai

Department of Biomedical Laboratory Science, School of Health Sciences, Mount Kenya University Kigali, Rwanda

Received: 20-09-2016 / Revised: 25-10-2016 / Accepted: 28-10-2016 / Published: 31-10-2016

ABSTRACT

The purpose of this study was to investigate the *in vitro* anthelmintic activity of *Sansevieria trifasciata* leaves extract against *Fasciola Hepatica*. The extract was prepared by soaking one portion of the plant leaves into absolute ethanol and another portion in distilled water for 3 days. The extracted plant material was then squeezed through a piece of porous cloth. The extracts were concentrated in a rotary evaporator at 40°C under reduced pressure and later stored at 4°C until use. The flukes were collected and transferred in flasks containing normal saline maintained at a temperature of 37°C to the laboratory in school of health Science, Mount Kenya University for experimental protocol. *S. trifasciata* leaves tested positive for flavanoids, tannins, alkaloids, phenols, steroids and saponins. The in-vitro assay showed that different doses of the extract resulted to death of the parasites at different mean time.

Keywords: *Sansevieria trifasciata*, *Fasciola Hepatica*, *Phytochemical*.



INTRODUCTION

The use of plants in managing various diseases and health conditions has been ongoing for years. Human being has been relying on plants with medicinal value since human civilization [1]. According to [2], plants have been used to generate parasitic medication for parasitic infections in man and animals. Helminthes infections pose a great challenge to the livestock industry globally. The livestock infestation with helminthes and other parasites has been associated with great global economic losses arising from death of the infested animals as well as decreased productivity [3]. Parasitic diseases are among the major livestock production obstacle in Sub-Saharan Africa [4]. *Fasciola hepatica* commonly known as liver fluke is among the parasites causing considerable effects of livestock production and especially in daily cows [5]. Previous studies have shown that fluke infection lowers the productivity of dairy cattle. [5] reported an 8 and 15% decrease in milk production in cows infested with flukes. Decrease in butterfat content and fertility are among other effects that has been associated with fasciolosis [6]. *Sansevieria trifasciata* commonly known as Snake Plant is one of the tropical plants native to

Africa. This evergreen plant is mostly known for its ability to purify air in offices and buildings [7]. In Rwanda and entire East Africa, the plant is commonly found cultivated around homes or potted in offices for its ornamental value. Besides being cultivated for use as a source of fiber, *S. trifasciata* is also viewed as a medicinal plant in African counties as well as and Southeast Asia [8]. The present study was conducted to evaluate the *in vitro* anthelmintic activity of ethanolic and water extract of *Sansevieria trifasciata* against *fasciola hepatica*.

MATERIALS AND METHODS

Collection of plant material: The plant was collected from Niboye sector in Kicukiro district, Rwanda and authenticated from the school of Health sciences in Mount Kenya University Kigali.

Extract preparation: The plant leaves were washed then cut into small pieces and divided into two portions. The first portion was soaked in sufficient amount of absolute ethanol for 3 days. Likewise, the second portion was soaked in distilled water. The plant material was squeezed through a piece of porous cloth. The extracts were

concentrated in a rotary evaporator at 40°C under reduced pressure and later stored at 4°C until use.

Collection and maintenance of Helminthes:

Adult liver flukes were obtained from cattle slaughtered in Satra abattoir in Kicukiro district, Kigali. The parasites were washed with warm normal saline solution to remove all the fecal matter. They were then transferred in flasks containing normal saline maintained at a temperature of 37°C and transported to the laboratory in school of health Science, Mount Kenya University for experimental protocol.

Phytochemical screening: phytochemical screening was done using procedures described by [9, 10, 11].

Test for Tannins: 1 ml of the ethanol extract was added in 2 ml of water in a test tube. 3 drops of diluted ferric chloride solution was added and blue-green coloration was observed confirming presence of tannins.

Test for Saponins: Foam Test; 0.5 gm of extract was shaken with 2 ml of water. The foam produced persisted for ten minutes indicating the presence of saponins.

Test for Alkaloids: Wagner's Test; Extracts were dissolved individually in dilute Hydrochloric acid and filtered. Filtrates were treated with Wagner's reagent. Formation of brown precipitate indicated the presence of alkaloids.

Test for Flavonoids: Alkaline Reagent Test; Extracts were treated with few drops of sodium hydroxide solution. Formation of an intense yellow color, which becomes colorless on addition of dilute acid, indicated the presence of flavonoids.

Test for Phenols: Ferric Chloride Test; Extracts were treated with 3-4 drops of ferric chloride solution. Formation of bluish black color indicated the presence of phenols.

In vitro anthelmintic activity of extracts: The test was carried out in vitro using motile adult liver flukes. Test samples of the extract were prepared at the concentrations 200 mg/ mL and 400 mg/mL and 800 mg/mL in distilled water. The worms were placed in three Petri dishes containing 200 mg/ mL and 400 mg/mL and 800 mg/mL of the extract each dish containing six worms. Albendazole (8 mg/mL) was used as the standard drug. Observation was made from the treatment of parasites with extract to time taken to paralyze or cause death of individual worms. Paralysis was said to have occurred when the worm lost or

significantly reduced motility. Death was concluded when the worm lost their motility completely followed by fading away of their body colour [12]. The bioassay data of the study was recorded as mean \pm standard deviation

RESULTS

Phytochemical Screening: A sample of ethanolic extract of *S. trifasciata* leaves was tested for the presence of various phytochemicals. Procedures for phytochemical screening described by [9, 10, 11] were used. The sample tested positive for flavanoids, tannins, alkaloids, phenols, steroids and saponins (Table 1).

Anthelmintic Activity of the extract: The current study sought to determine the anthelmintic activity of *Sansevieria trifasciata* ethanolic leaf extract against *fasciola hepatica*. The in-vitro assay showed that different doses of the extract paralyzed the parasites within different mean time. The mean time taken by the extract to paralyze the parasites decreased with increase in dose concentration as indicated in table 2. Additionally, the extract killed the parasites and the mean death time decreased with increase in dose concentration (Table 3).

DISCUSSION

The preliminary test showed that *Sansevieria trifasciata* contains flavanoids, tannins, alkaloids, phenols, and saponins. These findings are consistent with those reported by [8]. Evaluation of the plant extract for anthelmintic activity showed that *Sansevieria trifasciata* leaves extract has a wormicide activity against *fasciola hepatica*. All the studied dosages i.e. 200mg/ml, 400mg/ml and 800mg/ml have anthelmintic activity. However, the wormicide activity of the plant extract was comparable to that of Albendazole at a dose of 800mg/ml. This indicates that the active ingredients in the plant could be exploited to prepare wormicide that could be used by farmers to control liver flukes.

CONCLUSION

Following the findings, the study concludes that ethanolic leaf extract of *Sansevieria trifasciata* has anthelmintic activity against *fasciola hepatica*. Further, the study concludes that the plant extract activity against the parasites is comparable to that of Albendazole at 800mg/ml.

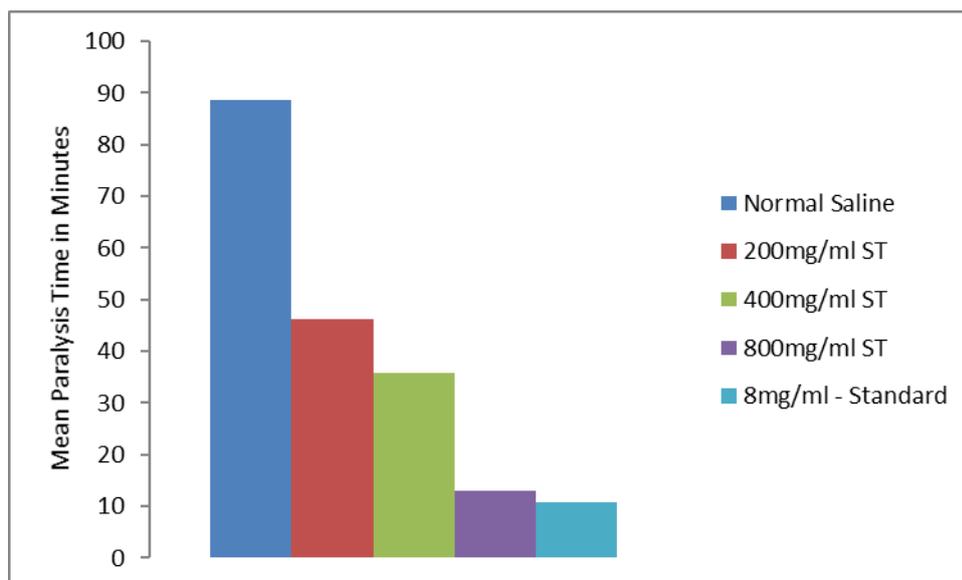


Figure 1 Mean Paralysis time in minutes of ethanolic extract of *Sanseiveria trifasciata* leaf extract and Albendazole on *Fasciola hepatica*

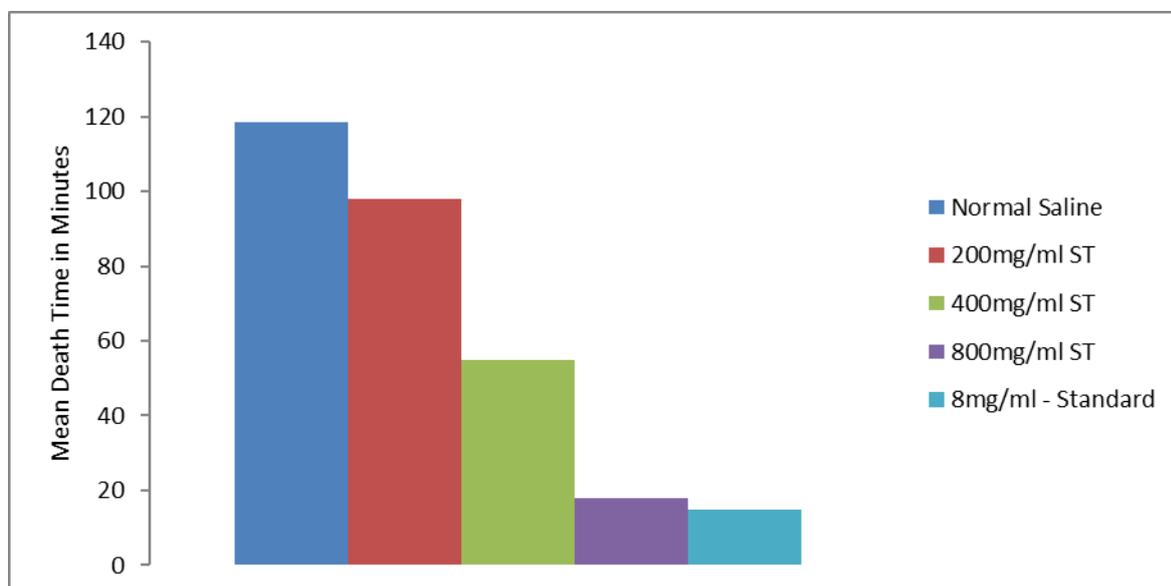


Figure 2 Mean death time in minutes of ethanolic extract of *Sanseiveria trifasciata* leaf extract and Albendazole on *Fasciola hepatica*

. Table 1: Phytochemical analysis of *Sanseiveria trifasciata* leaf extract

Photochemical tested	Observation	Conclusion
Flavanoids	++	Present
Tannins	++	Present
Alkaloids	+++	Present
Phenols	+++	Present
Saponins	+++	Present
Steroids	++	Present

Table 2. Paralysis effect of *Sansevieria trifasciata* leaf extract on *Fasciola hepatica* (n=6)

Test Compounds	Conc.(mg/ml)	Mean of Paralysis Time in minutes
<i>S.Trifasciata</i> <i>Ethanollic Extract</i>	200mg/ml	46.17 ± 4.167
	400mg/ml	35.83 ± 1.472
	800mg/ml	13.17 ± 3.061
Albendazole (ABZ) Standard	8mg/ml	10.83 ± 2.639

Table 3. Effect of *Sansevieria trifasciata* leaf extract on *Fasciola hepatica* (n=6)

Test Compounds	Conc.(mg/ml)	Mean of Death Time in minutes
<i>S. Trifasciata</i> <i>Ethanollic Extract</i>	200mg/ml	97.83 ± 7.834
	400mg/ml	55.00 ± 3.098
	800mg/ml	18.33 ± 4.719
Albendazole (ABZ) Standard	8mg/ml	15.00 ± 3.899

REFERENCES

1. Satyavati GV et al. Medicinal Plants of India. Indian Council of Medical Research, New Delhi 1976; I: 201–06.
2. Akhtar MS et al. Anthelmintic activity of medicinal plants with particular reference to their use in animals in the Indo-Pakistan subcontinent. Small Rum. Res 2000; 38: 99-107.
3. Raza AM et al. Point prevalence of gastrointestinal helminthiasis in ruminants in southern Punjab, Pakistan. J Helminthol 2007; 81:323–328.
4. Harper CK and Penzhorn BL. Occurrence and diversity of coccidia in indigenous, Saanen and crossbred goats in South Africa, Veterinary Parasitology 1999; 82: 1–9.
5. Schweizer G et al. Estimating the financial losses due to bovine fasciolosis in Switzerland, Vet. Rec 2005; 157 : 188–193
6. Khan, M. et al. Bovine fasciolosis: prevalence, effects of treatment on productivity and cost benefit analysis in five districts of Punjab, Pakistan 2009.
7. Kanimozhi M. “Investigating the Physical Characteristics of *Sansevieria Trifasciata* Fiber”, International Journal of Science and Research Publications 2011; 1: (1).
8. Sunilson J et al. Analgesic and Antipyretic effects of *Sansevieria Trifasciata* leaves. Afr. J. Trad. CAM 2009; 6 (4): 529 – 533.
9. Rizk A. Constituents of plants growing in qatar: A chemical survey of sixty plants. Fitoterapia 1982; 52:35-44.
10. Somolenski J, Farnsworth R. Alkaloid screening; Lloydia 1972; 35: 1-34.
11. Kokate CK. In Practical Pharmacognosy, Preliminary Phytochemical Screening, first ed., VallabhPrakashan, New Delhi, 1986; 111.
12. Sayyad R et al. Anthelmintic Activity of Ethanollic Extract of *Cassia Occidentalis* Linn. International journal of pharmacy research and science 2014; 02(1): 42-46.