



ACSTM

Asian Conference on Science,
Technology & Medicine

ANTHELMINTIC AND HISTOPATHOLOGICAL STUDY OF PHYTOCHEMICALS PRESENT IN ERITREAN MEDICINAL PLANTS.

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1. BACKGROUND / INTRODUCTION

Key Points:

Traditional Medicine:

- Ancient and widespread, diverse, crucial in developing countries, recognized by WHO.
- Eritrea: Significant reliance on the traditional herbal medicines and healer, but documentation is limited.
- Project Focus: Validating traditional uses of *A.anthelmintica*, *G.ferruginea*, and *S.kunthianum* for helminth

infections.

- Objectives: In vitro anthelmintic activity testing, phytochemical analysis, histopathology studies.
- Hypothesis: Plant extracts will exhibit anthelmintic activity.
- Scope: Focus on relevant pharmaceutical aspects, *Pheretim apostuma* model, phytochemical analysis, and mechanism of action.

2. MATERIALS AND METHODS

Goal: Investigate anthelmintic potential of Eritrean medicinal plants.

Plants: *A.anthelmintica*, *G.ferruginea*, and *S.kunthianum*

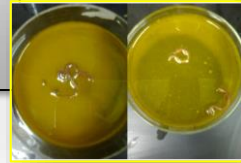
Methods:

- Extraction: Aqueous (cold) and 4-solvent (hot, Soxhlet) extracts prepared from leaves and bark.
- Phytochemical Screening:

Anthelmintic Assay:

Pheretimapostuma (earthworm model) exposed to extracts; paralysis & death times recorded. Positive/negative controls used. Moreover, Combination extracts tested.

- Histopathology: Microscopic examination of treated earthworm tissues.



4. DISCUSSION

- Anthelmintic resistance is a growing problem.
- Traditional use of these plants for worm expulsion is documented.
- The study provides scientific evidence supporting the anthelmintic activity of the extracts.
- Extracts appear to disrupt worm musculature and metabolism, similar to some commercial anthelmintics.
- Histopathology shows damage to various worm tissues.
- Further research is needed to isolate and characterize the active compounds.

3. RESULTS

- Phytochemical Analysis: presence of phytochemicals ((alkaloids, tannins, saponins) in the plants' extracts, creating a link to observed histopathologic activity. (Table 1) (Figure 1)

- Anthelmintic Activity:

- Cold Extracts: *A. anthelmintica* most effective. Higher concentrations showed greater activity. (Tables 2)
- Hot Extracts. Methanol extracts generally most effective. (Table 3)
- Bi-combination: Synergistic effect observed with combined *G. ferruginea*

and *S. kunthianum* extracts. (Table 4)

Histopathology: Microscopic analysis showed damage and destruction of body wall (BW), epidermal cells, cuticle of the body wall, circular muscle layer (CML), longitudinal muscle layer (LML), coelomic septa (CS), dorsal and ventral blood vessels, nerve cord (NC), in treated earthworms, varying depending on the extract. (Figures 2 & 3)

Overall: As compared to previous studies, praziquantal had almost the same average time of paralysis and death. Mebendazole, in contrary, showed much more elapsed average time of paralysis and death.

Plant extract (mg/ml)	MSD (min)	p-value
<i>A. anthelmintica</i> & <i>G. ferruginea</i>	796.333	0.001
<i>G. ferruginea</i> & <i>S. kunthianum</i>	1277.000	0.000
<i>G. ferruginea</i> & <i>S. kunthianum</i>	1277.000	0.000
<i>G. ferruginea</i> & <i>S. kunthianum</i>	522.533 (277.866)	0.000

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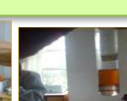
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5. CONCLUSION

- Plant extracts showed promising anthelmintic activity, even surpassing some standard drugs.
- These plants could be valuable for treating helminthiasis, especially in resource-limited settings.
- Further research recommended for standardization and active compound isolation.

• Acknowledgements: Thanks to various experts and Azel Pharmaceutical Company.

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Histopathology of earthworms of *A. anthelmintica*



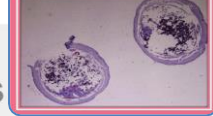
Histopathology of earthworms of *S. kunthianum* (leaf)



Histopathology of Earthworms *S. kunthianum* (Bark)



Histopathology of earthworms of *G. ferruginea*



Bark of *S. kunthianum* + *G. ferruginea*