

“Phytochemical And Pharmacological Screening Of Moringa Oleifera Leaves For Their Anthelmintic Activity”

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ABSTRACT

Moringa oleifera , also known as the “tree of life” or “miracle tree,” is classified as an important herbal plant due to its immense medicinal and non-medicinal benefits. Traditionally, the plant is used to cure wounds, pain, ulcers, liver disease, heart disease, cancer, and inflammation^{1,3}.

The crude ethanolic and methanolic leaf extract of *Moringa oleifera* was subjected to phyto-chemical analysis to determine the constituents of the leaf extracts. Results of phyto-chemical analysis showed that the crude extracts contained Carbohydrates, Proteins, Resins, Glycosides, flavonoids, steroids, triterpenoids, Tannin and Alkaloids². The chemical compounds found in these extracts of *Moringa oleifera* leaf have good pharmacological properties.

In vitro anthelmintic effects of *Moringa oleifera* leaf extracts against the parasitic worms *Pheretima Posthuma* and *Eisenia Fetida* studied , and results shows that At higher doses of *Moringa oleifera* ethanolic extract i,e at 100 mg/ml adult worms *Eisenia Fetida* paralyse in 0.12 min and Death occurs in 0.18 min. while worms *Pheretima Posthuma* paralyse in 0.9 min and death occurs in 0.15 min .

Moreover these results validate the traditional use of *Moringa oleifera* as a natural anthelmintic agent and then the pharmacological potential of its compounds for future in vivo investigations.

Keywords: *Moringa oleifera*, anthelmintic activity, *Pheretima Posthuma* and *Eisenia Fetida* , ethanolic extract , methanolic extract.

Introduction :

MORINGA OLEIFERA , also known as the “tree of life” or “miracle tree,” is classified as an important herbal plant due to its immense medicinal and non-medicinal benefits. Traditionally, the plant is used to cure wounds, pain, ulcers, liver disease, heart disease, cancer, and inflammation^{1,3}. The scientific information on this plant was obtained from various sites and search engines such as Scopus, Pub Med, Science Direct, BMC, Google Scholar, and other scientific databases. It was found that bioactive constituents are present in every part of the plant. So far, more than one hundred compounds from different parts of *Moringa oleifera* have been characterized, including alkaloids, flavonoids, anthraquinones, vitamins, glycosides, and terpenes². In addition, novel isolates such as muramoside A&B and niazimin A&B have been identified in the plant.

Moringa oleifera : ^{4,5}

Color – A vibrant green color, which indicates their high chlorophyll content and nutritional value.

Odour – Mild ,slightly earthy or grassy aroma .

Taste – Mild , slightly bitter or earthy taste obtain compare to spinach or green tea.

Shape – Tri-pinnate : The leaves are divided into three sets of leaflets. or elliptical leaflets: Each leaflet is typically oval or elliptical in shape.



Helminths are parasitic worms that can infect humans and other animals⁶. There are different types of helminths: flukes (trematodes), tapeworms (cestodes), roundworms (nematodes) and thorny-headed worms. When these worms enters into the human body, they cause parasitic infection, which can appear as a intestinal worms or lung flukes^{6,7}. This infection is known as helminthiasis, although it's sometimes called helminthosis or simply a worm infection. An Anthelmintic is a drug used to treat infection caused by parasitic worms also known as helminthes.

Symptoms : Abdominal pain, Diarrhoea , Blood loss, including blood in the stool, Weakness or exhaustion, Weight loss and malnutrition, Restricted growth, Cognitive effects (changes in thinking and memory), Rectal prolapse^{7,8} (the rectum protrudes beyond the anus)

Materials and Methods:

Collection and authentication of Plant : The leaves of *Moringa Oleifera* were purchased from local area of Gadhinglaj. The collected plants materials were cleaned manually to remove adherent impurities and dried under shade at a well-ventilated place. Further drying were done in the hot air oven to remove the remaining moisture. The leaves of *Moringa oleifera* were identified and authenticated by the botanist of botany department from DR . GHALI COLLEGE GADHINGLAJ.

Preparation of Extract :

- The dried leaves of *Moringa oleifera* were powdered into grinding machine .
- The powdered leaves of *Moringa oleifera* were extracted by using Petroleum ether as a solvent by soxhlation method to remove the Fats and oil from leaves.
- The dried extracted leaves after drying were re-extracted by using different solvents like ethanol and methanol separately by using soxhlet apparatus respectively .
- All extracts were filtered separately by using whatman's filter paper no 1. The phytochemical screening of different extracts were done in laboratory. The remaining extracts were preserved in the wide mouthed container in the refrigerator for pharmacological screening .

Phytochemical Screening of *Moringa oleifera* :

SR.NO	CHEMICAL CONSTITUENT	TEST	ETHANOLIC EXTRACT	METHANOLIC EXTRACT
1	Test for alkaloids	Wagner's test	+	+
		Mayer's test	+	+
2	Test for flavonoids	Lead acetate test	-	-
		Sodium hydroxide test	+	+
3	Test for protein	Biuret test	-	-
		Millon's test	+	+
4	Test for saponins	Foam test	-	-
		Liebermann Buchard test	-	-
5	Test for tannins	Lead acetate test	+	+
		Gelatin	+	+
6	Test for glycoside	Keller Killani test	+	+
		Baljet test	+	-
7	Test for steroid	Salkowski test	+	+
		Liebermann Buchard test	+	+
8	Test for triterpenoids	Liebermann Buchard test	+	+
		Salkowski test	-	-
9	Test for phenols	Tortelli Jaffe test	+	-
		Ferric chloride test	+	-
10	Test for carbohydrate	Lead acetate test	+	+
		Molish test	+	+
11	Test for amino acid	Ninhydrine test	-	-
		Test for tyrosine	-	-

Keywords : +++ : Present in high concentration , ++ : Present in moderate concentration, + : Present in low concentration and - : Absent.

In Vitro Study :

Procedure:

- **A. In Vitro Anthelmintic Activity Using Eisenia Fetida :**
- Collect healthy Eisenia fetida worms and acclimatize them in moist filter paper.
- Wash with saline to remove soil/debris.
- Divide worms into groups of 6 per concentration:
- Group I: Control (saline) ,
- Group II: Standard drug (e.g., Albendazole) ,
- Group III : Sample
- Place each group into beakers or Petri dishes containing 5–10 mL of the respective solutions.
- Observe continuously and record:
- Paralysis time: No movement even when shaken.
- Death time: No movement after exposure to warm water (50°C) or on pinching. Perform each test in triplicate for accuracy.

Observation table : Anthelmintic activity of Sample of Eisenia Fetida :

Groups	Treatment	Concentration (mg/ml)	Paralysis Time (min.)	Death Time (min)
I	Control	---	---	---
II	Albendazole	50	0.08	0.1
		75	0.05	0.09
		100	0.05	0.08
III	Sample	50	0.18	0.21
		75	0.15	0.20
		100	0.12	0.18

Results :

Standard (Albendazole):

- Rapid onset of paralysis and death.
- At 100 mg/mL: Paralysis in 0.05 min, Death in 0.08 min.
- Provides a strong benchmark for assessing extract efficacy.

Sample :

- Showed a dose-dependent response, but slightly less effective as compared to the standard.
- At 100 mg/mL: Paralysis in 0.12 min, Death in 0.18 min.
- Exhibited slower activity even at higher concentrations.

Procedure:

• B. In Vitro Anthelmintic Activity Using Pheretima Posthuma :

- Select healthy, mature earthworms (4–6 cm in length) and wash them with saline.
- Divide worms into groups of 6 worms each:
- Group I: Control (saline),
- Group II: Standard drug (e.g Albendazole),
- Group III: Sample.
- Place each group in separate Petri dishes or beakers containing 5–10 mL of the respective solutions.
- Observe and record:
- Time to paralysis: When worms do not move even on shaking.
- Time to death: When worms show no movement even after being placed in warm water (50°C).

Observations Table: Anthelmintic activity of Sample of Pheretima Posthuma :

Groups	Treatment	Concentration (mg/ml)	Paralysis Time (min.)	Death Time (min)
I	Control	---	---	---
II	Albendazole	50	0.5	0.8
		75	0.3	0.4

		100	0.2	0.3
III	Sample	50	0.18	0.21
		75	0.12	0.18
		100	0.09	0.15

Results :

Standard Drug (Albendazole):

- Showed rapid paralysis and death at all concentrations.
- At 100 mg/mL, it exhibited the fastest action (Paralysis: 0.2 min, Death: 0.3 min).
- Confirms the assay is working and provides a benchmark for comparison.

Sample A:

- Displayed a clear dose-dependent increase in activity.
- At 100 mg/mL, paralysis and death occurred at 0.09 min and 0.15 min, respectively.
- Most effective test samples, closely approaching the activity of Albendazole.

Conclusion:

Eisenia fetida : Sample of *Moringa oleifera* demonstrated the moderate potency, showing the fastest paralysis and death times . These results suggest that Sample has the most promising anthelmintic potential.

Pheretima posthuma : Sample of *Moringa oleifera* was the most effective, in comprising with standard Albendazole drug . The results suggest a dose-dependent effect for all samples, supporting their potential use as natural anthelmintic agents. These results suggest that Sample has the most promising anthelmintic potential.

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