



Anthelmintic Activity of *Musa paradisiaca* (L.) cv. Puttabale

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ABSTRACT

Musa paradisiaca cv. Puttabale (AB group) is an indigenous banana cultivar commonly cultivated in the Malnad region of Karnataka, India. Helminthes infections are acute and chronic illness in human beings and cattle. About 3 million people are infected with helminthes worldwide. Traditionally, the plant *M. paradisiaca* cv. Puttabale was used to expel parasitic worms. In order to justify the ethnomedicinal claim with scientific report, sincere attempts have been made to investigate the Anthelmintic activity from corm ethanol extracts of *M. paradisiaca* cv. Puttabale using *Pheretima posthuma* as an experimental model. Three concentrations of 25, 50 and 100 mg/ml of corm ethanol extract were used to study their effect in time of paralysis and death of worm. The results suggest that the ethanol extract at the concentration of 100 mg/ml showed significant effect in time of paralysis at 42.33±1.45 min and death time was 54.00±0.58 min than control group in time of paralysis (142.67±1.45 min) and death (168.00±1.53 min). Standard drug piperazine citrate showed paralysis on 39.67±0.88 min and death at 59.00±0.58 min. The corm ethanol extract confirmed anthelmintic activity in dose depend manure and efficient, than standard drug piperazine citrate. This investigation revealed that the anthelmintic property of ethanol extracts of *Musa paradisiaca* cv. Puttabale against *Pheretima posthuma* to support its medicinal claims.

Keywords: *Musa paradisiaca* cv. Puttabale, Ethanol extract, Anthelmintic activity, *Pheretima posthuma*.

INTRODUCTION

Helminthes infection causes chronic illness in human beings and cattle. Majority of cattle suffers from worm infections. Most of the Anthelmintics are used to expel parasitic worms (helminthes) from the body, by either stunning or killing.^[1] But, chemotherapeutic practice, parasites developed to resistance against Anthelmintics.^[2] Furthermore, it has been reported that anthelmintic substances having significant toxicity to human beings and are present in foods derived from livestock, posing a serious threat to human health.^[3] A number of medicinal plants have been used to treat parasitic infections in man and animals.^[4-5]

Musa paradisiaca (L.) cv. Puttabale (AB group) is an indigenous banana cultivar commonly cultivated in the Malnad region of Karnataka and distributed in Assam, Madhya Pradesh, Bihar, Gujarat, Andhra Pradesh, Jalgaon district (Maharashtra), West Bengal, and Tamil Nadu The fruits are valued for its delicious taste and flavor.

Traditionally the plant was used for different purposes such as abscess, alopecia (female), anasarca, burns, cancer, cataplasm, diabetes, diarrhea, dog bites, dysentery,

dyspepsia, eruptions, fractures, gangrene, headache, hematuria, hemiplegia, hemoptysis, hemorrhage, hypertension, lizard bites, mange, marasmus, migraine, nausea, otalgia, psoriasis, ringworm, scorpion sting, septicemia, shingles, smallpox, snake bite, sore, strain, syphilis, tuberculosis, warts, and wound.^[6-7]

Pharmacological investigations revealed that banana fruits, Stem juice, flowers are screened for analgesics activity,^[8] hair growth promoting activity,^[9] anticonvulsant activity,^[10] antimicrobial activity.^[11-16] Literature survey revealed that there are no reports on anthelmintic activity of *Musa paradisiaca* cv. Puttabale and considering the prevalence of helminthes infection. Hence, this study was undertaken to evaluate the anthelmintic property of ethanol extracts of *Musa paradisiaca* cv. Puttabale against *Pheretima posthuma* to support its medicinal claims.

MATERIALS AND METHODS

Collection and Preparation of the plant extract

The corms of *M. paradisiaca* cv. Puttabale were collected from the farmyard region of the Western Ghats, Karnataka, India. The corm of cultivar Puttabale was washed thoroughly in tap water to remove soil particles and other contaminants, followed by distilled water. It is then shade dried, ground coarsely by using mechanical blender and passes through 40-mesh sieve. About 1 kg of powder material was dipped in

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Table 1: Phytochemical screening of corm ethanol extracts of *M. paradisiaca* cv. Puttabale

S. No.	Test	Procedure	Observation	<i>M. paradisiaca</i> cv. Puttabale
1	Alkaloids	Extract + Dragondroffs reagent	No orange ppt.	-
		Extract + Mayer's reagent	No white ppt.	-
		Extract + Hager's reagent	No yellow ppt.	-
2	Sterols	Extract + Liebermann test	Change in color	+
		Shinodaw's test	Red color	+
3	Flavonoids	Zn-HCl acid reduction test	Magneta color	+
		Extract + Anthrone + H ₂ SO ₄ +Heat	Purple color	+
4	Glycosides	Extract + chloroform + con. H ₂ SO ₄	Lower layer turns yellow	+
5	Terpenoids	Extract + lead acetate + water	White ppt.	+
6	Tannins	Extract + conc. H ₂ SO ₄	No red color	+
7	Quinones	Extract + water + Shake well	Formation of stable froth	-
8	Saponins			

+ = Present, - = Absent

Table 2: Anthelmintic activity of corm ethanol extracts of *Musa paradisiaca* cv. Puttabale against *Pheretima posthuma*

S. No.	Test samples	Concentration (mg/ml)	Time taken for paralysis (min)	Time taken for death (min)
1	Control	-	142.67±1.45	168.00±1.53
2	Piperazine citrate	50	39.67±0.88**	59.00±0.58**
		100	42.33±1.45**	54.00±0.58**
		25	74.33±1.20**	101.67±1.45**
3	Ethanol extract <i>Musa paradisiaca</i> cv. Puttabale	50	82.67± 1.45**	115.00±1.73**
		25		

Values are the mean ± S.E.M. of three earthworms. Symbols represent statistical significance.

* P < 0.05, ** P < 0.01, ns: not significant as compared to control group.

cold 95% ethanol and incubated on rotary shaker at 80-120 rpm for 15 days in room temperature. The extracts were filtered and concentrated in vacuum under reduced pressure using rotary flash evaporator (Buchi, Flawil, Switzerland) and then the extract was kept on water bath to obtain crude extract and finally vacuum dried. The corm extract were subjected to phytochemical screening.

Test Organism for Anthelmintic Activity

Indian adult earthworms (*Pheretima posthuma*) collected from the Indian Institute of Horticultural Research, Bangalore, India. *Pheretima posthuma* organism was selected as model for Anthelmintic activity due to its anatomical and physiological resemblance with the intestinal roundworm parasites of human beings. [17-18] The earthworms were maintained under normal vermicomposting medium with adequate supply of nourishment and water, for about three weeks. Before the initiation of experiment the earthworms were washed with normal saline. Adult earthworms of approximately 4 cm in length and 0.2 - 0.3 cm in width were used for the experiment.

Anthelmintic activity

The Anthelmintic activity of corm ethanol extracts of *M. paradisiaca* cv. Puttabale at the concentration of 25, 50 and 100 mg were evaluated as per the method reported by Dash et al., 2002. [19] Five groups with three earthworms in each groups, each earthworm was separately released into 20 ml of desired formulation in normal saline, Group I earthworms were released in 20 ml normal saline in a clean petri plate. Group II earthworms were released in normal saline containing standard drug piperazine citrate (50 mg/ml) in 20 ml of normal saline. Similarly, group III, IV and V earthworms were released in 25, 50 and 100 mg/ml of ethanol extract in 20 ml of normal saline respectively. Earthworms were observed; the time taken for paralysis and the time taken for death was monitored and documented in minutes. Paralysis time was analyzed based on the behavior of the earthworm with no revival body state in normal saline medium. Death was concluded based on total loss of motility with faded body color. [20] The result of Anthelmintic activity is depicted in Table 2.

Statistical analysis

The data of Anthelmintic activity was expressed as mean ± S.E.M of three earthworms in each group. The difference in

values at $p \leq 0.01$ was considered as statistically significant. The analysis of variance (ANOVA) was performed using ezANOVA (version 0.98) software to determine the mean and standard error of paralysis and death time of the earthworms.

RESULTS AND DISCUSSION

The yield of ethanol crude extract for 1 kg of powdered corm material was 28 g. The preliminary phytochemical constituents present in corm extracts showed positive tests for the presence of flavonoids, glycosides, terpenoids, Sterols and tannins (Table 1).

Anthelmintic Activity

Earthworms belonging to control group showed paralysis time at 142.67±1.45 min and death time at 168.00±1.53 min. The ethanol extract at the concentration of 100 mg/ml showed the time of paralysis and death at 42.33±1.45 and 54.00±0.58 min respectively. For concentrations at 50, 25 mg/ml of ethanol extract, the paralysis was shown at 74.33±1.20, 101.67±1.45, 82.67± 1.45 and 115.00±1.73 respectively. On the other hand, standard drug piperazine citrate at the concentration of 50 mg/ml showed the time of paralysis and death at 39.67±0.88 and 59.00±0.58 min (Table 2). This investigation revealed that ethanol extract of *M. paradisiaca* cv. Puttabale showed significant Anthelmintic activity against *Pheretima posthuma* in dose depended manner when compared to control and very similar to the standard drug.

In the present investigation, the ethanol extracts of *Musa paradisiaca* cv. Puttabale were evaluated for Anthelmintic activity. The results of this investigation revealed that the extract were significantly effective in paralyzing and killing earthworm (*Pheretima posthuma*). Fractionation and characterization of the active compounds from crude extract is under investigation.

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