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PHYTOCHEMICAL AND ANTHELMINTHIC ACTIVITY OF *ASPARAGUS AETHIOPICUS*.L

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ABSTRACT

Asparagus aethiopicus, Sprenger's asparagus, is a plant native to the Cape Provinces and the Northern Provinces of South Africa. Often used as an ornamental plant, it is considered an invasive weed in many locations. asparagus fern, asparagus grass, and foxtail fern are common names; however, it is unrelated to true ferns. *A. aethiopicus* has been confused with *A. densiflorus*, now regarded as a separate species, so that information about *A. aethiopicus* will often be found under the name *A. densiflorus* it is well known official drug thought the world as a holistic gift of nature for medicinal, culinary, and cosmetic use. It has been found to possess various therapeutic activities, viz. anti-inflammatory, analgesic ant allergic, antifungal, ant diabetic, antibacterial, antiulcer, immunostimulating, anti-cancer, anti-oxidant, anti-amoebic, anti-dermatophytes, and many more. For different concentrations (100, 60, 40, 20mg/ml) of each extract(aqueous extract) were studied inactivity which involved the determination time of paralysis (vermifuge) and time death (vermicidal) of the worms Piperazine adipate in the same concentration as the extract was included as standard reference and normal saline (0.9%NaCl) water with 1% CMC as control. The extract exhibited significant anthelmintic activity at a concentration of 100mg/ml in this case it was found that aqueous extract gives better activity compared to the standard. Results showed that *Asparagus aethiopicus* rhizome extract gives better anthelmintic activity at all the tested doses.

KEYWORDS: *Asparagus aethiopicus*, anthelmintic activity, Piperazine adipate, vermifuge, and Vermicidal.

INTRODUCTION

Medicinal plants and their derivatives are widely used in traditional cultures all over the world and they are becoming increasingly popular in modern society as natural alternatives to synthetic chemicals [1].In the last few decades, there has been an exponential growth in the field of herbal medicine. It is getting popularized in developing and developed countries owing to its natural origin and lesser side effects [2].

At the present days, the modern conventional health care is burdened with great problems of unsafe medicines, chronic diseases, resistant infections, autoimmune disorders and degenerative disorders of aging, despite great scientific advances. More than 70% of India's 1.1 billion populations still use these non-allopathic systems of medicines [3]. India possesses almost 8% of the estimated biodiversity of the world with around 0.126% million species[4].

The World Health Organization (WHO) estimated that approximately 80% of the population relies mainly on traditional medicines, mostly plant drugs in their health care. Today, Ayurveda coexists with the modern system of medicine and is still widely used and practiced. About 30% of the currently used therapeutics is of natural origin [5].

Asparagus aethiopicus is also known as Greater galangal in English, *Arabic*: مرعان سجربس... and Kulanjan in Hindi. Most of the South Indian physicians of traditional Ayurveda and Siddha medicine system use *Asparagus aethiopicus* to treat various kinds of disease including diabetes mellitus [6]. The optimum time for harvesting *Asparagus aethiopicus* was determined in Kerala, India during 1995-1999. Treatments consisted of harvesting at 3-month intervals from 6-48 months after planting. Harvesting the crop at 42 months after planting was the best for realizing maximum rhizome (45.4 t/ha) and oil (127.4 liters/ha) yields, and for obtaining oil of good quality (27.1% cineole [eucalyptol]). A substantial quantity of oil (127.4 liters/ha) was obtained from the roots (19.5 t/ha) 39 months after planting. The shoot yield (40.5 t/ha) and shoot oil yield (70.61 h/a) were highest at 18 months after planting. *Asparagus aethiopicus* reached a maximum height of 129.4 cm with more than 48 tillers per clump and 13 leaves per tiller in the experimental location [7].

PLANT PHOTO

Fig No: 01

Whole plant

Fig No: 02

Branches

GEOGRAPHICAL DISTRIBUTION

The plant is distributed in Himalaya and Southern region of Western Ghats in India and throughout the world [8]. It is often cultivated in Konkan and North Kanara [9].

MORPHOLOGY

Asparagus aethiopicus generally has stems erect to weakly decumbent to 60 cm long, the branchlets typically 3.5 cm or shorter, the cladodes (leaf-like structure) 5-15 mm long, and the berries ca. 5 mm wide with one seed; it was previously misapplied to A. aethiopicus in Florida. Asparagus aethiopicus generally has stems climbing to erect to 1-7 m long, the branchlets typically 4 cm or longer, the cladodes (5)10-40 mm long, and the berries 5-7 mm wide with 1-3 seeds (Jessop 1966; Judd 2001). [10].

TRADITIONAL USES OF *Asparagus aethiopicus*

The Leaves of the plant is used as a carminative, digestive tonic, anti-emetic [10], anti-tumor, Anti-helmintic, anti-diuretic, anti-ulcerative, anti-dementia [11]. The extract of rhizome shows anti-tubercular activity, hypothermia, bronchial catarrh, tonic, stomachic, and stimulant [12].

It is also used as pungent, bitter, heating, stomachic, improve appetite, disease of heart, aphrodisiac tonic, expectorant, used in heal, ache, lumbago, rheumatic pains, chest pain, diabetes, burning of liver, kidney disease, disinfectants [13]. The rhizome is also used as anti-microbial, anti-bacterial [14], anti-inflammatory, and flavoring agent [15].

The seeds are used as cardiotonic, diuretic, hypotonic, gastric lesions, antiplatelet, anti-tumor, anti-fungal [16]. The tubers of this plant are used as carminative, irritant action, whooping cough in children, bronchitis, anti-asthma, dyspepsia, fever, and diabetes mellitus[17].

Biological and Pharmacological Action

During the past several years, *Asparagus aethiopicus* is gaining a lot of interest according to researchers' point of view. Recently many pharmacological studies have been conducted on *Asparagus aethiopicus*. A summary of the findings of these studies performed is presented below Anti-microbial activity, Anti-inflammatory, Hepatotoxicity, Anti-HIV, Immunomodulator, Anti-Diabetic, Anti-Oxidant, Anti-Ulcer, Anti-cancer, Anti-allergic, Anti-tumor, Anti-bacterial, Anti-fungal, Gastroprotective activity.

COLLECTION OF SAMPLE:

Fresh *Asparagus aethiopicus* leaves were collected in the medicinal garden on our college campus and they were washed with distilled water twice. Then they were cut into small pieces.

PREPARATION OF EXTRACTS

600g of dried rhizomes were suspended in 2lits of distilled water. Extraction was done at 80^0C by using soxhlet apparatus for 1 hour 30 minutes. This followed by filtering of the extracts using what man filter paper no 1. The extract was then concentrated at 80^0 C for 3hours to form asemisolid form and they were transferred into sterile wide-mouthed bottles and refrigerated until used.

PHYTOCHEMICAL ANALYSIS:

Test for reducing sugars: A little amount of Fehling's reagent was added to the extract and the mixture was boiled for 2 min. A brick red color indicated the presence of glycosides.

Test for proteins: 0.5ml of each extract was treated with an equal volume of 1% sodium hydroxide to which a few drops of copper sulfate solution was gently added. the solution turning to the purple color indicated the presence of proteins. [10]

Test for steroids: 0.5ml of the extract was dissolved in 3ml of chloroform and was filtered. To the filtrate, concentrated sulphuric acid was added by the sides of the test tube, which formed a lower layer. A reddish-brown color ring with a slight greenish fluorescence was taken as the indication for the presence of steroids.

Test for amino acids:

Ninhydrin test: To the sample extract, a few drops of Ninhydrin reagent were added. After mixing it well, the solution was boiled in water for 2-3 minutes. A bluish-black color indicated the presence of proteins.

Test for glycosides: 1 ml of extract solution was hydrolyzed with diluted conc.H_2SO_4 extracted with benzene. 1ml of dil.ammonia was added to it. Pink or Red coloration suggested a positive response for anthraquinones.

Test for alkaloids: 0.5gm of the extract was stirred with 2ml of Mayer's reagent. The cream color indicates the presence of alkaloids.

Test for lipids: To the extract add 3ml of alkali KOH solution and boil it for 10minutes. The formation of soap indicates the presence of lipids.

Test for flavonoids: To the extract adds few drops of NaOH the formation of yellow color takes place which upon addition of acid decolorisation takes place. Which indicates the presence of flavonoids.

Test for fats & oils: TO the extract add petroleum ether and pass the solution through filter paper. The formation of oil globules indicates the presence of fats and oils

Test for vitamin c: To 2ml of 2% solution add 2ml of water and 1gm sodium bi carbonate and 20mg of ferrous sulfate. Shake and stand. The appearance of violet color indicates the presence of vitamin C.

Preparation of plant extract:

The stored plant extracts were redissolved at concentrations of 20, 40, 60, and 100mg/ml were suspended in 2% v/v tween80 in normal saline solution and used for screening the anthelmintic activity. Standard Piperazine adipate was used with the same concentrations. All the solvents are freshly prepared before the commencement of the experiment.

Animals:

Adult Indian earthworms, *Pheretima posthuma* resemble the intestinal roundworm parasites of human beings both anatomically and physiologically and hence were used to study the anthelmintic activity. Healthy adult Indian earthworms *Pheritima posthuma* were used for evaluating the anthelmintic activity. All healthy earthworms were approximately 5-7cms in size and 0.1-0.2 cm in width. They were collected from local places, washed, and kept in water until they were used for screening of activity.

ANTHELMENTIC ACTIVITY Anthelmintic Activity [19, 20]:

The anthelmintic activity was evaluated on adult Indian earthworms by *Mathew et.al* method. For preliminary evaluation of anthelmintic activity test samples of the extract were prepared at the concentration of 20, 40, 60, and 100 mg/ml in 2% v/v tween80 in normal saline solution, 4 worms *Pheretima posthuma* of 5-7cm were placed in a Petri dish containing 20 ml of the above test solutions of extracts. Piperazine adipate (20, 40, 60 and 100mg/ml) was used as reference standard and normal saline with Tween80 (2%) is used as negative control. All the test solutions and standard solutions were prepared freshly before starting the experiment. Observations are made for the time taken for paralysis when the movement was lost or no movement. Time for death of worms was recorded after ascertaining that worms neither moved when shaken vigorously nor when dipped in warm water at 50^0c and fading of color of worms.

Results:

Phytochemical screening:

Table No: 01

Name of Phytoconstituents	Methanolic extract
Alkaloids	–
Carbohydrates	–
Amino acids	+
Tannins	–
Steroids	–
Saponins	–
Flavanoids	+
Glycosides	–
Mucilages	–
Terpenoids	+

Preliminary phytochemicalscreening of the aqueous extract of Asparagusaethiopicus reveals the presence of Amino acids, Flavonoids, and Terpenoids.Different doses of the extracts were screened for their activity mainly due tothe presence of flavonoids respectively.

Anthelmintic activity related photos:

Concentrations of extracts

Control group

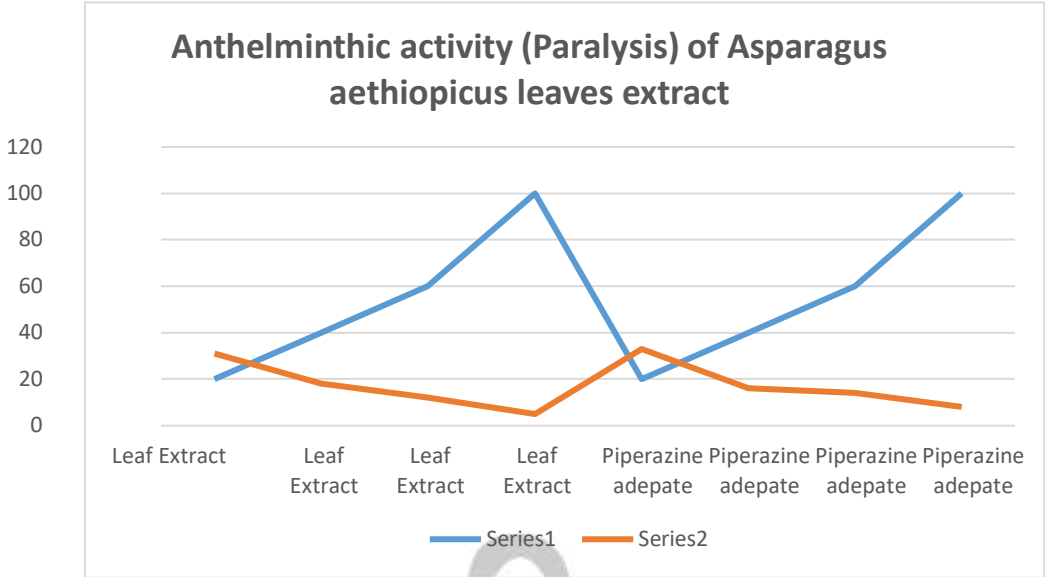
Anthelminthic activity (Paralysis) of Asparagus aethiopicus leaves extract:

Table No: 02

Type of extract	Dose (mg/ml)	Time taken
Rhiozme extract	20	31
	40	18
	60	12
	100	5
Piperazine adepate	20	33
	40	16
	60	14
	100	8
Control	-	-

Anthelminthic activity (Paralysis) of Asparagus aethiopicus leaves extract:

Graph No : 01



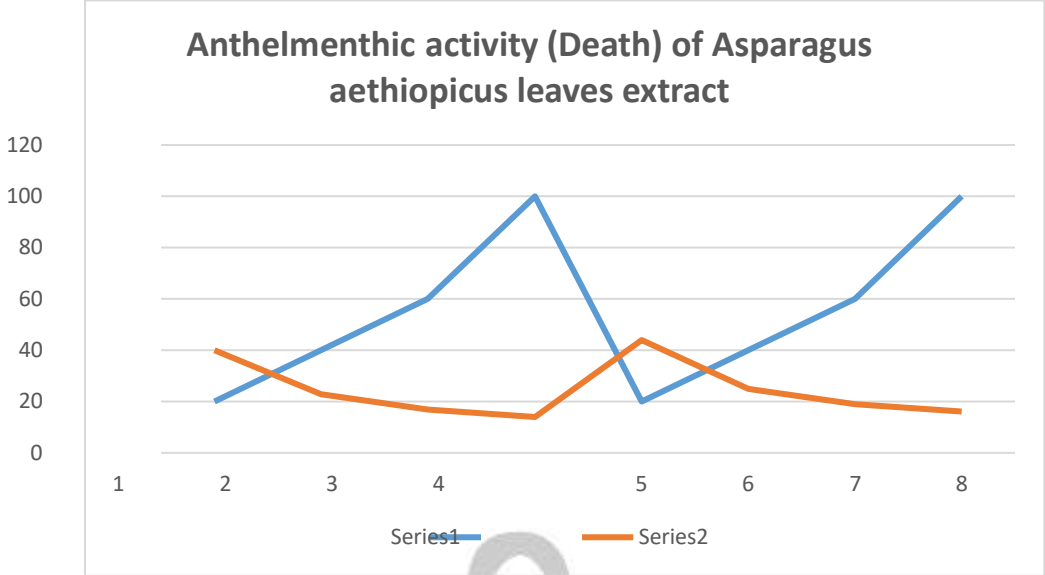
Anthelmintic activity (Death) of Asparagus aethiopicus leaves extract:

Table No: 03

Type of extract	Dose (mg/ml)	Time taken
Rhiozme extract	20	40
	40	23
	60	17
	100	14
Piperazine adepate	20	44
	40	25
	60	19
	100	16
Control	-	-

Anthelmenthic activity (Death) of Asparagus aethiopicus leaves extract:

Graph No : 02



Discussion:

Aqueous extract has significant anthelmintic activity when compared to standard Piperazine adepate. The paralysis and death time of aqueous extract was 31,18,12,5 and 40,23,17,14 minutes respectively at concentrations 20, 40, 60 and 100mg/ml for the rhizome extract and these are 33,16,14,8 and 44,25,19,16 minutes respectively at concentrations 20, 40, 60 and 100 mg/ml for Piperazine adepate.

Conclusion:

The plant *Asparagus aethiopicus* leaves were collected from the medicinal garden, in sounded areas of my University, Uruk University, Baghdad, Iraq. The leaves of the plant were subjected to soxhlation by using water as a solvent. Then this extraction distilled to get a concentrated mass. The phytochemical investigation was done.

The work states that the presence of Flavonoids, Terpenoids, and Amino acids in the extract of *Asparagus aethiopicus* leaves were responsible for its anthelmintic activity. The aqueous extract was shown significant values with respective to paralysis and death time of earthworms. It is interesting to observe the results of the anthelmintic effect of aqueous extract. But further investigations on the isolation of active compounds present in the extracts and *in vivo* studies are necessary to identify a potential chemical entity for clinical use.

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