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Evaluation of phytochemical, anthelmintic activity and antidiabetic activity-*melochia corchorifolia* ethanol extract

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ABSTRACT

Melochia corchorifolia belongs to the *Sterculiaceae* family and is a common weed distributed throughout tropical and subtropical regions in many countries. *Melochia corchorifolia* is a medicinal plant which is used as a traditional folk medicine for the treatment of the various diseases. Several studies have reported antibacterial, antifungal, cytotoxicity effects and anti-cancer activity of water and methanol extracts of the leaf. The dried leaves were powdered and extracted with ethanol solvent through the Soxhlet apparatus. The phytochemical analysis was done using standard techniques on the ethanolic extract. The analysis showed the presence of various phytoconstituents such as flavonoids, alkaloids, steroids, terpenoids, glycosides, tannins, phenols, saponins and anthraquinones. Besides, the research was aimed at assessing the Anthelmintic behaviour of ethanol extract of *Melochia corchorifolia* leaves against *Eisenia fetida (*Indian earthworms) the result shown that 300 mg/ml proved to be very active by paralyzing and killing the earthworms in a shorter time *and followed by* Antidiabetic activity in inhibition assay for α-amylase activity was evaluated using *Melochia corchorifolia* leaves showed maximum inhibition of the enzyme with the highest value of 85.0% seen at 100mg/ml. Our results reveal that ethanol extract of the leaf of *Melochia corchorifolia* acquires potent bioactive phytocompounds that might be developed into novel Anthelmintic and Antidiabetic activities.

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INTRODUCTION

The plants used as an important medicinal source in human culture and civilization in the Egyptian, Assyrian, Chinese and Indian valleys know that the elders and men of that time used related medicinal plants for various diseases (Ajaib *et al.*, 2010). Plant-derived medicinal products are popular for their health, easy availability and low cost. Herbal medicinal products may include whole parts of a plant or mostly prepared from roots, leaves, bark, seeds and plant flowers (Amar *et al.*, 2012). The plants of medicinal value lie in components of bioactive substances that induce particular physiological exploit to the human body. The bioactive phytochemical components are tannins, saponins, alkaloids, terpenoids, flavonoids, essential oils, and phenolic compounds. Many more such natural compounds formed the basis for modern medicinal drugs (Pieroni, 2000). The genus *Melochia corchorifolia* is the family of *Sterculiaceae* has extraordinary economic importance and medicinal properties. *Melochia corchorifolia*, is also called as choco-

late weed, is a typical weed plant available in the farmland. It was noted as an excellent source of fiber (Pullaiah, 2014; Mamatha *et al.*, 2018).

Traditionally, leaves are very much useful for many medicinal remedies. It has been used to diminish ulcers, abdominal swelling, headache, and chest pain. The pharmacological activities of plant leaves showed various activities like as Anthelmintic activity (Patel *et al.*, 2011), Hepatoprotective and Antioxidant ability, Antibacterial activity, Diuretic, Anti-Cancer activity and Antiurolithic activity on this plant (Alhakmani *et al.*, 2013a; Wickramaratne *et al.*, 2016).

Experimental

Preparation of plant material

Plant material

The plant *M. corchorifolia L.,* are collected from the Reserve forest area, Vandalur, Thiruporur, Kanchipuram Dt. The plant was taxonomically identified and authenticated by Prof.P.Jayaraman, Ph.D., and Director. Institute of Herbal Botany, Plant Anatomy research centre Chennai.

The leaves were washed and shade dried for 15 days to eliminate chlorophyll content. The dried leaves were finely powdered by using a mechanical blender. The 100g of dried powder leaves extracted by soxhlet method by using solvent viz. ethanol. After extraction, the extract was dried by distilling the solvents in a rotary vacuum evaporator.

Phytochemical analysis

The ethanol extract of was *Melochia chorchorifolia* subjected to preliminary phytochemical test using standard protocol (Ramamurthy and Sathiyadevi, 2017).

Total Phenol Content Determination

The phenol content ethanol leaves crude extract of *Melochia chorchorifolia* was evaluated by using Folin-Ciocalteu's assay, and gallic acid was standard solution (Alhakmani *et al.*, 2013b). The standard procedure was followed by plant extract 10.0 ml and 2.0 ml distilled water then mixed with 0.6 ml Folin-Ciocalteu's reagent (FCR) added after 10 minutes and about 1.6 ml freshly prepared 20% sodium carbonate was added. The absorbance of the sample measured against the blank at 320 nm by using a spectrophotometer (Chandra *et al.*, 2014).

Total Flavonoid Content Determination

The flavonoid content *Melochia chorchorifolia* leaves ethanol extract was assessed by the Aluminum chloride method and quercetin as a standard (Soares *et al.*, 2015). The test sample of 2ml, 5 ml water, 0.30 ml, 5% Sodium nitrite and then 0.3 ml 10% Aluminum chloride added, after that 5 minutes incubated at room temperature. The absorbance of the sample was measured against the blank at about 520 nm by using a spectrophotometer.

Anthelmintic test of ethanol plant leaves extract of *Melochia chorchorifolia*

The adult Indian earthworms (*Eisenia fetida*) were collected from the vermicomposting site of Hindustan College of Arts and Science, Padur, Tamil Nadu, India. For this experiment, adult earthworms of approximately 4 cm long and 0.2-0.3 cm broad were used. Due to its physiological and anatomical similarities to human intestinal roundworm parasites, this organism was chosen for Anthelmintic behavior (Heidari *et al.*, 2005). The earthworms washed in normal saline before assay.

The Anthelmintic assay accomplished with minor modifications by using standard methodology. The test sample plant extract prepared on the concentrations (100, 200, 300 mg/ml) added with distilled water then boiled for 10 minutes and mixture was filtered, collected supernatant was utilized for the Anthelmintic tests. The Adult Indian earthworms (*E. fetida*) of almost equal size were placed each in the petri dish having leaf extract. Albendazole used as a reference standard in the concentrations 25 mg/ml, 50 mg/ml and normal saline water as the control. The observations were made paralysis, and the death of worms was recorded.

Inhibition assay for α-amylase activity (DNSA)

The dialysis membrane and the 1-4,α-D-Glucanglucanohydrolase enzyme used for inhibition assay technique (α-amylase- Himedia Laboratories, Mumbai, India). The 500μl plant extract solution and 500μl sodium phosphate buffer containing α-amylase solution (0.5mg / ml) were incubated at 25°C for 10min. After pre-incubation, in 0.02 M sodium phosphate buffer (pH 6.9 with 0.006 M sodium chloride) 1 per cent starch solution for 500 μl has been applied to each tube at each appropriate interval (Hullatti and Telagari, 2015).

At 25°C for μl, the reaction mixture was incubated and then incubated for 5 minutes in a boiling water bath, and cooled to room temperature. About 10ml of distilled water was applied to the reaction solution to dilute the solution, and the absorbance was estimated at 540 nm (Kazeem *et al.*, 2013). Percentage inhibition is calculated as,

$$\% \, Inhibition \; = \; \frac{[Abs_{\;control} - Abs_{extract}]}{Abs_{control}}$$

Table 1: phytochemical analysis of ethanol extract of *Melochia* corchorifolia

S.No	Phytochemical	Presence in ethanol extract	Activities
1.	Alkaloids	+	Antimicrobial
2.	Phenols	++	Antimicrobial
3.	Coumarins	-	Antiviral
4.	Polypeptides	+	Antiviral
5.	Flavonoid	++	Antimicrobial

Table 2: Totalphenol and flavonoid content leaves of *Melochia* corchorifolia

S.No	Plant parts	Ethanol
1. Flavonoid content	Leaves	58.45
2.	Leaves	60.14

Table 3: Anthelmintic activity of the ethanol leaves extract of Melochia chorchorifolia

S.No	Treatment	Concentration(mg/	Time in minutes	
			Paralysis	Death
1.	Control(Normal saline)	-	-	-
2.	Standard (Albendazole)	25	20	30
		50	16	28
3.	Melochia chorchorifolia	100	65	85
		200	43	57
		300	17	25

Table 4: % Inhibition of α-amylase enzyme-ethanol extract of varying concentrations *Melochia* corchorifolia leaves

S.No	Concentration (mg/ml)	Melochia corchorifolia %
1.	25	72.05%
2.	50	75.55%
3.	75	81.44%
4.	100	85.0%

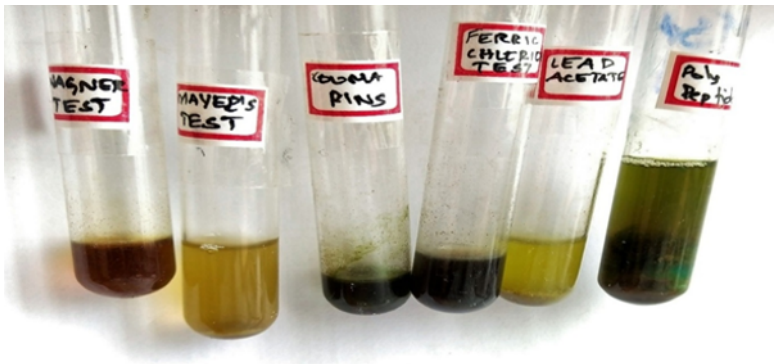

Figure 1: Result for phytochemical analysis of *Melochia* corchorifolia

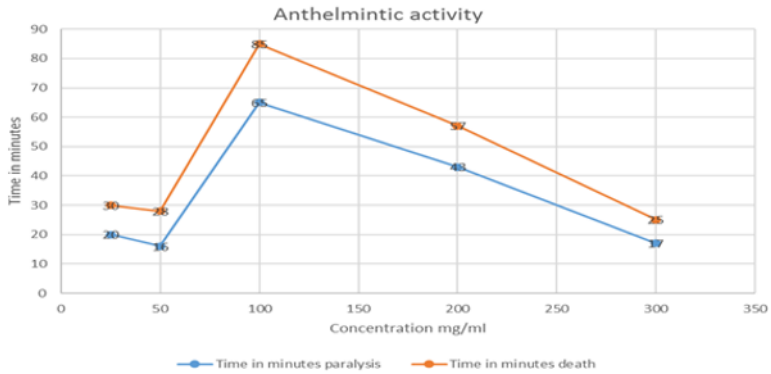

Figure 2: Anthelmintic activity of the ethanol leaves extract of Melochia chorchorifolia

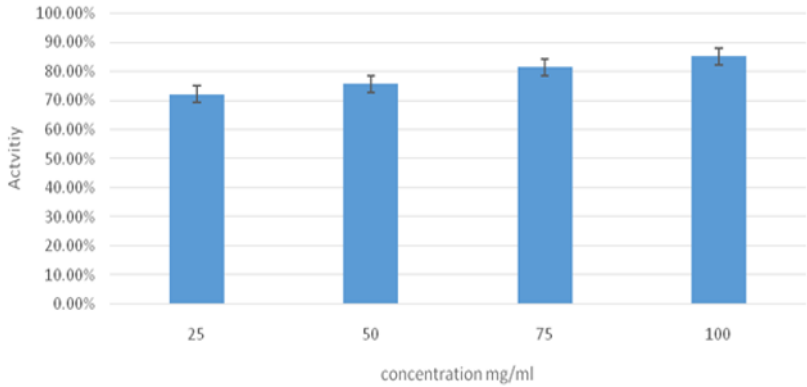

Figure 3: Antidiabetic activity of the ethanol leaves extract of Melochia chorchorifolia

RESULTS AND DISCUSSION

Phytochemical screening

The phytochemical tests *Melochia chorchorifolia* leaves, which shows abundantly in positive for alkaloids, polypeptide, Phenols, Flavonoids, and Alkaloids and negative for coumarins the results are tabulated (Table 1).

The screening of plant part revealed that the amount of total phenol and flavonoid content in which leaves indicates the presence of high phenolic content which may be due to presence of phenol, flavonoid and possess antioxidant activity (Table 2 and Figure 1). Evaluated the antibacterial activity of different extracts of *Melochia chorchorifolia* on eight bacterial strains by using cup plate method (Rao *et al.*, 2002).

Anthelmintic activity

At 100 mg/ml concentration *Melochia chorchorifolia* leaves extract-treated earthworms had taken less time for paralysis at 60 min and death of earthworms at 80 min. At 300 mg/ml concentration *Melochia chorchorifolia* leaves extract proved to be more potent by recording the time of paralysis of earthworms at 17 minutes and time of death of earthworms at 25 min. (Table 3 and Figure 2).

Inhibition assay for α-amylase activity (DNSA)

The DNSA assay analysis resulted are showed in (Figure 3 and Table 4). *Melochia corchorifolia* demonstrated high inhibition of the enzyme at all concentrations with the highest value of 85.0% reported at 100mg / ml plant extract concentration.

The phytochemical screening *Melochia corchorifolia leaves* ethanol extract revealed the secondary metabolites like triterpenes, carbohydrates, glycosides, flavonoids, and alkaloids, etc. The antimicrobial activity possessions on plant groups may be due to phytochemical chemical compounds in the plants (Cowan, 1999).The above phytochemical constituents are the primary source for the plant's therapeutic properties and synthesis of new medicine today (Harborne, 1984).

Similarly, noticed Anthelmintic activity of *Melochia corchorifolia against Pheritima Posthuma* (Indian worm) (Palaksha *et al.*, 2013). Present research is evident that plant extracts of Melochia corchorifolia have shown Anthelmintic activity against Eisenia Fetida at the short span of paralytic and death time showed ethanolic extracts of *Punica granatum*, *Mangifera indica* has an in-vitro inhibitory effect on α-amylase (Prashanth *et al.*, 2001). Present study shows *Melochia corchorifolia* has an excel-

lent inhibitory effect up to 85% on α-amylase, which decreases insulin resistance in diabetic.

CONCLUSION

The main benefits of utilizing plants are that they never exhibit the frequently linked deleterious side effects of other allopathic medications. Based on the above results we conclude that *Melochia corchorifolia leaves* ethanol extract showed secondary metabolites in phytochemical screening and activity effect on Anthelmintic and antidiabetic. Future researches isolated the compound through spectral studies from the leaves of the medicinal plant and check the efficacy of the compound through biological activity.

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Conflicts Of Interest

The authors declare that they have no conflict of interest for this study.

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