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Phytochemical screening and anthelmintic activity of leaf and seed extract of *Cassia occidentelis* L.

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Abstract: In present study the ethanolic extracts of leaf and seed of *Cassia occidentalis* were investigated for their phytochemical properties and anthelmintic activity against Haemonchus controtus at different concentrations (100, 150, 200 mg/ml). Alkaloids, flavonoids, saponins, tannins, phenols, steroids and carbohydrates are present in both leaf and seeds crude extracts. The study is mainly concerned with the determination of time of paralysis and time of death of the worms. When there was a gradual increase in the dose, a gradual increase in the anthelmintic activity was observed. The least time for the death and paralysis was recorded at concentration of 50 mg/mL and maximum time for death and paralysis was recorded at 10mg/mL concentration. The ethanolic extract of the leaf and seed showed a significant anthelmintic activity at highest concentration of 50 mg/ml. So the C. occidentalis plant can be used as anthelmintic drug for the treatment of gastrointestinal helminthic infections after clinical trials, toxicological effects and isolation of chemical compounds.

Keywords: Phytochemicals, Anthelmintic activity, Medicinal plants

1. Introduction

Medicinal plants have significant importance because they produce a variety of chemical constituents with valuable selectivity (Uddin et al., 2012). According to the World Health Organization, the 80% population of the world are unable to afford the synthetic drugs (WHO, 1993). There is a different variety of medicinal plants in Pakistan that have therapeutic value.

Traditional people depends upon the herbal medicine to cure diseases because that are less harmful and have no side effects. Hence they serve as one of the most efficient source for a healthy life because they contain many components that have great therapeutic potential (Ajaib et al., 2011).

Phytochemicals are natural bioactive compounds present in different parts (flowers, leaves and shoots) of plant which act as defense system to protect from diseases. Some of the important bioactive phytochemical constituents include flavonoids, tannins, terpenoids, saponins and phenolic compounds (Krishnaiah et al., 2009).

Helminthiasis is the animal diseases which results in production losses whereas the helminths is the most common infectious human's disease in the developing countries of the world which produce different diseases like eosinophilia, and pneumonia (Dhar et al., 1982). This disease is extremely widespread due to poor managing practices (Ajaib et al., 2018). People depend upon the herbal medicine to treat this disease because

they are more effective and less toxic than the synthetic medicine available in the market are not effective (Ajaib et al., 2019).

Cassia occidentalis is commonly known in Ghana as 'mmofraborodee' and 'Devidevikpelimumu' in Ghana. It is a pantropical plant that can grows about 5-8cm on roadsides and futile places of the villages and towns. It comprises the species of tree, herbs, shrubs and vines. It belongs to the family leguminaceae and botanically classified as both *Cassia Occidentalis*, and *Senna occidentalis*. The plant has been used by the traditional healers all over the world for treating different diseases (Mitsuyama et al., 1987).

1. Material and Method

Plant Materials:

The different parts (leaf and seeds) of *Cassia occidentalis* were collected from geographical regions of District Bhimber Azad Jammu & Kashmir (AJK). The collected parts of plants were dried and mounted on herbarium sheets and deposited to the herbarium, Department of Botany, MUST with correct identification.

2.1. Maceration of plant material

The leaf and seeds of *Cassia occidentalis* were cleaned and air dried in shade. The dried parts were grinded to coarse powder and then 250g of dried powder into Methanol solvents through soxhlet extraction apparatus. Then the obtained extracts were concentrated, dried and stored in air tight container. The yield of extract as calculated.

2.2. Phytochemical screening

The evaluation of qualitative phytochemical analysis of leaf and seed extracts of *Cassia Occidentalis* were performed through specific methods. The Phytochemicals were identify by using the procedure described by Akinjogunla et al., (2011). Bello et al., (2011); Sofowara (1993); Trease and Evans (1989) and Harborne (2001).

2.3. Anthelmintic Activity

2.3.1. Test Organism

For the investigation of anthelmintic activity of the leaf and seed extract of *Cassia Occidentalis*, the worm (*Heamonchus contortus*) were used which obtained from the stomach of goat and then wash it with the 0.9% solution of NaCl. The worms were store in solution of 0.9% NaCl for further examination.

2.3.2. Anthelmintic activity screening

The anthelmintic activity leaf and seed extract of *Cassia Occidentalis,* were carried at different concentrations (10, 20, and 50 mg/mL) by following the method of Bhinge et al., (2015) with minor variations. Before starting the procedure all the solutions were freshly prepared. The albendazole (10 mg/ml) was used as standard drug whereas saline water (0.9%) kept as a control. The worms of almost equal size were dipped in to 10mL of test solution and after four hours of test period, the time was observed and recorded

3. Results and Discussion

Medicinal plants are the rich source of phytochemicals constituents which have therapeutic importance to cure different diseases. The qualitative phytochemical screening of leaf and seed extracts of *cassia occidentalis* were evaluated to identify the alkaloids, flavonoids, saponnins, terpenoids, phenols, tannins, steroids, carbohydrates and proteins. The results revealed that the strongly appearance of alkaloids and flavonoids in both leaf and seed extracts whereas the terpenoids, saponnins and steroids were absent in leaf extract of plant (Table: 1).The results of the study were similar to the work of Amari *et al*., (2014) while evaluating the phytochemical screening of the aerial parts of *Thymelaea hirsuta* L.

The Anthelmintic activity of leaf and seed extracts of *Cassia occidentalis* was conducted at different concentrations included (10, 20, 50mg/mL). The time recorded for loss of motility and mortality in minutes. The least time for the death and paralysis was recorded at concentration of 50mg/mL and maximum time for death and paralysis was recorded at 10mg/mL concentration. In the methanolic leaf extract the minimum time for paralysis and death ranged from 3.5 to 9.2 minutes at 50mg/mL whereas the maximum time were recorded at 10mg/mL, ranged from 15.2 to 27.5 minutes (Table. 2, Fig. 1). The methanolic seed extract of *C. occidentalis* showed that the least time were taken for the paralysis and death of *Heamonchus contortus* at 10mg/mL ranged from 2.0 to 10.2 minutes and maximum time ranged from 8.5 to 25.3 minutes at 10mg/mL. The results indicate that the seed extracts were more effective for paralysis and death of worms than the leaf extract. The result of the study revealed that the anthelmintic activity is due to the active chemical compound present in the leaf and seed of plants. (Table. 2, Fig. 2). All the results obtained from the anthelmintic activity of leaf and seed extracts of *C. occidentalis* show close resemblance to the findings of Krishnaiah et al., (2009) evaluating the anthelmintic activity of the flowers of *Sesbania grandiflora* Pers and Ajaib et al., (2020) during evaluation of anthelmintic activity in *Dyspania ambrusioides*.

Table 1: Phytochemical analysis of leaf and seed extract of *Cassia Occidentalis*

Phytochemicals	**Extracts**	**Plant parts**	
		Leaf	Seed
Alkaloids	Methanol	++	++
Carbohydrates		+	+
Flavonoids		++	++
Proteins			+
Phenol and tannins		++	+
Terpenoids		-	+
Steroids		-	+
Saponins		-	++

+ = present, ++ = strongly present, - = absent

Table 2: Anthelmintic activity of methanolic extract of leaf and seed of *C. occidentalis* (Values are mean ± S.E.M.)

Extracts	**Conc. (mg/mL)**	**Paralysis (minutes)**	**Death (minutes)**
NaCl	----	Non-toxic	Non-toxic
Albendazole	50ml	11.42 ± 0.4	16.43 ± 0.3
	20ml	10.00 ± 0.4	13.40 ± 0.3
	10ml	12.22 ± 0.2	17.20 ± 0.4
Leaf	50ml	3.5 ± 0.22	9.2 ± 2.15
	20ml	8.3 ± 1.5	25 ± 2.12
	10ml	15.2 ± 2.25	27.5 ± 2.5
Seed	50ml	2.0 ± 1.5	10.2 ± 1.28
	20ml	5.5 ± 1.25	20.1 ± 2.07
	10ml	8.5 ± 1.65	25.3 ± 2.78

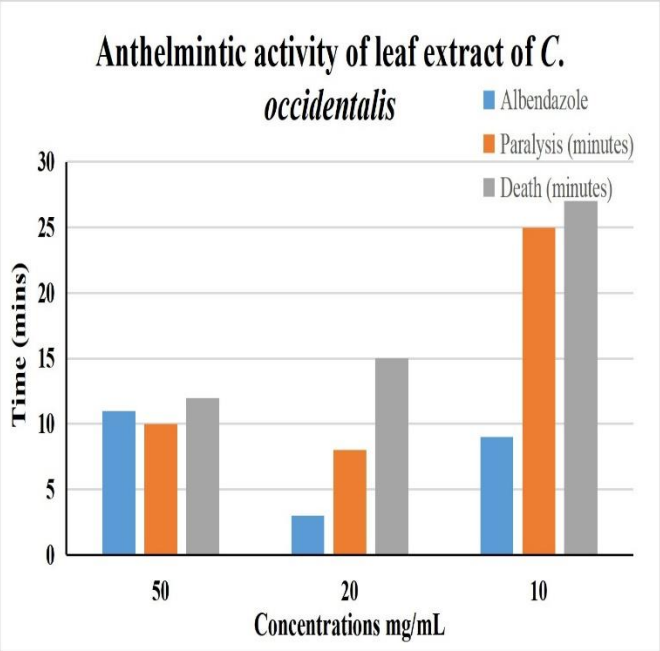

Figure 1: Anthelmintic activities of leaf extract of *C. occidentalis*

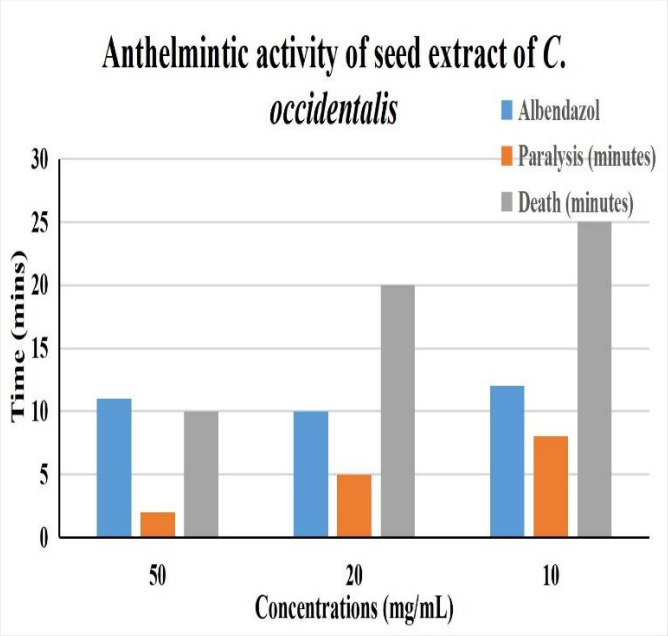

Figure 2: Anthelmintic activities of seeds extract of *C. occidentalis*

4. Conclusion

The use of leaf and seed of *Cassia occidentalis* as an Anthelmintic activity have been confirmed that the both parts of extracts displayed activity against the worms used in the study. In the comparative study the ethanolic extract of *Cassia occidentalis* shows more anthelmintic activity than Albedazole. Further, in future it is necessary to identify and isolate the possible active phytoconstitutents responsible for the anthelmintic activity and study its pharmacological actions.

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