Research Article

Study on Anthelmintic and Antidiabetic activity of leaves of *Acanthospermumhispidum*DC.

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ABSTRACT

*Acanthospermumhispidum*DC.is found in the tribal area of Koraput and Malkangiri districts andtraditionally used by the tribal people as anthelmintic, antidiabetic, antihypertensive, carminative and antifungal. No systematic study was conducted on *A .hispidum*DC. The present work was conducted to investigate the anthelmenticand Antidiabetic activities on the leaves of *A.hispidum*DC.Petrolium ether, Chloroform and Hydroalcoholic (70 % V/V) extracts were prepared and subjected to above mentioned studies. Anthelmentic activity was tested on adult Indian earthworms, *Pheretimapostuma*, Glibenclamideand Albendazolewas selected as standard for Antidiabetic and Anthelmintic activity respectively. Result showed the hydroalcoholic extract showed significant activity on both cases as compared to standard. The data were verified as statistically significant by using one way ANOVA at 5 % level of significance ($p < 0.05$).

Keywords: *Acanthospermumhispidum* DC, *Pheretimapostuma*, Anthelmintic, Antidiabetic.

1. INTRODUCTION

Medicinal plants have served through ages, as a constant source of medicaments for the treatment of a variety of diseases. The history of herbal medicine is almost as old ashuman civilization. The plants are known to provide a rich source of botanical anthelmintics, antibacterials, insecticides as well as Antidiabetic activity[1.] A number of medicinal plants have been used totreat parasitic infections in man andanimals. Parasitic helmintheseffect thehuman beings as well as animalsleading to considerable hardship andstunted growth. The parasitic invasionis caused by mixed infections withseveral species of stomach andintestinal worms.More than 100 medicinal plants are mentioned in the Indian system of medicines including folk medicines for the management of diabetes, which are effective either separately or in combinations.Despite extensive use of synthetic chemicals in modern clinical practices all over the world, interest in exploiting potential use of plants as source of drugs are under study[2].

*Acanthospermumhispidum*DC belongs to family *Asteraceae*and also called as BidigadiKanta (Odisha),BristlyStarbur or Goathead (English), Herbetricorne (French), Carapichno (Spanish).The plant commonly known as BristlyStarbur, is an upright annual with dichotomous (Y-shaped) branching.Acanthospermum, is from the Greek words acantha (thorn) and sperma(seed) and refers to the prickly fruit. Hispidum is Latin, and means rough, shaggy, prickly or bristly.The literature survey reveals that various parts of A. hispidum DC have been used as a folklore medicine for curing various ailments[3]. Few studies are reported for anthelmintic activity and no such studies are carried for Antidiabetic activity. Hence it is proposed to carry out the anthelmintic activity and Antidiabetic activity during the study.

2. MATERIALS AND METHODS

2.1 Plant materials

The leaves of A. hispidum were collected in the month of July 2009, from open field Rondapalli, Koraput(Odisha). The collected plant withcomplet herbarium was authenticatedat Botanical survey of India, Howrah, [CNH/I-I/ (340)/2009/Tech.II/382/90]. The leaves were collected and dried under subdued sun light and then homogenized to get coarse power. The powder was stored in a dessicator for further use.

2.2 Preparation of crude extracts

The powdered mass was exhaustively extracted successively in soxhletapparatus using solvents likepetroleum ether, chloroform and hydroalcohol (Ethanol 70 % v/v) based on their polarity[4]. Finally extracts were concentrated under reduced pressure using rotary evaporator and stored for further analysis.

2.3 Anthelmintic activity screening

The anthelmintic activity was performed according to the method of Ghosh et al. On adult Indian earthworm Pheritimaposthuma as it has anatomical and physiological resemblance with the intestinal roundworm parasites of human beings. All the extracts were dissolved in
minimum amount of dimethyl sulphoxide and then volume was adjusted with saline water. Three groups were prepared control (saline water), reference sample (albendazole) at 10 mg/ml and the extracts of (5, 10, 20 and 25 mg/ml).The reference samples and extract solutions were prepared freshly before starting he experiment. Observations were made for the time taken to paralyze or death of individual worms[5]. The results are shown in Table 1 depict the time taken for paralysis and death of worms after treatment with the extracts at the selected concentrations.

2.4 Antidiabetic activity screening

Wistar rats of either sex weighing 180-220gm were procured from Mahaveera Enterprises (Hyderabad, A.P., India). They were maintained in standard environmental conditions of temperature (25± 2^0C), relative humidity (55 ± 10%) and 12h dark/ light cycle were used. They were fed with standarddiet and water ad libitum. Diabetes was induced by asingle intra-peritoneal (i.p) injection of 120mg/kg of Alloxan monohydrate in sterile saline. After 5 days of alloxan injection, the diabetic rats (glucose level >250mg/dl) were separated and divided into five groups. *Group I*: Diabetic control was given CMC (1%). *Group II*: The Standard drug Glibenclamide was given orally at a dose of 5mg/kg. *Group III*: Treated with 250mg/kg Pet.ether Extract. *Group IV*: Treated with 250mg/kg Soxhlated chloroform Extract
Group V: Treated with 250mg/kg Hydroalcoholic Extract. The extracts were suspended in carboxymethylcellulose (0.2%). Blood samples were collected from retro-orbital vein at a time intervals of 2hrs after administration of extracts and standard[6].Plasma was separated and blood glucose levels were measured immediately by GOD-POD method as cited in Table 2. Mean and Standard Deviations were calculated and the results were compared with student t-test.

3. RESULTS AND DISCUSSION

All the extracts showed the anthelmentic activity in dose dependent manner at 5 to 25 mg/dl. The Pet ether, chloroform and hydroalcoholic extracts of A. hispidumrevealed significant anthelmintic activity as cited in figure 1. The hydroalcoholicextract shown better paralytic value and death at 64.32 minute, implies satisfactory value at 10 mg/ml as compared toalbendazole. The possible mechanism of those extracts may to interfere with energy generation by uncoupling oxidative phosphorylation or they may interfere with glycoprotein of cell surface[7,8]. It was also possible that those may act on central nervous system and caused paralysis of the *Pheritimaposthuma* worms.
The hydroalcoholic extract of A. hispidumshowed significant reduction in the blood glucose level when compared to standard at a dose of 250mg/kg. At 8 th hour the hydroalcoholic extract was able to supress the lower the blood glucose level at 134.17 mg/dl as cited in figure 2. All data were found to be significant at 5 % level of significance ($p < 0.05$).

4. CONCLUSION

It could be concluded and confirmed that the hydroalcoholic extract of leaves of A. hispidum DC has both anthelmintic and Antidiabetic activity comparable with standarddrugs, which is a significant result. Further studies are required to identify the actual chemical constituents that are present in the crude extracts of this plant which are responsible for above mentioned activity.

5. ACKNOWLEDGEMENT

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Table 1: Comparative anthelmintic activity of the extracts with reference samples

Test substances	Concentration(mg/dl)	Time taken for Paralysis(Min.)	Time taken for Death(Min.)
Pet ether extract (PE)	5	92.26±1.37	132.37±4.97
	10	83.48±2.49	110.48±2.48
	20	72.58±2.09	91.97±4.07
	25	64.35±3.06	82.64±3.58
Chloroform extract(CE)	5	84.41±3.45	124.74±3.86
	10	74.52±1.49	94.71±4.07
	20	61.36±2.83	80.23±3.56
	25	55.74±1.37	71.51±3.52
Hydro alcoholic extract(HE)	5	71.43±3.08	102.63±3.49
	10	64.73±2.67	84.33±4.23
	20	51.47±3.71	73.72±2.18
	25	48.52±2.37	64.32±2.95
Albendazole(AL)	10	37.09±3.64	52.78±3.52
All values are represented as mean± standard deviation (SD)			

Table 2: Effect of various extracts on blood glucose levels in alloxan induced rats

Groups	0 hr(mg/dl)	2 hr (mg/dl)	4 hr (mg/dl)	6 hr (mg/dl)	8 hr (mg/dl)
I	341.29±4.12	359.38±3.82	370.76±4.38	385.56±2.38	391.11±3.28
II	290.37±2.48	253.47±4.2	220.37±2.57	160.38±2.75	119.85±3.86
III	320.48±2.47	290.48±3.74	241.49±3.38	210.58±4.26	198.37±3.51
IV	302.38±3.49	268.38±3.71	235.23±3.61	201.49±3.71	173.27±2.45
V	281.29±1.73	242.37±4.02	231.48±3.71	183.11±2.09	134.17±3.09
All values are represented as mean± standard deviation (SD)					

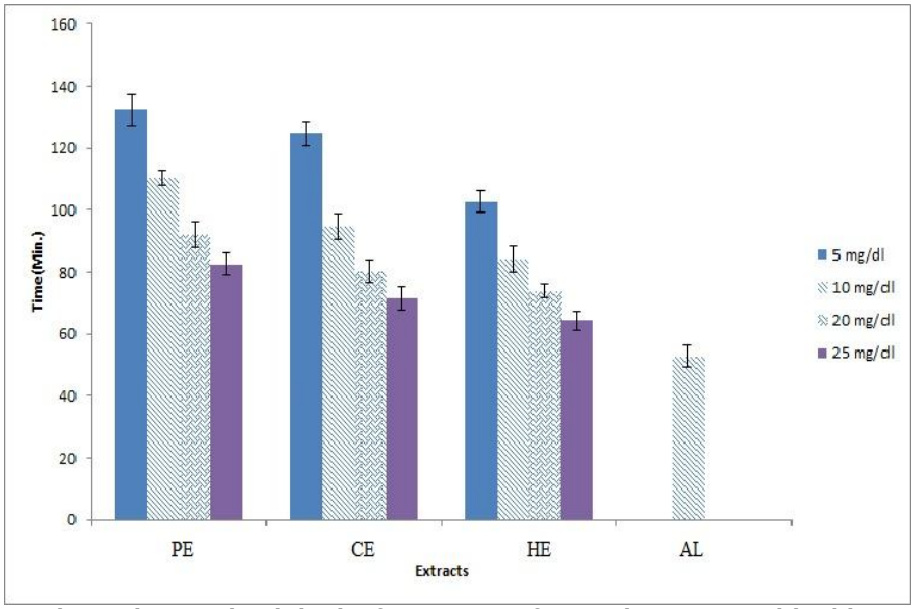

Fig. 1: Time taken to death by leafy extracts of *Acanthospermumhispidum*DC at different concentrations and reference sample

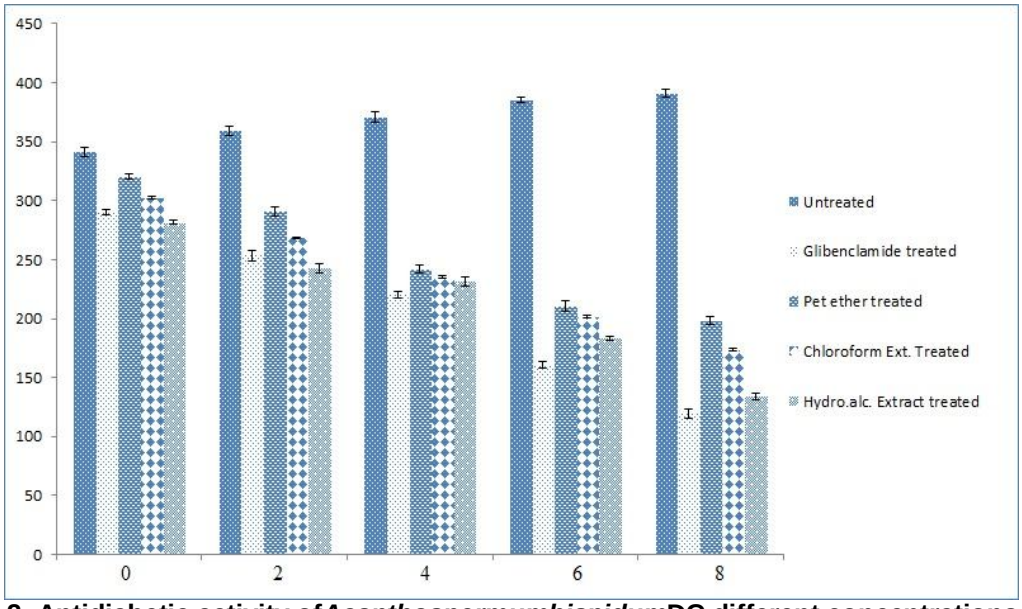

Fig. 2: Antidiabetic activity of*Acanthospermumhispidum*DC different concentrations and reference sample

6. REFERENCES

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