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Determination of Anti Mitotic and Anti-Ulcer Activity of Ruellia Tuberosa

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Abstract: ***The present study was carried out to determine the anti mitotic and anti ulcer activity of Ethyl Acetate extract of Ruellia Tuberosa. Ruellia Tuberosa may be found in moist and shady environments. The Ethyl Acetate extract of Ruellia Tuberosa was screened and showed the presence of Sterols, Triterpenoids, Phenols, and Flavonoids. The Ethyl Acetate extract of aerial part of Ruellia tuberose extract and solvent fractions exhibited considerable activity (dose dependent) when compared with reference standard. The present research work showed the validity and the clinical use of Ethyl Acetate extract of Ruellia Tuberosa in the control of antimitotic and anti ulcer activity.***
Keywords: Acanthaceae, Ruellia Tuberosa, Ethyl Acetate, Anti Ulcer.

I. INTRODUCTION

It is a small biennial plant with thick fusiform tuberous roots and striking funnel-shaped violet-colored flowers. Ruellia Tuberosa, [1-3] also known as Minnie Root, Fever Root, Snapdragon Root and Sheep Potato, was a species of flowering plant in the Acanthaceae family. Ruellia Tuberosa may be found in moist and shady environments. Its native range was in Central America but presently it had become naturalized in many countries of tropical South and Southeast Asia.[4-5] It is also used as a natural dye for textiles. Leaves contain Apigenin and Luteolin. The seed oil yields Myristic, Capril and Lauric acids, Study yielded Flavonoids, glycosides, phenols, Saponins and essential Minerals with good nutritive value and secondary metabolites. According to the literature review, it was found that various activities was done and reported on the Ruellia Tuberosa but antimitotic and antiulcer activities of the aerial plant of the Ruellia Tuberosa were not reported. So, my present work was aimed to carry out the Extraction and Isolation, Phytochemical Screening, anti mitotic and anti ulcer activity of Ethyl Acetate extract of Ruellia Tuberosa [6-7] as shown in **Fig. 1.**

Fig.1: Ruellia Tuberosa Plant.

II. MATERIALS AND METHOD

The fresh aerial plants of Ruellia Tuberosa were collected from Acharya Nagarjuna University, Nagarjuna nagar, Guntur. The plant was identified and authenticated by the Dr. M. Raghuram, Assistant Professor, Department of Botany and microbiology in Acharya Nagarjuna University, Guntur.

A. Phytochemical Analysis

The plant was collected and cleaned with water and the roots were separated from the plant. The aerial parts of the plant were cutted into small pieces and dried under shade. Then it was powdered and sieved with sieve no 44. The 250g of the powder was taken into soxhlet and it was soxhlated with Ethyl Acetate for 12 hours until the colour changed from greenish to colorless. It was distilled with Rotary vacuum evaporator (Hedolph) and the solvent was separated and crude extract was collected. The crude extract was dried in desiccators. The TLC was performed for Ethyl Acetate extract with different mobile phases. Approximately 5g of crude extract was placed in gravity column for isolation of chemical constituents. The Ethyl Acetate extract of Ruellia Tuberosa was screened and showed the presence of Sterols, Triterpenoids, Phenols, and Flavonoids.

B. Anti Mitotic Activity

Mung beans used in this study were obtained from the local market. Plant extract with different concentrations (100 mg, 200 mg, 500 mg) were prepared and Mung beans of equal weight were weighed and soaked in each concentration respectively for 6 hrs. Standard was prepared with the same concentrations, with the anti cancer agent Cisplatin 10 mg. Control was prepared with Mung beans soaked in tap water for 6 hrs. The water or the drug solution (test/ standard) was drained and the seedlings were kept moist (either with tap water or the drug solutions in a covered Petri dish) until the radicals in the control group had grown to 1.0 - 3 cm (time 0, T_0). At T_0, the weight of seedlings and length of radical were recorded both in the control and test groups. The seedlings were maintained at room temperature under moist conditions for an additional period of 48 h (T_{48}). The weight of the seedlings was measured again at T_{48}. Percentage inhibition is calculated using the formula:

$$\% \text{ inhibition} = \frac{\text{Wet weight of seeds in control group} - \text{Wet weight of seeds in sample group}}{\text{Wet weight of seeds in control group} - \text{Wet weight of seeds in sample group}} \times 100$$

The inhibition of radical growth in Ethyl Acetate extract of Ruellia Tuberose at 100, 200, 500 mg doses showed significant activity as compared to control. All the doses showed considerable activity when compared with standard (Cisplatin). From the above observations out of all the doses, 500mg of Ethyl Acetate extract was found to have the highest anti mitotic activity with 83.3% inhibition as shown in Table 1 and Fig. 2.

Table 1: Anti Mitotic Activity of Ruellia Tuberosa.

S.No	Compound	Weight of Beans (mg)				Length of Radical (cm)		% Inhibition
		Dry	Wet	t_0	t_{48}	t_0	t_{48}	
1.	Control	560	770	860	920	3.1	4	---
2.	Standard	560	650	670	670	0.1	0.2	99%
3.	Test-100mg	560	745	890	860	2.6	2.6	20%
4.	Test-200mg	560	720	790	850	1.5	1.5	41.6%
5.	Test-500mg	560	670	750	790	0.5	0.5	83.3%

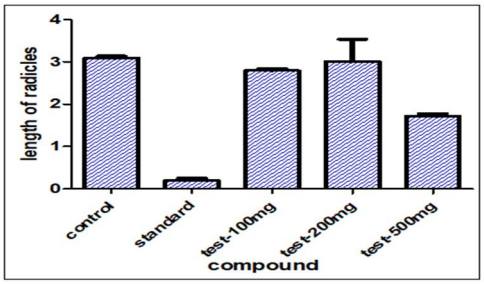

Fig.2: Comparison of Antimitotic Activity with Cisplatin Drug of Ruellia Tuberosa.

C. Anti ULCER Activity

Wistar rats of either sex weighing around 150-250g were taken, which were housed in cages at 24± 2°C in the college animal house and fed with commercial pellet diet and water ad libitum. The food was withdrawn 24 hours before the experiment but allowed free access of water. To avoid Coprophagy and fighting, the rats were fasted in wire-bottomed cages. All animal experiments were carried out in accordance with the guidelines of CPCSEA. The acute toxicity of Ethyl Acetate extract of Ruellia Tuberosa was determined by using Wistar rats (150-250 g) which were maintained under the standard conditions. The animals (n=5 per dose) were fasted 12 h prior to the experiment, up and down procedures were adopted for toxicity studies. Animals were administered with single dose of extract of Ruellia Tuberosa at a dose of 1000 mg/kg and observed for their mortality during 2 to 7 days study period (short term) toxicity and the dose increased up to 2000 mg/kg and was observed up to 7 days.

1) *Group A:* Normal animals treated with vehicle only.
2) *Group B:* Standard Ranitidine (20 mg/kg b.w. i.p).
3) *Group C:* Low dose of Plant extract (250mg/Kg b.w.).
4) Group D: High dose of Plant extract (500mg/Kg b.w.).

Anesthesia was given by using Ketamine inj 0.3ml i.p. The abdomen was opened and the pylorus ligation performed and then sutured. 4 h after pylorus ligation all the animals were sacrificed with excess of anesthetic ether and the stomach of each rat was dissected out. The reference standard (Ranitidine) completely inhibited ulcer formation. The Ethyl Acetate (EA) extract of aerial part of Ruellia Tuberosa was also screened for anti ulcer activity *in-vivo* studies by using pylorus ligation method in Wister rats. The rats were divided into four groups of 5 rats in each group. After scarification the abdomen was opened and observed the inhibition of ulcers at doses of 250mg/kg b.w and compared with reference standard Ranitidine (20mg/kg b.w). The extract of Ruellia tuberose was more significant at doses of 250mg/kg b.w and 500mg/kg b.w to inhibit ulcers when compared with standard Ranitidine (20mg/kg b.w) as shown in Table 2, Fig. 3 and Fig. 4.

$$\text{ulcer index} = \frac{\text{no. of animals used}}{X} \qquad \text{Where} \qquad X = \frac{\text{total mucosal area}}{\text{total ulcerated area}}$$

Table no: 2. Antiulcer activity of Ethyl Acetate extract of Ruellia Tuberosa.

S.No	Compound	Dose	Ulcer Index	% Inhibition
1.	EA extract of R.T	250mg/kg	1.30	64
2.	EA extract of R.T	500mg/kg	0.87	76
3.	Standard (Ranitidine)	20mg/kg	0	100
4.	Control	water	3.70	0

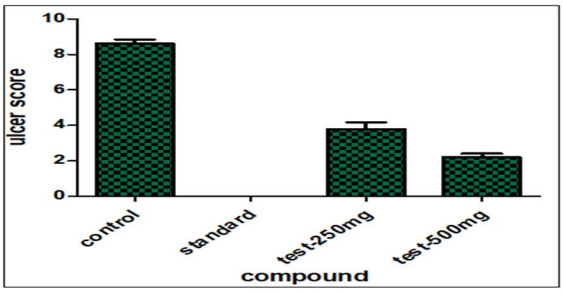

Fig.3. Antiulcer activity of Ethyl Acetate extract of Ruellia Tuberosa.

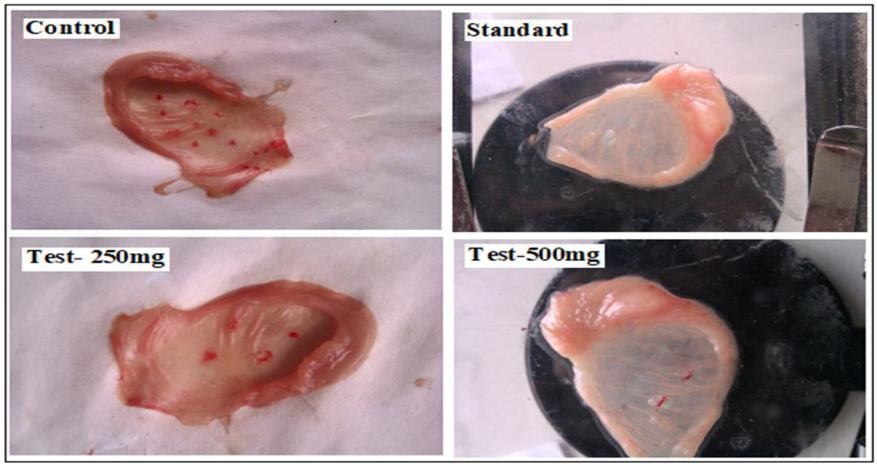

Fig.4: Antiulcer studies of the extracted compound in Rats of Ruellia Tuberosa.

III. CONCLUSION

The Ethyl Acetate extract of aerial part of Ruellia tuberose extract and solvent fractions exhibited considerable activity (dose dependent) when compared with reference standard. The present research work showed the validity and the clinical use of Ethyl Acetate extract of Ruellia Tuberosa in the control of antimitotic and anti ulcer activity.

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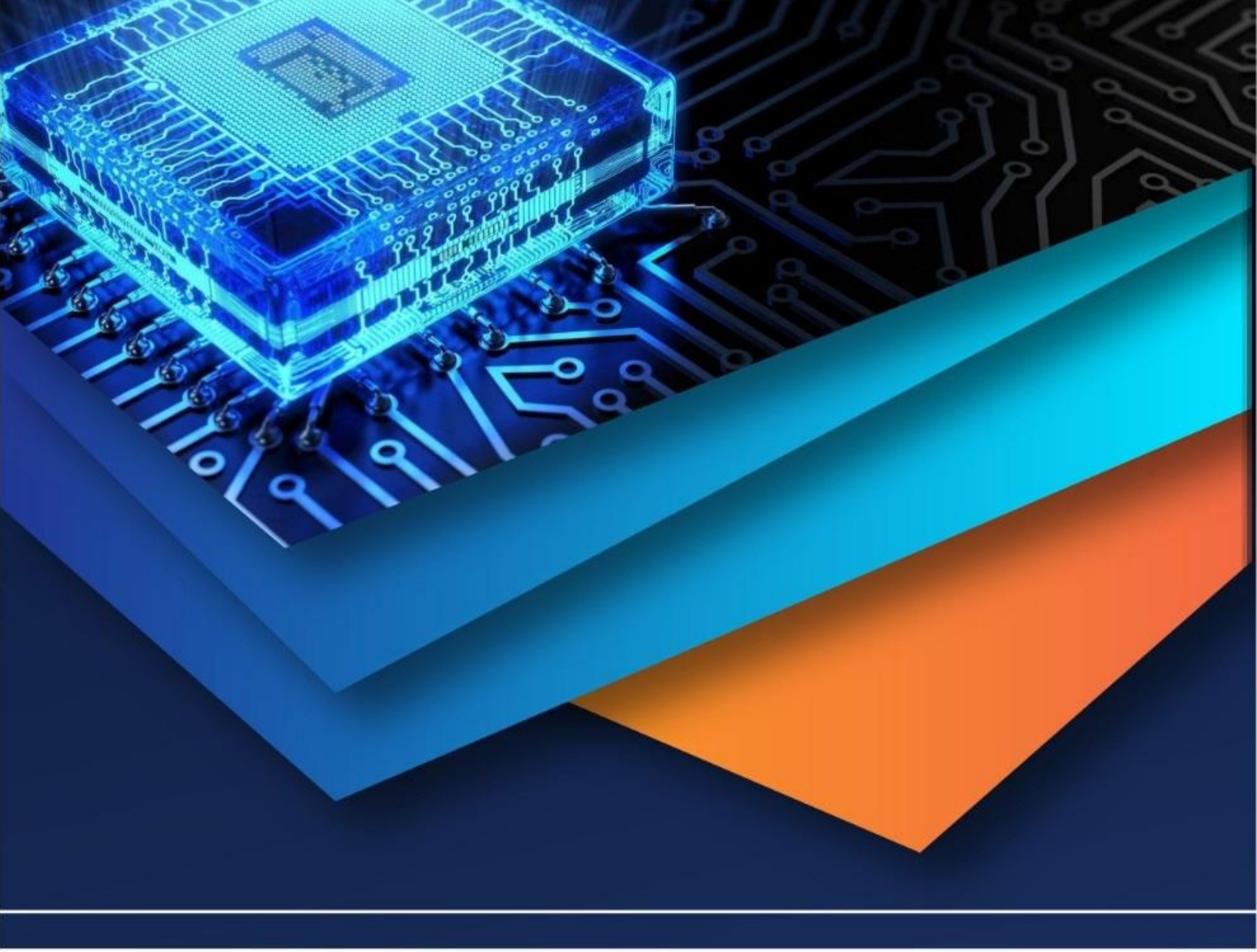

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