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RESEARCH ARTICLE

PHARMACOGNOSY

ANTHELMINTIC ACTIVITY OF *ZIZYPHUS JUJUBA* MILL & LAMK.

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ABSTRACT

Zizyphus jujuba Mill & Lamk. Is also called as Baer tree, belongs to the family Rhamnaceae. The dried bark was powdered and extracted with various solvents by successive soxhlet hot extraction process with increasing order of polarity. On phytochemical investigation, the methanol extract and aqueous extract has shown steroids, flavonids and tannins. The drug was screened for anthelmintic activity on adult earthworms *Phertima posthuma*, using piperazine citrate as standard drug. Both methanol and aqueous extract showed significant anthelmintic activity compared to standard drug Piperazine citrate.

KEY WORDS

anthelmintic activity, *Zizyphus jujuba*, piperazine citrate, *Phertima posthuma.*

INTRODUTION

Zizyphus jujuba Mill & Lamk. is also called as Badari, Baer, Bogari, Barihannu belonging to family Rhamnaceae. The plant is distributed throughout India, Iran, Afganistan, and in China[1].It is a small subdeciduous tree with dense spreading crown, commonly 0.6 m. girth and 6 m. high. The bark is blackish to grey or brown, rough, regularly and deeply furrow, the furrowed, the furrows are at about 1.2 cm apart. Blaze 9-13mm., Branches usually armed with spines, mostly in pairs, one straight, the other curved. Leaves 3-6.3 by 2.5-5 cm., oblong or ovate, usually minutely serrulate or apex distinctly toothed, obtuse, base oblique and 3-nerved, nerves depressed on the glabrous shining upper surface. Petiole 2.5-10 mm long. Flowers 3.8-5 mm. In Diam., greenish, in dense axillary tomentose cymes or fascicles 1.2-1.9 cm Long. Drupe 1.2-2.5 cm. Diam., globose, first yellow then orange and finally reddish brown, containing a single stone surrounded by fleshy pulp[2].

A survey of literature on *Zizyphus jujuba* Mill & Lamk. revealed a few pharmacological reports on the plant like antioxidant and antilisterial effect[3], antisteroidogenic activity[4], antiobesity activity[5], sedative and hypnotic[6], anxiolytic[7], anticancer[8].

The plant is reported to contain alkaloid jubanine-E[9]. It contains three flavone-C-glucosides-6$^{''}$-sinapoylspinosin, 6$^{''}$-feruloylspinosin and 6$^{''}$-p-coumaroylspinosin. The leaves and stems of *Zizyphus jujuba* Mill & Lamk. contains saponins 3-o-[2-o-α-L-fucopyranosyl-3-o-β-D-glucopyranosyl-α-L-arabinopyranosyl]jujubogenin.The fruits of *Zizyphus jujuba* Mill & Lamk. contain Zizyphus saponins I, II, III and jujuboside B[10], jujuboside D[11] and jujuboside E[12]. The bark of *Zizyphus jujuba* Mill & Lamk. contains 7% tannin[13].

MATERIAL AND METHODS

Plant Material: The dried stem bark of *Zizyphus jujuba* Mill & Lamk. belonging to the family Rhamnaceae, was collected from Raichur and authenticated by Dr. Siddamallayya N, NADRI, Jayanagar, Bangalore. The bark was dried under sun for seven days and powdered.

***Preparation of extract*:** The powdered plant material was extracted with successive solvent extraction ranging from non-polar to polar using soxhelet hot extraction process. The solvent was than distilled under reduced pressure, which gave brownish-black colored residues. The dried extracts were suspended in 0.1% Tween 80 in normal saline (vehicle) and used for anthelmintic activity.

Anthelmintic activity: The anthelmintic activity was evaluated on adult Indian earthworm *Phertima posthuma* due to its anatomical and physiological resemblance with the intestinal roundworm parasites[14-16]. Fourteen groups, each size consisting of six earth worms of approximately equal size were released into 20 ml of the extract suspended in 0.1% Tween 80.

Each group was treated with one of the following: vehicle 0.1% Tween 80 in normal saline serving as control, piperazine citrate(40 and 60 mg/ml) is the standard and extract containing 20,40,60,80 mg/ml in normal saline containing 0.1% Tween 80 as different

treatments. The time taken for paralysis / death of individual worms were recorded up to four hours of test period. Paralysis was said to occur when the earth worms lost their motility followed with fading away of their body color and finally death. The results were recorded in Table 1.

Table - 1
Anthelmintic activity of Zizyphus jujuba Mill & Lamk. Extract

Treatment	Time taken for paralysis (min)	Time taken for death (min)
Vehicle	-	-
Piperazine citrate		
40mg/ml	42.0 ± 1.26	59.4 ± 0.40
60mg/ml	33.4 ± 0.60	55.6 ± 0.24
Benzene Extract		
40mg/ml	79.66 ± 0.50	302.02 ± 0.58
Chloroform Extract		
40mg/ml	75.76 ± 0.42	262.50 ± 0.76
Acetone Extract		
40mg/ml	148.71 ± 0.51	79.75± 0.85
Methanol Extract		
20mg/ml	147.25 ± 0.85	194.5 ± 0.54
40mg/ml	36.5 ± 2.02	116.6 ± 0.74
60mg/ml	27.3 ± 1.52	48.3 ± 1.76
80mg/ml	10 ± 0.57	23.6 ± 1.14
Aqueous Extract		
20mg/ml	175.6 ± 0.76	250.02 ± 0.57
40mg/ml	165.7 ± 1.15	240.02 ± 0.57
60mg/ml	45.75 ± 0.52	117.6 ± 0.80
80mg/ml	36.62 ± 0.80	302.02 ± 0.58

RESULTS AND DISCUSSION

The data revealed that the methanol extract showed anthelmintic activity at a concentration of 20 mg/ml, whereas the aqueous extract also showed paralysis and death at similar concentrations. The other test concentrations of both the extracts showed marked degree of anthelmintic activity. The anthelmintic effect of methanol extract at 40 mg/ml concentration is comparable with that of the effect produced by the standard drug piperazine citrate. The

methanol extract showed the effect beyond 80 mg/ml concentration that is comparable with the standard drug Piperazine citrate.

The present study suggested that the methanol extract was more effective than the other extracts, even though all the extract were endowed with anthelmintic property. The activity was concentration dependent of the different extracts. The activity of the extracts was found to be inversely proportional to the time taken for paralyse / death of the earth worms.

The active principles responsible for anthelmintic activity is due to the presence of flavonoids, steroids and tannins in the extracts. The isolation and characterization of a particular active principle responsible for anthelmintic activity is under progress.

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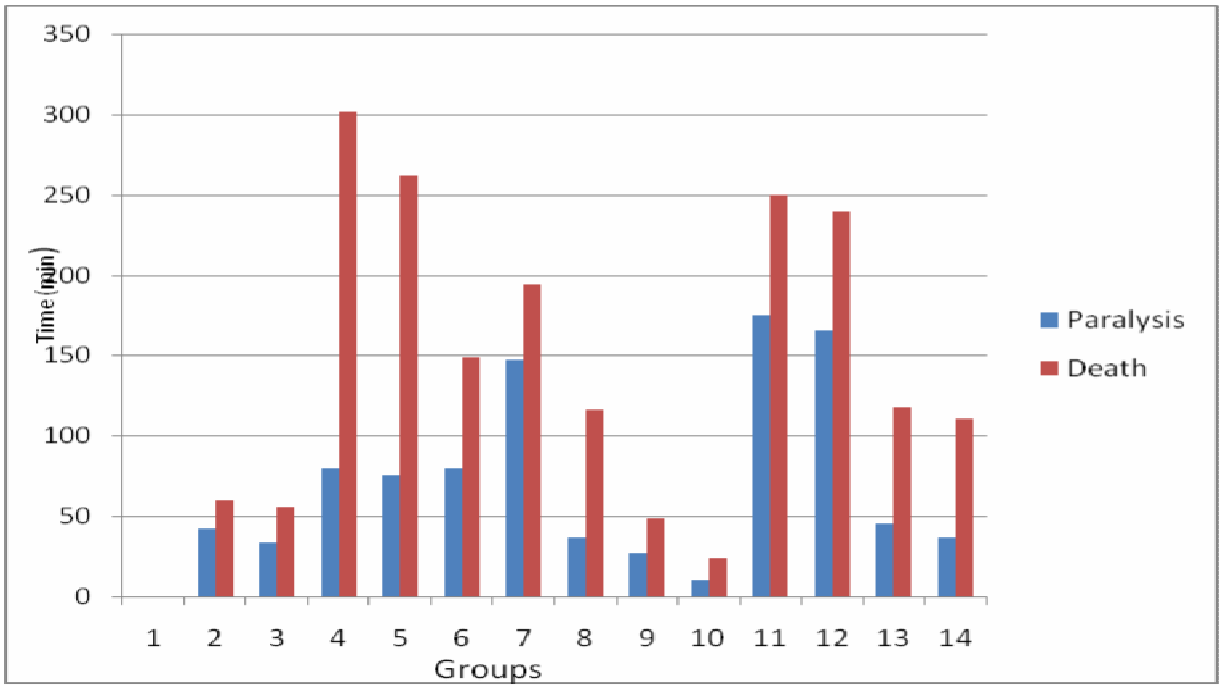

Fig 1

Anthelmintic activity of various extracts of stem bark of Zizyphus jujuba Mill & Lamk. on Indian Earthworms Phertima Posthuma.

Each bar is represented as mean ± standard deviation group 1- control (Normal saline water), group 2 & 3 standard-Piperazine citrate- 40 & 60 mg/ml respectively, group 4- benzene extract 40 mg/ml, group 5- chloroform extract 40 mg/ml, group 6- acetone extract 40 mg/ml, group 7 to 10- methanol extract 20 mg/ml, 40 mg/ml, 60 mg/ml, & 80 mg/ml respectively, group 11 to 14- Aqueous extract 20 mg/ml, 40mg/ml, 60mg/ml, & 80 mg/ml respectively.

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