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Short Communication

Phytochemical constituents and effects of aqueous root-bark extract of *Ficus sycomorus* L. (Moracaea) on muscular relaxation, anaesthetic and sleeping time on laboratory animals

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Aqueous extract of the leaves, stem-bark and root-bark of *Ficus sycomorus* were screened for chemical constituents and effects on muscle relaxation, local anaesthetic and sleeping time on 20 wister rats (138.7 - 143.9g ± 22.4) and one rabbit (1300 g ± 0.00). The extract contained tannins, alkaloids, reducing compounds, saponins, flavonoids, steroid, terpenoids and anthracenoside. The aqueous root bark extract induced 50% anaesthesia at 30 mg/ml on rabbit compared with xylocaine. The extract was also tested on rats to see its effect on aminobarbitone sleeping time as it increased the period. The extract was observed to show muscle relaxation in rats. It promotes muscle relaxantion and increased aminobarbitone sleeping time in rats. Hence, *F. sycomorus* exhibits pharmacological activities.

Key words: Muscle relaxation, local anaesthetic, sleeping time, tannins, alkaloids, steroid, flavonoids.

INTRODUCTION

Medicinal plants play important role in individuals and communities health. The medicinal value of these plants depends on some chemical compounds that produce a definite physiological action in the human body. The most important of these bioactive constituents of plants are alkaloids, tannins, flavonoids and phenolic compounds (Hill, 1952). The state of medicinal plants research has been emphasized in many developing countries (Edeoga et. al., 2005). The appropriate utilization of local resources to cover drugs needs, is dependent on the preliminary scientific study to determine the efficacy and safety of any preparation (Burkill, 1984).

The awareness of the role of medicinal plants in health care delivery of developing countries has resulted in researches into traditional medicine, with a view to integrating it with modern orthodox medicine (Sofowara, 1993). This is imperative as 70% of Nigerian population (140 million) rely solely on traditional medicine (Rahila et al., 1994). *Ficus sycomorus* (moraceae) has many traditional medicinal uses in the treatment of snake bites, jaundice, chest pains, dysentery, cool, coughs and throat infections (Sofowara, 1993). The objective of this work is to determine the chemical constituents, local anaesthetic, sleeping and muscles relaxation effects of *F. sycomorus* on experimental animals.

MATERIALS AND METHODS

Collection of plant materials

The leaves, stem-bark and root-bark of Ficus sycomorus were collected from Kwayam Village in Maiduguri, Borno state, North-Eastern Nigeria. The voucher specimens were deposited in the Chemistry Laboratory of the University of Maiduguri.

Preparation of extract

The plant samples were air-dried for ten days under shade and

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Table 1. Qualitative analysis of the phytochemicals of *Ficus sycomorus.*

Chemical component	Leaves	Stem-bark	Root-bark
Steroids	+	+	+
Terpenoids	+	+	+
Flavonoids	+	-	+
Tannins	+	+	+
Saponin	+	-	+
Reducing compounds	+	-	+
Anthracenosides	+	+	+
Alkaloids	+	+	+

+ (Positive) = present; - (negative) = absent.

ground into uniform powdered using a Thomas-willey milling machine. 100 g of dried powdered samples was dissolved in 200 ml of distilled water and then introduced into the soxhlet extractor for distillation in 6 h. The filtered extract yielded 124 mg/ml of root-bark and stored in refrigerator at 4℃ until needed.

Preparation of xylocaine (standard)

A stock solution of 50 mg/ml xylocaine was prepared from which 0.3mg/ml and 1.0 mg/ml concentration were made.

Phytochemical screening

Standard procedures as described by Sofowara (1993), Evans and Trease (1989) and Harborne (1973) were used to identify the chemical constituents.

Local anaesthetic effect of the root-bark extract

The method described by Shetty and Anika (1982) was adopted. Twenty rats weighing 142.7 -143.9 g ± 22.4 and one rabbit weighing 1300g±0.00 were obtained from Nigeria Institute for Trypono-somiasis Research, Vom, Jos. The rats were used for sleeping and muscles relaxation tests wile were rabbit was used for the local anaesthetic test. The experimental animals were housed in clean plastic rat and rabbit cages and allowed to adjust to the laboratory environment for a period of one week.

Two identical, symmetrical and circular regions each were shaved on the thoracic, lumber regions of the dorsum of the rabbit, 24 h before the experiment. Two concentrations (1.0 and 3.0 mg/ml) of xylocaine were injected subcutaneously in the right thoracic and left lumber shaved regions respectively to form wheals which were encircled with a marker. Likewise, 30 and 100 mg/ml of the root-bark extract were injected intradermally in the shaved right lumber and left thoracic regions respectively to form wheals which were also encircled with a marker.

The encircled regions were each pricked with a needle 10 times each at 5 min. intervals for 30 min. starting at time zero (0). The number of responses to pain by the rabbit when pricked with a needle was recorded.

The muscle relaxation effect of the extract

The method of Kitano et al. (1983) was adopted using an inclined board. Twelve rats of both sexes weighing 127.2 - 128.0 ± 8.3 g were group into three (A - C) and housed in clean plastic rat cages. The rats were placed one after another on the smooth surface of a board inclined at 35° degrees to the horizontal before extract administration. They were allowed a minimum of 10 s to remain on the board. The rats were then treated with varying doses (100, 200 and 400 mg/kg) of the root-bark extract intraperitoneally. 30 min after treatment, the rats were again placed on the inclined board and allowed for a minimum of 10 s to remain on the board. Those rats that slipped down the board before 10 s were counted positive for muscle relaxation.

Effect of the root-bark extract on aminobarbitone

Aminobarbitone solution of concentration 60 mg/ml was prepared by dissolving 600 mg of powder salt of aminobarbitone in 10 ml of distilled water. The rats were all administer via intraperitoneal route. Twelve rats of both sexes weighing 143 -150.0g ± 13.2 were separated into three groups of four (4) rats each (A - C). The rats were treated as follows:

Group A: The rats were given 100 mg/kg intraperitoneal (I.P) dose of root-bark extract, 30 min before I.P aminobarbitone (12 mg/kg) administration.
Group B: The rats were given 200 mg/kg I.P dose of the root-bark extract, 30 min before I.P aminobarbitone (12 mg/kg).
Group C: (Control). The rats were treated with aminobarbitone (12 mg/kg) only.

RESULTS AND DISCUSSION

Phytochemical constituents

The extract showed the presence of tannins, alkaloids, reducing compounds, saponins, flavonoids, steroids, terpenoids and anthracenoside (Table 1). The stem-bark extract did not contain flavonoids, saponins and reducing compounds.

Local anaesthetic effect

The root-bark aqueous extract produced 50 and 58.3% local anaesthetic effects at 30 mg/ml and 100 mg/ml, respectively. Xylocaine produced 33.3 and 53.3% anaesthesia at 0.3 and 1.0 mg/ml respectively (Table 2). The extract showed profound depressant effects on both

Table 2. The local anaesthetic effect of *Ficus sycomorus* root-bark extract.

Drug	Conc. (mg/ml)	Number of Positive responses over time (min)							Total out of 60	Anaesthesia (%)
		0	5	10	15	20	25	30		
Xylocaine	0.3	0	6	2	6	3	2	1	20	33. 3%
	1.0	0	6	8	6	3	6	3	32	53. 3%
***F. sycomorus* extract**	30.0	0	8	9	7	3	2	1	30	50.0%
	100.0	0	8	7	8	6	4	2	35	58. 3%

Table 3. Effect of the *Ficus sycomorus* root-bark extract on aminobarbitone sleeping time in rats.

Group	Dosage of extract (mg/kg)	Min ± SD (Mean time)
A	100	151 ± 3.77
B	200	155 ± 6.60
C	Control	144 ± 1.87

Table 4. The muscle relaxation effect of the *Ficus sycomorus* extract.

Group*	Dosage of extract (mg/kg)	Percentage of rats unable to grasp board with fore paws (%)
A	100	25
B	200	75
C	400	75

*Four rats per group.

peripheral and central nervous systems. The peripheral action was observed as local anaesthesia in rabbit.

Effect of the extract on aminobarbitone sleeping time

The effect appears to increase the sleeping time of aminobarbitone, although is dose dependent. The rats that received both extract and aminobarbitone slept longer (Table 3). The central action of the extract was observed by its effects on aminobarbitone sleeping time. The extract appeared to potentiate aminobarbitone induced sleeping time, suggesting a pharmacological action.

The muscle relaxation effect of the extract

The results obtained in various treatment groups showed that the extract could produce some relaxation effects in rats (Table 4). The central action of the root-bark extract was also demonstrated by its effect on muscle relaxant activity.

Conclusion

The phytochemical screening of the *F. sycomorus* for the chemical constituents studied, showed that leaves and root-bark contained alkaloids, tannin, steroids, terpenoids, flavonoids. They were known to show medicinal activities as well as exhibiting physiological activity (Sofowara, 1993). The plant studied could be potential sources of useful drugs, especially for use as anaesthesia. Isolation, identification, characterization and elucidation of the structure of the bioactive compounds are currently under investigation. The psychotropic activities of this plant for the treatment of psychiatry disease as claimed by traditional healers are also being investigated.

REFERENCES

Burkill HM (1984). The Useful Plants of West Tropical Africa 1; Families A-D. Royal Botanical Garden Kew. pp. 415-440.

Evans WC, Trease GE (1989). Pharmacognosy. 11th ed. BraillIar Tiridel Can. Macmillian Publishers.

Edeoga HO, Okwu DE, Mbaebie O (2005). Nutritional Values of some known conventional leafy vegetables of Nigeria. Afr. J. Biotechnol. 4(7): 685-688.

Harborne JB (1973). Phytochemical Methods, London Chapman and Hall, Ltd. pp. 48-189.

Hill AF (1952). Economic Botany. A text Book of Useful Plants and Plant Products (2nd ed) McGarwHill Book Company Inc., New York, pp. 86-90.

Kitano T, Horikoni A, Kamiya J (1983). Studies on general Pharmacological properties of sultopride in Oyo Yakuri. Global J. Pure Appl. Sci. 8b: 202-210.

Rahila T, Rukhsandra N, Zaidi AA, Shamishilia R (1994). Phytochemical screening of medicinal plants belonging to *Euphorbiaceae*. Pak. Vet. J. 14: 159-163.

Shetty A, Anika T (1982). Pharmacological Basis of therapeutics (3rd and 5th ed.). Macmillan Publisher, New York. pp. 157-201.

Sofowara A (1993). Medicinal Plants and Traditional Medicine in Africa, Spectrum Books Ltd., Ibadan, Nigeria. pp. 289-300.