

## In Vivo Toxicity Studies and Phytochemical Screening of Stem Bark of *Ficus Sycomorus* Linn (Moraceae)

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**Abstract:** This research paper has investigated the *In vivo* toxicity studies and phytochemical screening of Stem bark of *Ficus sycomorus* Linn (Moraceae). Ethno-pharmacological relevance of *Ficus sycomorus* is quite obvious. It finds relevance in the treatment of Diabetes mellitus and other infectious diseases in the Northern part of Nigeria. The preliminary phytochemical screening of the extract revealed the presence of flavonoids, glycosides, reducing sugars, resins, saponins and tannins. The result of the experimental study carried out on albino rat which is close to human being indicates that stem bark extract of *F. sycomorus* produces toxicity at a dose of 1500 mg/kg. The outcome of this study offers support to the Ethno-medicinal uses of *F. sycomorus* in the treatment of various ailments.

**Keyword:** *F. sycomorus*, Phytochemical, Saponins, flavonoids, glycosides, reducing sugars and Toxicity

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### I. Introduction

The extensive use of natural plants as primary health remedies is due to their pharmacological properties is quite common. Natural products are preferred for biological screening based on ethno-medical use of plants because many infectious diseases are known to have been treated with herbal remedies throughout the history of mankind [1]. Medicinal plants contribute significantly to rural livelihoods apart from the traditional healers practicing herbal medicine, many people are involved in collecting and trading medicinal plants [2]. The investigation of efficacy of plant-based drugs has been paid great attention because of the few or no side effects, cheap and easy availability [3,4]. The rich flora of West Africa is linked to two different environments: the rain forest along the coast and the savannah in the hinterland. It is well known that plants are significant sources of drugs and drug leads [5, 6]. According to WHO, 25% of pharmaceutical drugs are made from plants that were first used in traditional medicine [7].

*Ficus sycomorus* Linn belongs to Moraceae, a family that is reputable for its medicinal values and consists of about 40 genera and over 1,400 species of trees, shrubs, vine and herbs, often with milky latex juices [8]. They are usually found near streams in the savannah area. *F. sycomorus* which is known as "Baure or Bore" in Hausa is a tree attaining height of 20m with widely spreading branches and a massive crown. Sheep and cattle eat its foliage [9]. *F. sycomorus* have been suspected to possess antidiarrhoeal [10] and anticonvulsant activities [11]. The plant has also been reported to be a potent antimicrobial agent against ciprofloxacin resistant *Salmonella typhi* [12]. The Hausa and Fulani tribes of northern Nigeria use the stem-bark of *F. sycomorus* to treat diabetes mellitus. The aim of this work was to discover the chemical constituents of stem bark extract of *F. sycomorus* as well as determine the oral acute toxicity/Lethal dose (LD<sub>50</sub>) of the extracts in Wistar Albino mice.

### II. Material And Methods

#### 2.1. Collection of plant

All chemicals used were of analytical grade. Fresh stem-bark of *F. sycomorus* was collected from the outskirts of Mashi town in Mashi Local Government area of Katsina State, Nigeria. The plant material was collected. The plant was identified by Prof. B. S. Aliyu of the Biological Science Department, Bayero University, Kano, Nigeria, where the voucher number of the plant was submitted.

#### 2.2. Extract of plant material

The stem-bark of *F. sycomorus* was air-dried and pounded into fine powder to increase the surface area. The powder (200g) was percolated with 750ml of methanol at room temperature for two weeks after which

it was filtered. The percolate was concentrated using rotary evaporator machine at 40°C. The crude methanol extract obtained (8.82 g) was kept in a deep freezer at 4°C until used

### 2.3. Phytochemical screening

The methanol fraction (2.8g) of the stem-bark of *F. sycomorus* was subjected to preliminary phytochemical screening, to identify the secondary metabolites present. The methods of analysis employed were those described by Brian and Turner (1975).

## III. Result And Discussion

### Acute toxicity study

The LD<sub>50</sub> of the methanol extract of *F. sycomorus* was determined by methods of Lorke (1983) using 15 rats in the first phase. The animals were fasted for 2 h before the study, but were given water ad libitum. In this phase, rats were divided into three groups of three rats each and were treated with the methanol extract of the specimen at different doses of 10, 100 and 1000 mg/kg (body weight) intraperitoneally. They were observed for 24 h for signs of toxicity. In the second phase, 12 rats were divided into four groups of three rats each and were treated with the extract doses of 1500, 2900, and 5000 mg/kg (body weight). The results are shown on table 1. The LD<sub>50</sub> was calculated using appropriate formula.

**Table 1: Phytochemical Analysis of Stem bark extract of *Ficus sycomorus* Linn**

S/N	SECONDARY METABOLITES	A.S.E	C.S.E	E.S.E	M.S.E	H.S.E
1	<b>ALKALOIDS</b>					
	a. Wagner's reagent	+	+	+	+	-
	b. Hager's reagent	+	+	+	+	-
2	<b>FLAVONOID</b>					
	a. Alkaline reagent test	+	+	+	+	+
	b. NH <sub>4</sub> OH test	+	+	+	+	+
3	<b>REDUCING SUGAR</b>					
	a. Fehling Solution A&B	+	+	-	+	-
4	<b>TANNINS</b>					
	a. Lead Acetate test	+	-	+	+	+
	b. FeCl <sub>3</sub>	+	-	+	+	+
5	<b>CARDIAC GLYCOSIDES</b>	-	+	-	-	+
6	<b>SAPONINS</b>	+	+	+	+	+
7	<b>STEROIDS</b>	-	-	-	-	-
8	<b>RESINS</b>	-	-	+	-	-

A.S.E.-Aqueous Stem bark Extract, C.S.E.-Chloroform Stem bark Extract, E.S.E.-Ethyl acetate Stem bark Extract, H.S.E- Hexane Stem bark Extract, M.S.E- Methanol Stem bark Extract

Note: (+) = Present, (-) = Absent

**Table 2: Acute toxicity test of the methanol leaf extracts of *F. sycomorus* Doses (mg/kg) Survival rate (Phase 1)**

Doses (mg/kg)	Survival rate
10	0/3
100	0/3
1000	0/3

### (Phase 11)

Doses (mg/kg)	Survival rate
1600	0/2
2900	0/2
5000	0/2

(By determining the cube root of the highest value, (Lorke, 1983))

**Table 1** shows the result of Phytochemical screening of *Ficus sycomorus* Linn. Preliminary Phytochemical investigation of the Aqueous, Chloroform, Ethylacetate, Methanol and Hexane extracts of the stem bark of the plant *Ficus sycomorus* Linn were compared. Flavonoids and Saponins were present in all the solvents' extracts whereas Alkaloid was evident in Aqueous, Chloroform, Ethyl acetate and Methanol extracts of the stem bark of the plant. It also shows that Tannins were present in Ethyl acetate, Methanol and Hexane soluble extracts only, Reducing sugar was absent in Ethyl acetate and Hexane extracts of the stem bark of the plant, Cardiac Glycosides were evident in Chloroform and Hexane extracts whereas Resins could only be found in Ethyl acetate extract of the stem bark of *Ficus sycomorus* Linn. Steroids were absent in all the compared extracts of the plants.

**Table 2** shows that after each dose was given, the rats were observed for 24 hours for signs of dizziness, inaction, loss of appetite or death, which should result from the toxic nature of the plant extract. It was found that the methanol extract of *F. Sycomorus* was slightly toxic because at very high dose of 5000mg/kg body weight, neither death nor other signs of toxicity were observed. According to the classification of levels of toxicity based on the dose: “compounds of slight toxicity will have LD<sub>50</sub> between 1000 and 5000mg/kg. These compounds would be expected to cause illness until only large quantities were ingested” (Lorke, 1983). Garba, et al., had reported earlier that the aqueous root bark extract of *F. sycomorus* is slightly toxic. (Garba, et al., 2006). Thus, the LD<sub>50</sub> was calculated as 30% of the highest dose which in this study is 1500 mg/kg (bw).

#### IV. Conclusion

The LD<sub>50</sub> (1500mg/kg bw) value is an indication that the plant (*F. sycomorus*) is slightly toxic hence its extract can be safely used ethno-medically at lower doses. The phytochemical result indicates the presence of some secondary metabolites such as tannins, steroids glycosides, flavonoids which may be responsible for the activity and medicinal uses of the plant.

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