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Original article

Preliminary Phytochemistry and Acute toxicity of ethanol leaves extracts of Ficus ingens and Ficus sur (Forssk) in broiler chickens

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ABSTRACT

This study was carried out to determine the chemical constituents and acute toxicological effects of ethanolextracts of *F. ingens* and *F. sur*. Twelve number of broiler birds were distributed into varying phases and groups administered at different doses (10, 100, 1000, 1600, 2900 and 5000 mg/kg) of aqueous leaves extract of *F. sur* and *F. ingens respectively.* The qualitative and quantitative phytochemicals and acute toxicity of the plant extracts were carried out using standard methods. Preliminary phytochemical screening showed that both plant extracts contain tannins (*F. sur*1.52%; *F. ingens*1.59%); alkaloids (*F. sur*2.08%; *F. ingens*1.12%), cardiac glycosides, flavonoids (*F. sur*1.70%; *F. ingens*1.08%), saponins (*F. sur (*3.60%; *F. ingens*(2.40%) and steroids (*F. sur* 2.60%; *F. ingens* 2.80%) respectively. However, no anthraquinone in the plant extracts. Both plant extracts showed LD_{50} above 5000mg/kg in broiler chickens, substances in both plants need to be isolated.

Keywords: Acute toxicity, LD_{50}, Broiler Chickens and Phytochemical screening.

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INTRODUCTION

Medicinal plants are plants in which one or more of their organs contain substance(s) that can be used for therapeutic purposes or for pharmaceutical synthesis [1]. *Ficus ingens* (Miquel) Miquel belongs to the Moraceae family [12]. It is one of the numerous medicinal plants with long historical use in traditional herbal practices in the treatment of anaemia, piles and diarrhoea. In Borno State, Nigeria, preparations of the bark, roots and leaves are used for treatment of piles and diarrhoea [1]. Extracts of *Ficus* spp. including *F. ingens* have been reported in the treatment of diarrhoea, dysentery,

sexually transmitted disease-causing microorganisms, chest ailments, tuberculosis, leprosy, convulsions, pain, anaemia and wound [17]. *Ficus sur* belongs to the family Moraceae and is found mostly in the tropics and warm temperate regions. The fresh leaves of *Ficus sur* is traditionally used as food in the form of vegetable, blood enhancer and in folklore medicine where it is used to treat diarrhoea, anaemia as well as sexually transmitted diseases (Yakubu *et. al.,* 2020). Several studies have been reported on the medicinal values of the plant with little or no consideration on the bioactive substances that are responsible for its healing properties. *Ficus Sur* (Forssk) formerly called *Ficus capensis*, has common names among the tribes in Nigeria (Akankoro in Igbo, opoto in Yoruba and dullu in Hausa). The fresh leaves of *Ficus Sur* (Forssk) is used as vegetable, blood builder and medicine.[5] reported the use of the plant leaves in treating dysentery, oedema, epilepsy and rickets in infants among some tribes in Edo-Delta areas. *F. sur* is believed by the Igala people of Kogi State to possess immune-boosting property, hence, forming part of most of their traditional remedies for several ailments [7]. The present study was carried out to provide information on phytochemical constituents and determine the acute toxicity of the leaf that is frequently utilised in the treatments of several diseases.

MATERIALS AND METHODS

Collection and preparation of plant samples

Fresh leaves of *Ficus ingens* and *F. sur* plants were collected from population within Makurdi area in Benue State, Nigeria. The collected samples were kept in paper envelopes and transported to Federal College of Forestry Jos for identification by Joseph Azila dropped of voucher numbers and then authentication at College of Forestry, JOSTUM and at Drug Development Unit of N.V.R.I. Vom, where the samples were cleaned with sterile distilled water and air dried for 5 days. The GPS locations of the collection sites were recorded. Voucher specimens were deposited within the Herbarium, College of Forestry Jos.

Extraction procedure

The dried plant parts were ground into fine powder using a mortal and electronic grinding machine. The air-dried leaves of *F. sur and the F. ingens* were pulverized separately, and the powdered materials (1.6 kg each) were macerated with ethanol by cold macerationfor 72 hours with intermittent agitation. The powdery form of each plant parts was sieved using 2.00 mm wire mash. They were filtered with a filter paper and the filtrates were concentrated with the aid of a rotary evaporator to afford the respective dry extracts [15]. These were then air-dried, weighed and stored at room temperature until required for use [22]. The ethanol extracts were then subjected to both qualitative and quantitative phytochemical screening.

Qualitative phytochemical examination

The ethanol extracts of leaves were subjected to qualitative phytochemicals to test for the presence of secondary metabolites following the procedure of [19].

Quantitative phytochemical examination

Quantitative phytochemical examination carried out on the ethanol extracts of

leaves of *Ficus ingens* and *F. sur* were done using the procedures of [4, 20].

Experimental Animals

In this experimental study, twenty-eight (28) matured broilers weighing between 100 were housed in the Experimental Large Animal House of National Veterinary Research Institute, Vom, using standard cages. They were then acclimatized for fourteen (21) days, with water and feed provided ad libitum. All procedures used in this study conformed to the guiding principles for research involving animals as recommended by the Declaration of Helsinki and the Guiding principles in the Care and Use of animals (APS, 2002).

Oral Toxicity Study (LD50)

The mean lethal dose of oral administration of *F. sur* was estimated using the[14]. Firstly, nine birds were divided into three groups of three birds each. Each group was administered different doses (10, 100 and 1000 mg/kg) of aqueous leaves extract of *F. sur* and *F. ingens* simultaneously, three broiler chickens which were distributed into three groups of one bird each, were administered higher doses (1600, 2900 and 5000 mg/kg) of the extract. All animals were then observed within 24 hours for mortality. The median lethal dose was then calculated thus:

$$LD_{50} = \sqrt{(D0 \times D100}$$

Where, D0 = Highest dose that gave no mortality D 100 = Lowest dose that produced mortality

Cage Side Observation

All the treatment groups of birds recorded normal behavioural, motor, and neuronal functions for all the administered OS extracts with no mortality observed. The monitoring of skin and fur, eyes, behavioural pattern such as gait and posture, and autonomic and central nervous system activities of treatment birds remained unchanged with the treatment of *Ficus* species when compared with those of control group. This showed that the oral LD50 of absolute ethanol of *F. sur* and *F. ingens* leaves was greater than 5000mg/Kg body weight.

Body Weight Measurement

The body weight of the treatment group broilers of both sexes did not record any statistically significant ($p>0.05$ changes

Data Analysis

Data were analyzed using percentages and graphical presentation.

RESULTS

Preliminary Phytochemical Screening of Leaves Extracts of *Ficus sur* and *F. ingens*

The extracts (hexane, chloroform, ethyl acetate, acetone and ethanol) of the leaves of *Ficus sur* and *F. ingens* were screened for the presence of some phytochemicals. Table 1 presents the results of phytochemical screening of crude leaf extracts of *Ficus sur* and *F. ingens*.

Table 1: Qualitative test results for phytochemical screening

Parameters	*Ficussur*	*Ficusingens*
Saponin	+	+
Tannins	+	+
Cardiac glycosides	+	+
Steroids	+	+
Alkaloids	+	+
Flavonoids	+	+
Anthraquinone	_	_

Key + = Present - = Not present

Table 2: quantitative test result for phytochemical screening.

Parameters	*Ficus sur*%	*Ficus ingens*%
Saponin	3.60	2.40
Tannins	1.52	1.59
Steroids	2.60	2.80
Alkaloids	2.08	1.12
Flavonoids	1.70	1.08

Acute Oral Toxicity (LD50) Study

Table 3. Result of acute oral toxicity of *Ficus sur and F. ingens*

Phase	Group	Dose	Mortality
A	1 2 3	10 100 1000	0/3 0/3 0/3
B	4 5 6	1600 2900 5000	0/1 0/1 0/1

The result of this study demonstrates that the acute oral toxicity study of the leaves of *F. sur* is above 5000 mg/kg in broilers.

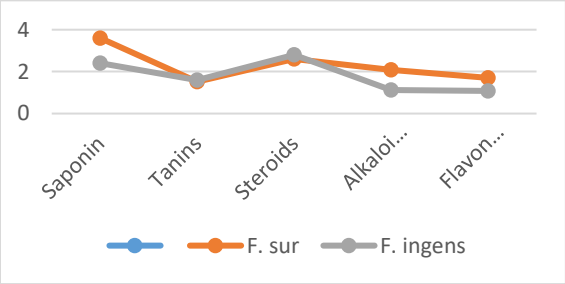

Figure 1: Quantitative Test Results (%) for Phytochemical Screening of *F. sur F. ingens.*

DISCUSSION

Ficus sur and Ficus ingens used as traditional medicine and food in different parts of Nigeria. The present study was conducted on preliminary phytochemical and quantitative analysis of the leaf extracts of the plants.

Preliminary phytochemical analysis.

Result of the qualitative analysis revealed the presence of saponins, tannins, flavonoids, glycosides, alkaloids, cardiac glycosides, steroids in the plant leaves investigated with exception of anthraquinone (Table 1). The results obtained revealed the absence of anthraquinones in both qualitative and quantitative analysis of the extracts. Tannins were present in all extracts. Quantitative analysis carried out on two detected phytochemicals; saponins, tannins, flavonoids, glycosides, alkaloids, cardiac glycosides and steroids reveals that these secondary metabolites are present in different amount in the leaves of the plant (Table 2). Amongst the quantified phytochemicals, Saponins content of the leaves of *Ficus sur was found to be* (3.60%) *and Ficus ingens* was (2.40%). Tannins were found to have *F. sur* (1.52%) while *F.ingens* contains (1.59%) the presence of alkaloids in *F. sur* (2.08%) and *F. ingens* (1.12%) in their leaves supports the findings by [17], that the antibacterial activity of this plant may be attributed to the presence of alkaloids. Alkaloids have been reported to possess various pharmacological activities including antihypertensive effects, antiarrhythmic effect, antimalarial and anticancer activity [1]. Pure isolated alkaloids and their synthetic compounds have been used in medicine as an analgesic, antispasmodic and bactericidal agents [13]. Steroids were found to be present in the ethanol extracts of *Ficus sur* (2.60%) *and F. ingens* (2.80%) species are rich sources of precursors ofsteroid drugs which were obtained in the present study. These steroidal materials have been found useful as anti-inflammatory agents. However, the findings of this study is similar to [10] but contradict the findings

of [6, 22, 23]. Flavonoids in *F. sur* contains (1.70%) and *F. ingens* (1.08%) respectively are a class of naturally occurring plant secondary metabolites imparting protection to the reservoir [17, 21]. They have enormous biological and pharmacological activities conferring many health benefits to the human. They are the group of compounds which received considerable attention from the researchers as depicted from the scientific literature [5,8]. Mostly they are present in plants as glycosides but can also be isolated in free aglycon form [17, 21]. The phenolics and polyphenols are one of the largest groups of secondary metabolites to have exhibited antimicrobial activity [11]. Naturally occurring plant flavonoids have also been reported to possess antimicrobial activities [9]. Phlobatannins and resins were respectively absent in the leaves in line with [12]. Some of these phytochemicals most importantly saponins, flavonoids, and tannins have been found to be of high medicinal values [12,15]. The absence of those phytochemical constituents may be attributed to the solvent used in this study.

Conclusion and Recommendation

The nontoxic nature of ethanol extracts of *F. ingens and F. sur* have showed the acute oral toxicity conducted as per OECID guidelines. The behavioural profiles of the tested broilers during a period of 14 days suggests that the plants are nontoxic in nature to the birds. Hence the *Ficus ingens* and *F. sur* could be safe up to the dose of 5000mg/kg body weight of the broilers. Furthermore, most of these constituents were found in abundant in the leaves. The presence of these phytochemical compounds attests to the usefulness of these plants in the treatment of several diseases. Also, the leaf could serve as ingredients in pharmaceutical industries. Further studies are warranted to determine the chronic toxicity of the leaf extracts andconstituents responsible for the blood building ability and healing activities should be extensively and exhaustively investigated [18].

Conflict of interest

The authors have no conflict of interest.

Ethics approval and informed consent.

Ethical approval was obtained from AUCC N.V.R.I. VOM

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