INTRODUCTION
In developing countries, about 80% of its people depend solidly on traditional medicines to manage their health problems. Recently, in developed countries a lot of interest has increased for plant value and traditional medicines in drug development and their healthy lifestyles (Ajoku et al., 2004; Watkins et al., 2006; Ben A. et al., 2012). Successful treatments of various diseases using different medicinal plants with no proper scientific evidence have been established by traditional herbalists. Hence, proper evidences with well-established claims of these medicinal plants on their pharmacological and toxicological properties to ascertain their biological potential and safety is indeed necessary.

Human chronic diseases are associated with deleterious damage, dysfunction of various organs and oxidative stress are suggested to be their main contributory factors leading to cardiovascular diseases (Muruga and Pari, 2006; Anoja et al., 2018). A lot of medicinal plants extracts have been used widely, in Ayurveda medicine in Nupe lands against vascular complications (Ediriweera and Ratnasooriya, 2009; Anoja et al., 2018). However, most of these plant extracts have not been properly scrutinized in appropriate model. Hence, its efficacy assessment against vascular disorders in animal model is of urgently important.

Ficus platyphylla is belonging to a family Moraceae. It is a deciduous plant locally identified by Hausas and Nupes as “Gamji and Gbagun”, respectively, and widely distributed throughout the savannah region of the West African coast. Preparations of the plant have been used in the Nigerian traditional medicine for the treatment of insomnia, epilepsy, psychosis, depression, pain, inflammation and central nervous disorders (Aodu, 1989, Chindo et al., 2003). F. platyphylla aqueous stem or root bark extract, powder/decoction are orally taken, the powder is sometimes taken with food, or placed in burning charcoal and inhaled to enhance fertility (Aodu, 1989, Chinenyi et al., 2011). Chindo et al. (2008) have reported that the plant contain certain biological active compounds that have antinociceptive, anti-inflammatory, and gastrointestinal effects in rodents. Ben et al. (2012) have reported that crude doses of F. platyphylla stem bark methanol extract administered orally for 28 days are safe in rats. Preliminary phytochemical tests of the plant part methanol extract showed the presence of some bioactive compounds (Amos et al., 2001). The selection of plant part was based on the frequent uses of it in Ayurveda preparations in the management of cardiovascular diseases. Due to the different utilizations, well established and proven effectiveness of F. platyphylla parts extract in the Nigerian traditional medicine and lack of optimum effective doses in the management of human diseases, this study is aimed to evaluate the phytochemical components and effects of different concentrations (1000, 3000 and
5000 mg/kg) of acetone bark extract of *F. platyphylla* on some selected biochemical parameters in rats.

**MATERIALS AND METHODS**

**Chemicals and Assay kits**

Acetone was purchased from sigma-Aldrich Company (st. Louis, MO, United State). Albumin, alkaline phosphatase (ALP), alanine and aspartate aminotransferase (ALT and AST), antioxidant enzyme assay kits were obtained from Roche Diagnostic GmbH, Mannheim, Germany.

**Sample Collection**

Stem bark as selected part of *F. platyphylla* was collected in March 2016 from Lapai in Lapai Local Government Area of Niger State, Nigeria. The botanical identification and authentication of the selected plant was confirmed in the Biological Department, Faculty of Natural Sciences, Ibrahim Badamasi Babangida University, Lapai. The debris on the stem bark was removed and air dried at room temperature. Dried samples were pounded in to fine powder using mortar and pestle and stored in a labeled airtight container for future use.

**Preparation of Crude Extract**

The extractant used was acetone due to its selective property of extracting tannin and flavonoid (Iyambo, 1991). Eight (80) grams of *Ficus platyphylla* stem bark powder in one (1) litre capacity conical flask containing 500 ml of cold acetone (Sigma-Aldrich, Europe) was prepared, kept in a cupboard with intermittent shaking for five days. The mixture was filtered using muslin cloth and the filtrate was evaporated in a rotary evaporator to give a yield of 12.47g, the paste was poured in to beaker and placed in a water bath for complete evaporation of the solvent. This was reconstituted separately in distilled water to give the required doses of 1000, 3000 and 5000 mg/kg of the extract used in this study.

**Experimental animals**

Apparently healthy twenty four (24) adult male rats of Wister strain weighing between 125 and 160g body weight were obtained from the Animal House of the Biochemistry Department, Federal University of Technology, Minna, Niger State. They were housed in clean metabolic cages placed in well-ventilated house conditions (temperature 23 ±1°C; photoperiod: 12h natural light and 12h dark; humidity: 45–50%), and also allowed free access to Balanced Trusty Chunks and tap water freed of humic property of extracting tannin and flavonoid (Iyambo, 1991). The rats were acclimatized after randomized in to different groups for a period of seven (7) days in standard environmental conditions before the experiments. The protocols used were in accordance with that of Organization for Economic Development (OECD) guidelines on good laboratory practice (OECD).

**Experimental Animal group design**

The rats were grouped in to four with six rats per group, and orally administered as follows:

Group 1: Healthy control rats administered with distilled water for 28 days

Group 2: Healthy rats treated with 1000 mg/kg of extract for 28 days

Group 3: Healthy rats treated with 3000 mg/kg of extract for 28 days

Group 4: Healthy rats treated with 5000 mg/kg of extract for 28 days

The animals were anaesthetized and sacrificed after the 28th day of treatments and blood were collected by cardiac puncture. The collected blood from each group were pulled, dispensed in to plain bottles and allowed to clot and centrifuged at 3500 rpm for 10 min. The sera were separated, stored at -4°C and used for evaluation of biochemical indices.

**METHODS**

**Phytochemical analysis:** The qualitative analysis of the plant constituents was assessed by the methods described by Trease and Evans, 1999; El-Olemmy et al., 1994 and Harbone 1993. The tests were carried out to find out the presence of the active chemical constituents that included: Saponins, tannins, flavonoids, and glycosides.

**Lipid parameters:** The serum total cholesterol (TC), high density lipoprotein (HDL) and triglyceride (TG) concentrations in rats were analyzed using spectrophotometric enzyme assay kits (Bergmeyer et al., 1978; Boners and McComb, 1966). The serum Low density lipoprotein (LDL) and Very low density lipoprotein (VLDL) concentrations were calculated following the Friedewald formulae (Friedwald et al., 1972). Cardioprotective index (CPI), atherogenic (AI) and coronary risk indices (CRI) were calculated using the formulae:

CPI=HDL/LDL; AI=TC- HDL/HDL and CRI = TC/HDL.

**Liver and antioxidant Markers**

Liver enzymes activities, alanine aminotransferase (ALT), aspartate aminotransferase (AST), and alkaline phosphatase (ALP) were analyzed using spectrophotometric enzyme assay kits (Bergmeyer et al., Bowers Jr and McComb, 1966). The serum activities of reduce glutathione (GSH), glutathione reductase (GR), glutathione peroxide (GPx), and glutathione S-transferase (GST) were estimated using reported procedures (Sedlak and Lindsay, 1968; Habig et al., 1974). Also, the total protein and lipid peroxidation concentrations were analyzed by malondialdehyde (MDA) formation following Lowry and thioarbituric acid methods, respectively (Ohkawa et al., 1979; Lory et al., 1951).

**Hematological indices**

EDTA-added whole blood samples were used for hematological examination. Hematological parameters like number of red blood cell (RBC), white blood cell (WBC), lymphocytes (LYM), platelets (PLT), hemoglobin (Hb) concentration and hematocrit (Ht) values were determined by standard methods using automated hematology analyzer (Abacus 360; Japan).

**Statistical analysis**

Data were presented as means±SEM. Analysis variance (ANOVA) was used to analyze the data using Dunnett’s multiple comparisons test. Data were considered significant at p < 0.05.

**RESULTS**

The results of phytochemical studies of *F. platyphylla* stem bark are presented in Table1. It shows the presence of Saponins, flavonoids, tannins, volatile oils and phenols. However, the present of steroids were not detected (Table 1).
The results of lipid, antioxidant and hematological indices in all studied rats are presented in Table 2 and 3 and 4, respectively. As presented in Table 2, all rats treated with 1000, 3000 and 5000 mg/kg of extracts displayed a significant reduction (p<0.05) in serum concentrations of TC (3.2, 3.4 and 3.1 mmol/L), TG (1.1, 0.8 and 1.2 mmol/L), VLDL (0.5, 0.7 and 1.1 mmol/L), HDL (0.1, 0.03 and -0.1), and CRI (1.1, 1.0 and 1.9), and significant elevation in LDL (3.0, 3.3 and 3.5 mmol/L) and calculated CPI (1.4, 1.5 and 1.8), respectively, when compared to HDL (1.3 mmol/L) and CPI (1.2) of untreated rats after 28 days of treatment (Table 2).

In addition, general reduction of liver enzymes were experienced in all rats treated with 1000, 3000 and 5000 mg/kg of extracts when compared to those of untreated rats (Table 3). Furthermore, a significant increase in serum concentrations of GSH (761. 2, 810.1 and 825.3 μg/g), GR (8.8, 10.5 and 10.7 nmol/min/mg), GPx (11.5, 12.1 and 12.6 nmol/min/mg), and GST (10.5, 10.8, and 11.2 nmol/min/mg) were observed in rats treated with 1000, 3000 and 5000 mg/kg, respectively (p<0.05) when compared to the untreated rats after 28 days of study (Table 3). In contrast, MDA concentrations in rats treated with all levels of extract were decreased significantly (p<0.05) when compared to untreated rats (Table 3).

Subsequently, significant elevation of all hematological indices were observed in all extract treated rats (p<0.05) when compared to untreated rats (Table 4).
**DISCUSSION**

This study was conducted to evaluate the phytochemical components in acetone bark extract of *F. platyphylla* and its effects at different dose concentrations on some selected biochemical indices in rats. The medicinal property or effect of various plants extracts in the treatment and management of various ailments is ascribed to their bioactive substances. Different portion extract of *F. platyphylla* could be used to manage diseases such as, Anaemia, Gonorrhoea, Dysentery, Jaundice and Liver disorder (Babalola, 1993; James et al., 2010). The presence of these Phytochemicals in *F. platyphylla* can be attributed to its various medicinal properties as it is being used traditionally. The Phytochemicals detected in *F. platyphylla* stem bark extracts signified that it contains bioactive chemical compounds such as Flavonoids, Alkaloids, phenols, tannins, Saponins, and glycosides etc. These Phytochemicals were reported severally for their medicinal values on ailments such as, Diabetes, microbial diseases, Atherosclerosis, cancer and inflammatory diseases (Chukwuka et al., 2011).

A significantly reduction in the serum concentrations of TC, TG, LDL, VLDL and increased concentration of HDL recorded in all extract treated rats as compared to untreated rats may signify extract’s high protective effect against hypercholesterolemia and hypertriglyceridemia at all doses of extract in rats. This could be due to rate-limiting enzyme HMG-CoA reductase of cholesterol biosynthesis inhibition and activation of lipolysis by reducing the activity of hormone sensitive lipase, respectively. High levels of LDL may risks the formation of atherosclerotic plaques (Adaramoye and Akanni, 2014; Anoja et al., 2017). The high levels of HDL associated with high risk of cardiovascular disorders have been established by epidemiological and clinical studies (Tan, 2016; Anoja et al., 2018 and paper). High levels of HDL demonstrated in all extract treatments indicated that all doses of extracts exhibit a protective role against cardiovascular disorders by counteracting LDL oxidation, leading to inhibition of cholesterol transport pathway by preventing the formation of modified LDL oxidative particle (Yokozawa et al., 2006; Anoja et al., 2018). More again, low levels of calculated indices like CRI and AI in all doses of extract treated rats when compared to untreated rats could be a demonstration of their high protective potency against hyperlipidaemia. In contrast, increased levels of CPI in terms of HDL/LDL ratio in all extract treated rats may further strengthen the potency of the plant extracts against atherogenicity. In clinical trials and animal models, relationships between lipid peroxidation and hypercholesterolemia have been established (Perry et al., 2014; Samarghandian et al., 2013). In agreement with reported literature, this study demonstrates lower levels of serum concentrations of MDA in all doses of extract treated rats when compared with that of untreated rats, which may indicate extract’s potency in hepatoprotection. In addition, high serum concentrations of GR, GPs, and GST were observed in all rats treated with different doses of extracts as compared to untreated rats. This observation could be due to the extracts protective effect against oxidative mechanisms. The antioxidant preservative mechanism signifies a system protective effect against chronic diseases (Ndatsu and Umaru, 2016). The presence of bioactive components (phytochemicals) as stated earlier in this study may also contribute to antioxidant mechanism protection by all doses of medicinal plant extracts.

**CONCLUSION**

This study reveals that the bark extracts of *F. platyphylla* are rich phytochemicals and all doses extracts may possess a protective potency against various human disorders. Therefore, all doses of extract in this study are toxic free and may be an excellent promising in the management of diseases as acclaimed by traditional herbalists.

**REFERENCES**


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