

THE POSSIBLE ANTIFUNGAL ACTIVITY OF PARKIA BIGLOBOSA (LOCUST BEAN TREE) LEAVES AQUEOUS EXTRACT ON TRICHOPHYTON MENTAGROPHYTE, MICROSPORUM CANIS AND EPIDERMOPHYTON FLOCCOSUM

¹Damter, S.A., ¹Gyang, I.Y., ¹Magaji, S.T., ²Guluwa, L.Y. and ¹Gofwan, G.P.

¹Department of Animal Health Technology, Plateau State College of Agriculture, Garkawa

²Faculty of Agriculture, Plateau State University, Bokoos.

Corresponding author: sylvanusdamter@gmail.com; 08069651376

ABSTRACT

This study evaluated the phytochemical screening, and antifungal effects of Parkia biglobosa leave aqueous extract using standard protocols. Veterinary drugs are very costly, from synthetic source and animals have developed resistance to them. There is need for an alternative source which is cheap, available and the need for conservation of plants with medicinal value. A preliminary phytochemical screening of the aqueous extract of Parkia biglobosa leaves revealed the presence of saponin, carbohydrate, alkaloid, tannins, flavonoid, cardiac glycosides and resins. The aqueous extract dose of Parkia biglobosa leaves (100, 200, 300 mg/ml and Fluconazole 50 mg/ml), inhibited growth of Trichophyton mentagrophyte, Microsporum canis and Epidermophyton floccosum depending on the concentration used. The result obtained showed that the extract contained some active chemical compounds which may form the basis for its antifungal activities. The findings substantiate the use of Parkia biglobosa leaves in the treatment of fungi related problems. It is therefore recommended that, active ingredient responsible for the antifungal activities should be standardized for use as an antifungal agent

Keywords: Antifungal activity, Parkia biglobosa, Aqueous Extract, Phytochemical screening

INTRODUCTION

The African continent has long history with the use of plant for medicinal purpose. Traditional medicine has been the only source of health care in Nigeria in history time Borokini *et al.* (2013). Even today, plants remain the source of the majority people in developing countries to alleviate health problems Maki (2008). (Chollom *et al.*, 2012) defined medicinal plants as those plants that have medicinal properties which have been proven to be useful as drugs or contain constituents that are used as drugs. Plants consist of various kinds of chemical constituents known as phytoconstituents. *Parkia biglobosa* is a perennial deciduous tree from the savannah, they are important multipurpose trees and are well known in many African countries and important in traditional medicine (Koura *et al* 2011)

The cost of obtaining veterinary drugs is on the increase which demands for urgent need for a cheap alternative, as Animals have developed resistance to most antifungal drugs which are synthetic in nature. The research is aimed at finding out the possible antifungal effect of *Parkia biglobosa* leaves for the purpose of developing it into a new drug so as to reduce cost in Animal production.

MATERIALS AND METHODS

Plant collection, authentication and extraction

These were carried out as earlier described by (Chollom, 2012) and (Okpara, 2006). The leaves of *Parkia biglobosa* were collected in Mangu Local Government Area, Plateau State of Nigeria. It was identified and authenticated at the Herbarium of Federal College of Forestry, Jos.

Preparation of the plant extract

The leaves were air dried for seven days, pulverized into powder using mortar and pestle and then sieved (Okpara, 2006).

Two hundred and forty grams (310 g) of the powder mixed with 3 liters of distilled water was allowed to stay for 24 hours and was shaken at 30 minutes intervals. After close of work, it was kept in a freezer to avoid fermentation. It was then sieved using laboratory sieve with porosity of 150 microns and allowed to stand for 1½ hours to permit heavier particles to settle at the bottom of the measuring cylinder, and then transferred through Whatman's number 1 filter paper. The filtrate was transferred into an open tray and then taken into an oven (hot air oven). The oven was adjusted to 40°C for 3 days to dry. The dried sample was scraped, measured using sensitive balance and 44gm was obtained. It was then transferred into specimen container, crushed into fine powder using laboratory mortar and pestle (Okpara, 2015)

Preliminary phytochemical analysis

The presence of phytochemical components in the extract was determined at the Toxicology Unit of Biochemistry Division of National Veterinary Research Institute (NVRI), Vom, as described in standard procedures (Sofowora, 1984; Trease and Evans, 1983; Okpara, 2015; Damter *et al* 2022) The extract was screened for the presence of saponin, carbohydrate, alkaloid, tannins, flavonoids, anthraquinones, cardiac glycosides and resins.

Source of fungi Isolates

Clinical isolates of *Trichophyton mentagrophyte*, *Microsporum canis* and *Epidermophyton floccosum* were obtained from the Dermatophilosis Department of, NVRI Vom, Plateau State, where the organisms were prepared and standardized for use (Okpara, 2015; Damter *et al* 2022)

Antifungal screening

Nutrient agars in Petri dish were placed in an incubator for 24 hours at 37°C for sterility check. The method used was the punch hole method. After the organisms *Trichophyton mentagrophyte*, *Microsporum canis* and *Epidermophyton floccosum* were introduced or flooded on the nutrient agar, an equal distance hole of 5mm in diameter was punched into the nutrient agar using sterile corn borer.

The extract dose of 100mg/ml, 200mg/ml, 300mg/ml and Fluconazole 10mg/ml were filled into the holes. The plates were then incubated for 24 hours at 37°C. They were afterwards examined and zone of inhibition measured using ruler. The experiment was carried out three (3) times. Analysis of Variance (ANOVA) was the statistical tool used. Duncan's test was used in separation of mean (Okpara, 2015) and (Damter *et al* 2022).

RESULTS

Phytochemical Screening

The result of the phytochemical screening of aqueous extract of *Parkia biglobosa* leaves is presented in Table 1. The result shows presence of saponin, carbohydrate, alkaloid, tannins, flavonoids, cardiac glycoside and resins, only anthraquinones is absent.

Antibacterial Effect of *Parkia biglobosa* Leave Aqueous Extract

Table 2 shows that the aqueous extract dose of *Parkia biglobosa* leaves (100, 200, 300mg/ml and fluconazole 50mg/ml), inhibited growth of *Trichophyton mentagrophyte*, *Microsporum canis* and *Epidermophyton floccosum* differently when repeated three (3) times depending on the concentration. This demonstrates that the extract has antifungal activity.

Table 1: Result of Phytochemical Screening of Aqueous Extract of *Parkia biglobosa* leaves

Test	Inference
Saponin	+
Carbohydrate	+
Alkaloid	+
Tannins	+
Flavonoids	+
Anthraquinones	-
Cardiac glycoside	+
Resins	+
+ Presence; -Absence	

Table 2: Antifungal effect (diameter zone of inhibition[mm]) of *parkia biglobosa* (PB) leaves aqueous extract. (n=3;)

Concentration of extract (mg/ml)					Positive control (mg/ml)	Distilled water
Organism	N	300	200	100	50	
<i>T. mentagropyte</i>	3	30.2±0.2 ^b	27.1±0.0 ^b	25.1±0.3 ^b	52.0±0.4 ^a	0.00±0.0 ^c
<i>M. canis</i>	3	25.2±0.1 ^b	25.1±0.0 ^b	25.2±0.0 ^b	40.1±0.1 ^a	0.00±0.0 ^c
<i>T. floccosum</i>	3	23.1±0.0 ^b	20.4±0.0 ^b	22.6±0.0 ^b	25.1±0.0 ^a	0.00±0.0 ^c

n = Number of observations, DW = distilled water, Positive control= Fluconazole, =*parkia biglobosa* leaves aqueous extract, Means denoted by different superscripts are significantly different (P <0.05).

DISCUSSION

The presence of saponin, alkaloid, tannin, flavonoids, cardiac glycoside and resins in the leaves of *Parkia biglobosa* aqueous extract may be the reason it is used in the treatment of diseases. Okpara, *et al.* (2015) and Borokini *et al.* (2017) have reported that plants have been discovered and used in traditional medicine practices since prehistoric time. also states that plants synthesize chemical compounds for defense against insects and treatment of diseases. (Koura, *et al.* 2011) observed that *Parkia biglobosa* contain constituents that are used as drugs and plays major role in the treatment of various diseases which is in agreement, that chemical compounds such as common sugar, alkaloid, steroids, terpenoids, tannin etc. in plants are responsible for curing different kind of diseases.

CONCLUSION

The aqueous extract of *parkia biglobosa* leaves have antifungal effects against *Trichophyton mentagrophyte*, *Microsporum canis* and *Histoplasma capsulatum*. It is recommended that the active ingredient responsible for the antifungal activities be standardized for use, and conservation of *parkia biglobosa* and other Plant species with medicinal values be encouraged in ethnoveterinary research

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