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Short Communication

Studies of antimicrobial activity and chemical constituents of *Ximenia americana*

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Abstract

Ximenia americana is a plant that is used in traditional medicine for the treatment of malaria, leproutic ulcers and skin infections of mixed origin in Northern parts of Nigeria. To evaluate the scientific basis for the use of the plant, the antimicrobial activities of extract of the leaves were evaluated against six common bacterial isolates. Chemical constituents of the extract were also determined. The extract of was active against the test organisms including *Escherischia coli, Pseudomonas aeruginosa* and *Candida albicans.* Tannins, flavonoids, alkaloids, saponins, anthrax-quinones, starch, general glycosides and bitter principles were found to be present in the extract.

Key words: *Antimicrobial activity, chemical constituents leaves extract, Ximenia americana*

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Introduction

*Ximenia American*a is a plant which grows widely in the tropical and temperate regions of the world. It is extensively used among the Hausa/Fulani communities in the Northern parts of Nigeria as herbal remedies in treating malaria, leproutic ulcers and skin infections of mixed origin. Although oral evidence indicates that the plant is effective in these conditions, there is no documented scientific evidence to support such use.

The aim of the present study is to determine the chemical constituents and antimicrobial activity of the plant.

Materials and Methods

Ximenia americana leaves were collected in Zaria, Nigeria and authenticated at the Department of Biological Sciences, Ahmadu Bello University, Zaria by the Herbarium Keeper, Mr. Ohiare. A specimen was kept at the herbarium. The leaves of the plant were air-dried and reduced to coarse powder. About 200 g was extracted overnight with distilled water and organic solvent (ethanol: chloroform – 50:50). The distillates were freeze-dried to yield a 13.5 g and 17.4 g of semi-solid mass extracts coded XAW and XAO, respectively. Appropriate concentrations of the extracts were made in sterile distilled water or ethanol as appropriate.

The ethanolic extract of the leaf of the plant was tested for the presence of tannins, flavonoids, alkaloids, saponins, anthraxquinones, starch, general glycosides and bitter principles using standard procedures[1]. Cup-plate method was used in the evaluation of the antimicrobial activity of the plant extracts (XAW and XAO) on *Escherichia coli,* NCTC 10418; *Pseudomonas aeruginosa*, NCTC 6750; *Proteus vulgaris*, NCTC 4636; *Bacillus subtilis*, NCTC 8241; *Staphylococcus aureus*, NCTC 6571; and *Candida albicans*, AATC IO231[2].

Results and Discussion

The results of phytochemical analysis indicated the presence of saponins, cyanogenetic glycosides, flavonoids and tannins. Alkaloids and anthraquinones were not present in the extracts. The sensitivity test results indicated that the organic extract of *Ximenia americana* was active against all the test isolates (Table 1). The zone of inhibition recorded for the various organisms was highest for *Ps. aeruginosa,* indicating the highest degree of activity against the organism. The zones of inhibition against *B. subtilis and C. albicans* (10 mm) were 50% that of the zone of inhibition against *Ps. aeruginosa* (20 mm). Activity of the organic extract of the plant was comparable to that of commercially available penicillin disc (2 ug) although the latter was less effective against *Staph aureus* but more active against *Ps. aeruginosa*.

Tannins have been traditionally used for protection of inflamed surfaces of the mouth and treatment of catarrh, wounds, haemorrhoiods, and diarrhea, and as antidote in heavy metal poisoning. Flavonoids are naturally occurring phenols which possess numerous biological activities including anti-inflammatory, antiallegic, antithrombitic and vasoprotective effects. Cyanogenetic glycosides are reported to possess antimicrobial activity[3]. The observed antimicrobial activity against the tested organisms could be due to the presence of tannins and cyanogenetic glycosides in the extract as these have previously been reported to possess antimicrobial activities[3, 4]. These could explain the rationale for the use the plant in the treatment of the various conditions in traditional medical practice.

Conclusion

Ximenia americana leaves possess antimicrobial activity. This can explain the rationale for the use of the plant in treating infections in traditional medicine. The plant could be a veritable and cheaper substitute

for conventional drugs since the plant is easily obtainable and the extract can easily be made via a simple process of maceration or infusion.

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