Original Research Article

Phytochemical Screening of Root, Stem and Leave Extracts of *Terminalia avicennoides*

ABSRACT

The phytochemical screening of *Terminalia avicennoids* was carried out using qualitative method to determine the bioactive compounds present in the plant root, stem and leave extracts. Cooled Maceration method was used for the extraction. Hundred grams (100g) of each powder was soaked in 1000ml of distilled water, allowed to stand for 5hours. The suspension was agitated after 30 minutes. The filtrate was thereafter separated from residue using No. 1 Whatman filter paper and concentrated using rotary evaporator. The crude extracts were separately kept in a screw capped bottle for further research. The bioactive compound in the plants were detected using AOAC method. The result revealed that alkaloid, flavonoid, tannin, saponins, phenol and glycoside were detected in the plants while steroid was not detected in the plants. Therefore, the presence of these phytocompounds is an indicative that the plant is medicinal and it can be used for the treatment of bacterial and fungal infections.

Key words: Phytoscreening, *Terminalia avicennoids*

1.0 INTRODUCTION

Terminilia avicennoids also known as Combretaceae grow in the savannah region of West Africa (Mann, *et al.,* 2007). It is called “baushe” in Hausa and “Ungbo” in Adara. The plant is used for the treatment of burn wound infection in humans by the Adara people of North central of Nigeria. The use of the root necesacitated this works to determine the phytochemical composition of the entire plant parts.

The use of medicinal plants in the treatment of diseases has gained popularity and generated special interest in recent times. Herbal preparations are increasingly being used in both human and animal healthcare systems. Diarrhea is one of the common clinical signs of gastrointestinal disorders caused by both infectious and non-infectious agents leading to serious human and livestock debilitating condition. Herbal medicine has long been recognized as one of the oldest sources of remedies used by humans according (Mann *et al.*,

2009). A lot of people in both undeveloped and developing countries still rely on medicinal plants for their daily healthcare needs, in spite of the advancement in modern medicine (Passalacqua, *et al.*, 2006). Different traditional healing practices globally are designed for either therapeutic or prophylactic use in human or animal diseases. A number of studies carried out in Africa, Asia, Europe, Latin America and North America show that plants are routinely used as remedy for animal diseases. Historically, it is documented that humans make use of the same herbal preparations that they use to treat their sick animals. In Nigeria, farmers are known to treat animal diseases with herbs before the advent of modern medicine. Traditional medical and veterinary practices remain relevant and vital in many areas in Nigeria (Ojewole, 2004).

Modern drugs are derivatives of medicinal plants (Abdullahi, 2012). It is now believed that nature has given the cure of every disease in one way or the other. Plants have been known to relieve various diseases worldwide. Plant-derived substances have recently become of great interest owing to their versatile applications. Today, plant materials play a crucial role in the health sector and many studies revealed plants are good sources of antimicrobials (Mann, 2012). Medicinal plants are the richest bio-resource of drugs, traditional systems of medicine, modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs (Ncube *et al*., 2008). The knowledge of the phytocompounds present in extracts is a merit for area of specialization. The correct identification of the herbal material and the active constituents is crucial to quality control, safety, efficacy, acceptability and possible integration into the national healthcare system of herbal remedies. This study was thus carried out to identify bioactive compounds present in *Terminalia avicennoides* extracts, which also may be responsible for its antibacterial activity. The plant T. *avicennoides* gained special interest because it has been used traditionally for the treatment of different microbial infection. Aqueous was used due to the fact that it is a universal solvent and most populace in Nigeria that use this plant local usually soaked in cool water and the poultice will be apply on the surface of the wound. Whereas those that used it for the treatment of bacterial infection such diarrhea soaked the powder in water and the infected person would now drink the suspension, as a result the choice of aqueous became very crucial in the research.

2.0 MATERIALS AND METHOD

2.1 Collection, Identification and Authentication of the Plant

The fresh root, stem and leaves of *Terminalia avicennoides* was collected in July, 2017 from Doka village in Doka District along Kaduna-Abuja express way, Kachia Local Government Area, Kaduna State, Nigeria. It was identified at the Department of Botany, Faculty of Science, Ahmadu Bello University Zaria, with the herbarium number 900239.

2.2 Preparation of the plant material

The root, stem and leaf *Terminilia avicennoides* were collected in July, 2017. The grey bark was cleared. All the part of the plant were air-dried and later pulverized with the aid of mortar and pestle into powder form. The powder was packed into a clean plastic container with screw cap for subsequent bench work.

2.3 Extraction

Hundred gram of each powder (root, stem and leaf) was soaked in litre of distilled water and allowed to stand for five hours and was agitated after 30 minutes, after which the suspension was macerated. The extracts were successively extracted using aqueous solvent. With the help of vacuum evaporator, all the plant extracts were concentrated. Each extract was dried using hot-air oven at 45ºC to a constant mass for further research.

2.4 Phytochemical analysis

The method of Trease and Elvans, (1996) was applied for the determination of the presence of phytochemicals. The filtrate obtained from each extraction was tested for alkaloids, saponins, flavonoids, phenol, steroids, tannins and glycosides.

3.0 RESULT

The phytochemical analysis of aqueous extracts of T. *avicennoids* revealed the presence of alkaloid, flavonoid, tannin, saponins and glycoside while steroid was not detected in the plants.

TABLE 1: Phytochemical Constituents of Root, Stem and Leaf Extracts of *T. avicennoids*

PHYTOCOMPOUNDS	ROOT	STEM	LEAF
Alkaloids	+	+	+
Flavonoids	+	+	+
Tannins	+	+	+
Saponins	+	+	+
Steroids	-	-	-
Phenol	+	+	+
Glycosides	+	+	+

Key: + Detected, - Not Detected.

4.0 DISCUSSION

From Table 1, the phytochemical constituents of the plant extracts 'root, stem and leaf' showed the presence of alkaloids, flavonoids, tannins, saponins, glycosides and phenol. Brantner and Grein, (2004) also carried out the same research and detected the presence of alkaloids, tannins, saponins and using ethanol. This result indicates that the parts of the plants have active ingredients responsible for antimicrobial activity. The presence of these secondary compounds makes the plants fits or good for the treatment of bacterial and fungal infections because most therapeutic effects of medicinal plants are traced to the plant constituents and the medicinal actions of these constituents are unique to particular species or family (Cowan, 1999). Also, from the result it can be deduced that only polar and moderately polar phytocompounds are presence which may be due to the fact that, the extraction was done using polar solvent (distilled water). It is possible that this plant may have high antimicrobial activity due to the presence of these metabolites. Further study can be done to separate the individual metabolites to test their antimicrobial activity against some pathogenic bacteria to determine their potency.

5.0 CONCLUSION AND RECOMMENDATION

Phytochemical composition of the root, stem and leaf extracts of the *T. avicennoids* indicate the presence of six active constituents. The presence of these phytocompounds is an indicative that the plant has should have antibacterial property and it can be used for the treatment of bacterial and fungal infections. Other solvents such as ethanol, methanol, and petroleum ether can be used for extraction so that other phytocompounds can be detected. Further investigation, purification and determination of these promising constituents can be done to assay their antimicrobial activity.

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