

2 **Phytochemical Screening of Root, Stem and Leave**

3 **Extracts of *Terminalia avicennoides***

4 **ABSTRACT**

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

17 **Key words:** Phytoscreening, *Terminalia avicennoides*

18 **1.0 INTRODUCTION**

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

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

30 2009). A lot of people in both undeveloped and developing countries still rely on medicinal
31 plants for their daily healthcare needs, in spite of the advancement in modern medicine
32 (Passalacqua, *et al.*, 2006). Different traditional healing practices globally are designed for
33 either therapeutic or prophylactic use in human or animal diseases. A number of studies
34 carried out in Africa, Asia, Europe, Latin America and North America show that plants are
35 routinely used as remedy for animal diseases. Historically, it is documented that humans
36 make use of the same herbal preparations that they use to treat their sick animals. In Nigeria,
37 farmers are known to treat animal diseases with herbs before the advent of modern
38 medicine. Traditional medical and veterinary practices remain relevant and vital in many
39 areas in Nigeria (Ojewole, 2004).

40 Modern drugs are derivatives of medicinal plants (Abdullahi, 2012). It is now believed that
41 nature has given the cure of every disease in one way or the other. Plants have been known to
42 relieve various diseases worldwide. Plant-derived substances have recently become of great
43 interest owing to their versatile applications. Today, plant materials play a crucial role in the
44 health sector and many studies revealed plants are good sources of antimicrobials (Mann,
45 2012). Medicinal plants are the richest bio-resource of drugs, traditional systems of medicine,
46 modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical
47 intermediates and chemical entities for synthetic drugs (Ncube *et al.*, 2008). The knowledge
48 of the phytochemicals present in extracts is a merit for area of specialization. The correct
49 identification of the herbal material and the active constituents is crucial to quality control,
50 safety, efficacy, acceptability and possible integration into the national healthcare system of
51 herbal remedies. This study was thus carried out to identify bioactive compounds present in
52 *Terminalia avicennoides* extracts, which also may be responsible for its antibacterial activity.
53 The plant *T. avicennoides* gained special interest because it has been used traditionally for the
54 treatment of different microbial infection. Aqueous was used due to the fact that it is a
55 universal solvent and most populace in Nigeria that use this plant local usually soaked in cool
56 water and the poultice will be apply on the surface of the wound. Whereas those that used it
57 for the treatment of bacterial infection such diarrhea soaked the powder in water and the
58 infected person would now drink the suspension, as a result the choice of aqueous became
59 very crucial in the research.

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62 **2.0 MATERIALS AND METHOD**

63 **2.1 Collection, Identification and Authentication of the Plant**

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

68 **2.2 Preparation of the plant material**

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

73 **2.3 Extraction**

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

79 **2.4 Phytochemical analysis**

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

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84 **3.0 RESULT**

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

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

95	PHYTOCOMPOUNDS	ROOT	STEM	LEAF
96	Alkaloids	+	+	+
97	Flavonoids	+	+	+
98	Tannins	+	+	+
99	Saponins	+	+	+
100	Steroids	-	-	-
101	Phenol	+	+	+
102	Glycosides	+	+	+

103 **Key: + Detected, - Not Detected.**

104 **4.0 DISCUSSION**

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

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120 **5.0 CONCLUSION AND RECOMMENDATION**

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

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