IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)
e-ISSN:2278-3008, p-ISSN:2319-7676. Volume 11, Issue 3 Ver. IV (May - Jun.2016), PP 88-91
www.iosrjournals.org

Pharmacognostic Studies on the Stem bark of *Albizia chevalieri* (Fabaceae).

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Abstract*: Studies on the macro-morphological, microscopic, chemo microscopic were made on the stems of Albizia chevalieri. Morphologically the stems are of variable in size and ,somewhat cylindrical in shape, light grey in colour with short fracture and the fracture surface has striations and furrows. Chemomicroscopic parameters shows that cellulose, lignin, tannins, calcium oxalate crystals and starch grains to be present. These study could be useful in the preparation and identification of the monograph of the plant..*
Key words*: macroscopy, microscopy, chemomicroscopy, Albizia chevalieri*

I. Introduction

The plant *Albizia chevalieri* is a tree that grows up to 12m high or a shrub under harsher conditions of the dry savannah from Senegal, Niger and Nigeria. It has an open and rounded or umbrella shaped canopy, bark pale-greyish, twigs pubescent with white lenticels, leaves with 8-12 pairs of pinnate and 20-40 pairs of leaflets, each leaflets 1 cm long x 2-3 mm wide, sometimes slightly curved, greyish-pubescent on both sides and apiculate. Rachis also pubescent, with a large gland at the base of the petiole. Flowers in globose pinkish heads and pods 10-15 cm long x 2-2.5 cm wide, flat, containing 7-10 seeds. The bark was reported to contain alkaloids and also tannins sufficient for use in tanning in Nigeria and Senegal. It is used in Borno-North eastern Nigeria as purgative, taenicide and also remedy for coughs. A decoction of leaves is used in Northern Nigeria as remedy for dysentery [1] [2]. There are also reports on the local use of the leaves extract for cancer treatment in Zaria city, Kaduna state. Previous studies on *Albizia* species have indicated the presence of phenolic compounds from *Albizia amara* with significant antioxidant activity [3] and *Albizia inundata* was reported for effective anti-candida activity from Brazilian flora [4]. Lipophilic extracts of *Albizia gummifera* revealed very promising anti trypanosomal activity [5]. The extracts of *Albizia ferruginea* were also reported to have significant antimicrobial activity on selected microorganisms [6], and *Albizia saman* was found to have good antiplasmodial activity [7]. *Albizia lebbeck* was reported to contain 3_,5 dihydroxy 4_, 7 dimethoxy flavone and N-BenzoylLphenylalaninol [8]. As the focus of medicine shifts from treatment of manifest disease to prevention, increasing awareness on herbal remedies as potential sources of phenolic antioxidants have grown in recent years, and several plants are being screened for their antioxidant properties using different assays [9]. The aim of this papaer is to establish the macroscopic, microscopic and chemomicroscopic standards of the stem of *Albizia chevalieri* that would be useful in preparing monograph of the plant.

II. Materials And Methods

2.1 Plant Collection

The sample stems and of *Albizia chevalieri* were collected in june 2013 from the bush in Tudun kaya,karaye LGA. The plant has been identified before collection using the standard method of identification given in the Flora of West Tropical Africa [10] and Woody Plants of Ghana [11].

2.2 Identification

However, confirmation of the identity of the plant was carried out, by the comparing the sample with the original herbarium specimen placed in the herbarium of the Department Biological Sciences, Faculty of Science, Ahmadu Bello University, Zaria, Nigeria, and the voucher specimen number was 900247.

2.3 Drying

The stem barks were dried in the shade to avoid photoreaction due to sunlight. Pieces of the stem were separated apart to avoid fungal infection.

2.4 Extraction of Plant Material

The leaves, stems and roots of this plant were removed and separated from each other, air-dried and pulverized with mortar and pestle. 800g each of the powdered leaves, stem and roots was defatted with petroleum ether (60 – 80^{o}C) using a continuous Soxhlet extraction method to exhaustion. The extract was then concentrated in vacuum and greenish viscous oil was obtained (stem extract). The marc was extracted exhaustively by the same method using ethanol to obtain a greenish mass. The ethanol extract was used for all the tests.

2.5 Stem

The following features were observed for identification of the stem [12].

Size
Colour
Fracture surface
Shape
Surface

stem

Odour
Texture
Taste
Colour

2.6 Chemomicroscopical Examination

The powdered samples and the various anatomical section were treated separately on microscope slides and observed under the light microscope for the presence of chemical substances which include cellulose, gums and mucilages, starch, proteins, fats and oils, tannins, cutin, suberin and calcium oxalate crystals.

2.6.1 Test for cellulose

To the powdered plant materials, N/50 iodine or chlor-zinc-iodine solution and 60 % sulphuric acid was added. A blue colour indicates the presence of cellulose.

2.6.2 Test for lignin

To the various samples and anatomical sections of the root, stem and leaves were mounted in phloro-glucinol and 1 or 2 drops of hydrochloric acid added. A red colour would indicate the presence of lignin. The intensity of red colour would indicate the extent of lignification. [13]

2.6.3 Test for tannins

The various powdered samples were mounted in ferric chloride (2 drops). A bluish or greenish colour would indicate the presence of tannins.

2.6.4 Test for Mucilage

The different samples were mounted separately in Ruthenium red. A red or dark pink colour would indicate the presence of mucilage.

2.6.5 Test for starch

The various samples were mounted separately in N/50 iodine. A blue colour indicates the presence of starch.

2.6.6 Test for calcium oxalate crystals

The powdered samples were cleared in chloral hydrate solution. The presence of bright structures of definite shapes and size indicate the presence of calcium oxalate crystals. After addition of a few drops of concentrated.Sulphuric acid (80%) and re-viewed under the microscope the calcium oxalate crystals turn to disappear, this confirm their presence. presence of calcium oxalate crystals in the sample.

2.6.7 Test for oil

The different samples were mounted in Sudan IV reagent. A pink colour in any of the structures would indicate the presence of oils.

2.6.8 Test for cutin and suberin

The samples are stained with tincture of alkanna, a red colour indicate the presence of cutin and suberin.

2.6.9 Test for Protein

The different samples were stained separately with millon's reagent. A red stain indicates the presence of protein.

III. Results

3.1 Plant Collections and Identification

Plant collection was done from Tudun kaya, Karaye Local government area, Kano State. All the morphological features tally with description of *A. chevalieri* given in the literature (Hutchinson and Dalziel, 1973). The identity of the plant was confirmed by comparism with prepared herbarium specimen at the Herbarium of Biological sciences Department, Faculty of Science, Ahmadu. Bello. University, Zaria, Nigeria. The following number has been given to the voucher specimen (900247).

3.2 Drying

The stem bark of the plant under study were subjected to drying, however, this takes place under shade, to prevent photoreaction by sunlight. The sample was also spaced in order to prevent fungal infection during drying.

3.3 Stem

The following features were observed for identification of the stem.

Preparation: - The stem was derived from the stem of *A. chevalieri* and was prepared whole. The stem is of variable size and mostly light grey in colour. It had a rough texture, other characteristics are summarized as follows:-

Size		- (variable)
Colour	-	Green-light green
Fracture	-	Short
Fractured surface	-	Short
Shape		-Straight
Surface	-	Outer surface – light grey

Inner surface – light red, with striations and furrows.

Sensory characters of the powdered stem

Odour slightly spicy
Texture smooth
Taste slightly bitter
Colour light red

3.4 Chemomicroscopical Tests

3.4.1 Test for lignin

The result of the test was positive with stem bark in which red colour was observed in the xylem vessels, sclereids, some fibres and phloem fibres. Xylem tissue is highly lignified compared to other regions of the cells such as phloem, which is slightly lignified.

3.4.2 Test for cellulose

A blue-black colour was observed with Chlor-zinc-iodine and N/50 iodine followed by 66 % Sulphuric acid. The Epidermal cells, parenchyma cells, phloem tissues, stained red with this reagent. Most of the tissue in plant cells is made up of cellulose especially the cell wall.

3.4.3 Test for mucilage

Stem tissue does not contain mucilage.

3.4.4 Calcium oxalate crystals

A positive test was observed in the sample in which a bright structures were observed and disappeared on the addition of 80% H_2So_4. This indicated the presence of calcium oxalate crystals.

3.4.5 Tannins

This was indicated by the appearance of brown or yellow stain in some cell; this was confirmed by appearance of bluish-greenish colour when mounted in ferric chloride solution.

3.4.6 Test for oils

A red stains in some cells was observed when mounted with Sudan IV solution indicating of the presence of oils.

3.4.7 Test for protein

A red stains with millon's reagent was observed which indicated a traces of protein in the stem extract..

3.4.8 Cutin and suberin

The sample showed a negative reaction for cutin and suberin, the cork cells didn't show any red colouration indicating the absence of this substance in the sample.

3.4.9 Test for starch

A blue-black coloured grain were observed in the sample indicating the presence of starch. .

Table 2 : Chemomicroscopical Examination of Stems of Albizia chevalieri

Constituents	Stem
- Lignin	+
- Mucilage	+
- Cellulose	+
- Tannins	+
- Calcium oxalate crystals	-
- Oils	-
- Protein	
- Cutin and suberin	

Key: (+) Present
(-) Absent

IV. Discussion

Various macro morphological determinations on the stems of *Albizia chevalieri* were carried out, as such the stems are of variable size and mostly light grey in colour and rough in texture. It also has short fracture. In terms of morphology , the outer surface of the stem has a light grey colour while the inner surface has light red appearance with striations and furrows. On the sensory characters of the powdered stems, it possesses a smooth texture with slightly spicy odour and taste slightly bitter and the colour of the powdered stem is light red. Chemomicroscopic data revealed the presence of cellulose, lignin, tannins, calcium oxalate crystals and starch grains, as part of the secondary metabolites and diagnostic features for the identification of the plant

V. Conclusion

Pharmacognostic studies on the roots of *Albizia chevalieri* was carried out which revealed the macroscopic, microscopic and chemomicroscopic structures of the plant. These parameters determined would serve in the identification of the plant and potential monograph of this vegetable drug.

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