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PRELIMINARY PHYTOCHEMICAL SCREENING OF *Albizia lebbeck* STEM BARK

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ABSTRACT
Preliminary screening of phytochemicals is a valuable step in the detection of the bioactive chemicals in plants which may lead to drug discovery and could also be used for the treatment of various ailments. The aim of this experiment was to examine a preliminary phytochemical screening of *Albizia lebbeck* stem bark. The solvent used for the analysis includes: methanol, petroleum ether and water. The result obtained revealed the presence of alkaloids, tannins, terpenoids, saponins, phenols, flavonoids, glycosides, steroids, carbohydrates and proteins in all the solvent used. This bioactive chemicals and nutrients have therapeutic value and have been reported to be cheap, safe, and effective with no side effects in the body of animals.
Key words: Albizia lebbeck; bioactive chemicals; nutrients; solvents; phytochemicals.

1. Introduction

Albizia lebbeck L. is a large deciduous tree belonging to the family Leguminosae (Fabaceae), it is also known as Woman's tongue. The plant is found in Africa (Nigeria, Cameroon, Tanzania, Ghana, Togo, South Africa, Kenya, Zambia, Zimbabawe, Mali, Sudan, Senegal and Niger) and some parts of Asia (Everist, 1986; Hawary *et al*., 2011). The tree range from medium to large of multi -stemmed spreading habit. The leaves are traditionally used for feeding ruminant animals, the stem and root extracts have been traditionally used for the treatment of asthma, malaria, conjunctivitis and diarrhea (Parrota, 2003; Rashid *et al*., 2003). Its seeds are easily extracted by hand from the pods by hand or by crushing the pods and winnowing to obtain the oil (Gupta and Chakarbarty, 1964; Hagerman and Butler, 1964; Pal *et al*., 1995).
Scientific studies showed that the stem, roots and leaves contains tannins, alkaloids, saponins, phenols, flavonoids and terpenoids (Kirsti et al., 2010) and is capable of acting as antioxidants (Siddikov *et al*., 2007; Sherbeiny *et al*., 1971), antibacterial (Suzgec *et al*., 2005; Farooq *et al*., 1954), hypolipidemic (Sala *et al*., 2002; Gauher *et al*., 1968; Ghani, 2003), antifungal (Sezik *et al.*, 2004; Shikishima *et al*., 2001), hepato-protective (Gupta and Chakarbarty, 1964; Kumar and Toky, 1994), anti-allergic (Pal and Achari, 1995; Sissikov *et al*., 2007) and neuro-protective properties (Tada *et al.*, 2002; Suzgec *et al.*, 2005; El-Sherbeiny *et al*., 1971).
The study was aimed to examine a preliminary phytochemical screening of *Albizia lebbeck* stem bark.

2. Materials and methods

Site of the experiment
The study was carried out at the College of Agriculture, Dambartta, Kano State, Nigeria.
Sample collection and processing
Fresh stem barks of *Albizia lebbeck* were purchased from a local market in Kano State. It was identified and authenticated by a certified crop taxonomist (Mr. Bello Isyaku). Samples were washed with running tap water, air dried for 14 days and grounded into powder using a mortar and pestle and stored in an air tight well labeled container. 100 g of the grounded sample was dissolved in 500 mL each of petroleum ether, methanol and distilled water for 48 hours, the samples were stored in the refrigerator and the extracts were filtered separately with Whatman filter paper No.1 to obtain filtrates which was subjected to further analysis.
Measurements
Test for Tannins
Ferric chloride test
2 ml of test solution followed by addition of few drops of 5 % ferric chloride solution. The formation of a blue colour indicates the presence of hydrolysable tannins (Kokate, 2005; Harbone, 1998).
Lead acetate test
2 ml of test solution in a test tube, a few drops of 10 % lead acetate solution was added, a formation of a yellow or red precipitate indicated the presence of condensed tannins (Tease and Evans, 1985).
Test for Flavonoids
Pew's test
Zinc powder was added to 2 ml of extract in a test tube followed by drop wise addition of conc. HCl. The formation of purple red or cherry colour indicates the presence of flavonoids (Peach and Tracey, 1956).

Shinoda test

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2 ml of the extract was added in the test tube with few fragments of magnesium metal followed by drop wise addition of conc. HCl. Formation of magentia colour indicates the presence of flavonoids (Kokate et al., 2001).
NaOH test
2-3 ml of the extract was put in a test tube and few drops of sodium hydroxide solution were added. Formation of intense yellow colour which becomes colourless on addition of few drops of dilute HCl indicates the presence of flavonoids (Khandewal, 2008).
Test for alkaloids
Iodine test
3 ml of extract was poured into a test tube, few drops of dilute iodine solution was added. Formation of a blue colour which disappears on boiling and reappears on cooling indicates the presence of alkaloids (Khandewal, 2008).
Wagner's test
2-3 ml of the extract was put in a test tube followed by few drops of Wagner's reagent. Formation of reddish brown precipitate indicates the presence of alkaloids (Kokate et al., 2001).
Dragendorff's test
2-3 ml of the extract was put in a test tube, a few drops of Dragendorff's reagent. The formation of an orange brown precipitate indicates the presence of alkaloids (Kokate et al., 2001).
Test for phenol
Ellagic acid test
3 ml of the extract was treated with few drops of 5 % (w/v) glacial acetic acid and 5 % (w/v) $NaNO_2$ solution in a test tube. Formation of a muddy or niger brown coloration indicates the presence of phenol (Gibbs, 1974).

Test for Saponins
Foam test
2 ml of the extract was diluted with 20 ml of distilled water; it was shaken in a graduated cylinder for 15 minutes. A 1 cm layer of foam indicates the presence of saponin (Kokate et al., 2001).
Test for Sterol
Salkowski's test
2 ml of the extract with 2 ml of chloroform and 2 ml conc. H_2SO_4 were added in a test tube and shaken well. Chloroform layer appeared red and acid layer showed greenish yellow fluorescence indicated the presence of sterols (Kokate et al., 2001).
Test for glycosides
Keller-Kiliani test
3 ml of the extract and glacial acetic acid were put in a test tube followed by one drop of $FeCl_3$ and conc. H_2SO_4. Reddish brown appears at the junction of the two liquid layers and upper layer bluish green colour indicates the presence of glycosides (Kokate et al., 2001).
Test for Terpenoids
5 ml of the extract was mixed with 2 ml of chloroform in a test tube and 3 ml of conc. H_2SO_4 was added to form a layer. A reddish brown colouration at the interface is an indication of terpenoids.
Concentrated H_2SO_4 test
5 ml of the test material was mixed with 2 ml glycial acetic acid in a test tube, followed by the addition of one drop of 5 % $FeCl_3$ and conc. H_2SO_4. Formation of a brown ring indicates the presence of glycosides (Kokate et al., 2001).

Test for carbohydrates
Molisch's test
2 ml of extract in a test tube, add a few drops of 1 % alpha-napthol followed by 2 ml of conc. H_2SO_4. A reddish violet or purple ring indicates the presence of carbohydrates (Harbone, 1998).
Seliwanoff's test
1 ml of extract in a test tube was added to 3 ml of Seliwanoff's reagent and it was heated on water bath for 10 minutes and cooled followed by 1 % nitrate solution. A formation of red colour confirmed the presence of carbohydrates (Harbone, 1998; Kokate et al., 2001).
Test for protein
Biuret test
3 ml of extract was placed in a test tube followed with the additions 5 drops of melons reagent and 2 ml of 10 % NaOH and mixed thoroughly. Purple or violet colour is an indication of the presence of protein (Harbone, 1998).

3. Results

Test	Aqueous	Methanol	Petroleum ether
Test for tannins			
Ferric chloride test	+ve	+ve	+ve
Lead acetate test	+ve	+ve	+ve
Test for flavonoids			

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Pew's test	+ve	+ve	+ve
Shinoda test	-ve	+ve	+ve
NaOH test	-ve	+ve	+ve
Test for alkaloids			
Iodine test	-ve	+ve	-+ve
Wagner's test	-ve	+ve	+ve
Dragendorff's test	-ve	+ve	+ve
Test for phenols			
Ellagic acid test	+ve	+ve	+ve
Test for Terpenoids			
Salkowski test	+ve	+ve	+ve
Test for Phlobatannins			
Test for saponins			
Foam test	+ve	+ve	+ve
Test for steroids			
Salkowski's test	+ve	+ve	+ve
Test for glycosides	+ve	+ve	+ve
Keller-Kiliani test	+ve	+ve	+ve
Conc. H_2SO_4 test	+ve	+ve	+ve
Test for carbohydrates			
Molisch's test	+ve	+ve	+ve
Seliwanoff's test	+ve	+ve	+ve
Test for protein			
Biuret test	+ve	+ve	+ve

+ve : positive; -ve : negetive

4. Discussions

The results obtained showed the presence of tannins, alkaloids, terpenoids, flavonoids, phenols, steroids, saponins, glycosides, carbohydrates and protein. According to Cowan (1999); Alagbe et al. (2020); Omokore and Alagbe (2019); Shittu et al. (2019) various chemicals such as alkaloids, tannins, saponins, terpenoids and glycosides are often naturally found in plants have been implicated as being responsible for the antimicrobial activities of plants containing them. These chemicals or phytochemicals allows plant to perform multiple biological activities such as: antimicrobial, antifungal, antiviral, antioxidant etc. (Alagbe, 2017, 2018; 2019; Alagbe and Grace, 2019). Medicinal plants contain numerous biologically active compounds such as nutrients and phytochemicals which have physiological actions on the human body (Olowokudejo *et al*., 2008). Terpenoids are attractants for insects and mites and also exhibit various pharmacological activities i.e., anti-inflammatory, anticancer, antimalarial and antiviral (Knappers *et al*., 2005; Mahalo and Sen, 1997; Oluwafemi *et al*., 2020; Shittu *et al*., 2020). Flavonoids, tannins and saponins have been suggested to posses' antibacterial, anti-thrombitic, antiplasmodic, anti-malaria and antioxidant properties (Saleem *et al*., 2005; Enzo, 2007; Williams *et al*., 2000; Cheeke, 2000). Phenols are strong antioxidants and exhibit hypolipidemic properties (Hollman, 2001). Proteins play a key role in tissue maintenance and growth of animals; carbohydrates are needed for energy in the body (Musa *et al*, 2020)

5. Conclusion

Albizia lebbeck stem bark is rich in various nutrients and useful chemicals which have therapeutic properties without side effects in the body of human and animals. Further research needs to be carried out to ascertain the bioactive chemicals in other parts of the plants.

6. Funding

This research received no external funding.

7. Conflicts of Interest

The author declare no conflict of interest

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