



E-ISSN: 2707-2835

P-ISSN: 2707-2827

IJPLS 2020; 1(2): 47-49

Received: 27-05-2020

Accepted: 29-06-2020

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Preliminary phytochemical screening of some selected medicinal plants in Sudan

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DOI: <https://doi.org/10.33545/27072827.2020.v1.i2a.20>

Abstract

Phytochemical screening of the medicinal plants reveals, very important and vital phytochemicals like tannins, saponin, flavonoids, Terpenoids and/or Stroids, alkaloids and anthraquinones, at a very appreciable quantity. In this study aims to assess the phytochemicals screening for ethanolic extracts of *Boscia senegalensis*, *Cymbopogon schoenanthus*, *Hydnora abyssinica* and *Rhynchosia minima*, from the Sudan. The results showed the phytochemical screening revealed the presence of tannins, saponins, flavonoids, terpenoids and/or stroids, alkaloids and anthraquinones, in all plants, expect tannins (*Boscia senegalensis*), saponins (*Hydnora abyssinica*), flavonoids (*Cymbopogon schoenanthus*), terpenoids and/or Stroids (*Boscia senegalensis* and *Rhynchosia minima*.) and alkaloids (*Cymbopogon schoenanthus*). However, we can see a phytochemical screening harvested in all plants ethanolic extracts highlighted in this study could justify the traditional uses of this plant in the treatment of several pathologies.

Keywords: Phytochemical screening, Ethanolic extract, *Cymbopogon schoenanthus*, *Hydnora abyssinica*, *Rhynchosia minima*

1. Introduction

Medicinal plants are plants which contain substances that could be used for therapeutic purposes or which are precursors for the system of useful drugs [1]. Sudan is rich with medicinal plants, which contain biologically active compounds but not thoroughly evaluated. A number of naturally occurring compounds (such as alkaloids, phenols and flavonoids) have been shown to possess antimicrobial activities against many pathogens [2]. Secondary metabolites are mainly alkaloids, phenolic components (phenolic acids, tannins, flavonoids and coumarins) and heterosides [3].

Boscia senegalensis is a species of perennial woody plant of the genus *Boscia* belonging to the Capparaceae family. It is a shrub or bush 1 to 5 m high, conical in shape, with a very dense crown and small diameter trunks with many branches. The plant produces fruits grouped in small clusters, in the form of spherical yellow berries that are yellow at maturity and up to 8 mm in diameter. These fruits contain 1 to 4 whitish nuts and the edible kernel is greenish when ripe [4]. The leaves are used as a treatment against bilharziosis, haemorrhoids, and as eyewash [5]. *Cymbopogon schoenanthus* is a perennial, caespitose grass, culms 30-120 cm long, it is an aromatic grass harvested from the wild, but also cultivated for it is fragrant leaves. The young leaves are used in salads and as spices. Leaves are also used to make tea. Distillation of the roots and leaves yields a fragrant oil known as 'camel grass oil' [6].

Hydnora abyssinica (Fam. Hydnoraceae) known locally as 'Altartous' is a parasitic, fungus-like plant with a fleshy subterranean rhizome. It is widely distributed in Sudan. It contains large percentage of tannins. In Sudan, the plant is found effective against severe infectious diarrhea [7].

Endemic Sudanese medicinal plant traditionally used as anti-inflammatory and against many infectious diseases [8]. *Rhynchosia minima* is a slender, trailing or twining plant with numerous stems 30- 150 cm or more long. the leaves are abortifacient, the root is laxative, vermifuge and the leaf-sap and the root are used to treat haemorrhoids, the seed is cardiac[9]. The study to investigation the preminary phytochemical screening of the *Boscia senegalensis*, *Cymbopogon schoenanthus*, *Hydnora abyssinica* and *Rhynchosia minima* from Sudan.

2. Material and Methods

2.1 Plant Material

The plants leaves *Boscia senegalensis*, and flowers *Cymbopogon schoenanthus*, collection from North Kordofan state. Rhizome *Hydnora abyssinica* and aerial part *Rhynchosia minima*, collection from Sinnar state, Sudan. The plants species was taxonomically identified by Mr. Mubarak Siddig, Department of Botany, Faculty of science, Sudan University of Science and Technology. The plant was washed thoroughly under running water to remove contamination and was shade dried with active ventilation at ambient temperature for 5 days; the dried leaves and flowers were to fine powder using pistil and mortar.

2.2 Preparation of extract

50g from plants samples (*Boscia senegalensis*, *Cymbopogon schoenanthus*, *Hydnora abyssinica*, and *Rhynchosia minima*) were placed in 500ml conical flask and then 300ml 70% Ethanol were added. The conical flask was placed in the water bath and was allowed to stand for 1 hour. The time was measured after boiling start (after appearance of the first bubble). The mixture (powder and ethanol) was filtered using filter paper while it is hot by using another 500 ml conical flask.

3. Qualitative phytochemical Analysis

Phytochemical screening for the identification of major groups of chemical constituents using standard procedures [10, 11]. The phytochemical components analyzed were, tannins, saponins, flavonoids, terpenoids and/or Steroids, Alkaloids, Anthraquinones.

Phytochemical analyses to test for the presence or absence of various phytoconstituents by the following tests:

3.1 Test for Tannins (Ferric chloride)

0.5ml of the extract was boiled with 10ml of distilled water in a test tube and then, few drops of 0.1 % ferric Chloride Solution were added and the reaction mixture was observed for blue greenish black Colour change.

3.2 Test for Saponins (Frothing Test)

0.5ml the Extract was added to 5ml of distilled water in test Tube. The Solution was shaken vigorously and observed for The Stable persistent froth. Frothing was mixed with 3 drops of olive oil and shaken vigorously after which it was observed for the formation of an emulsion.

3.3 Test for Flavonoid

To The 0.5ml of the extract 5ml of distilled water was added and then a piece of magnesium ribbon and 2ml of Concentrated HCL was added. The reaction mixture was observed for the pink or red colour solution.

3.4 Test for terpenoids and/or steroids

To 0.5ml each of the extract 2ml of chloroform was added and then 3ml of the concentration H₂SO₄ Was Carefully added to form a layer. A reddish brown coloration of the interface indicated the presence of terpenoid and steroids.

3.5 Test for Alkaloid

Three different test were used Identification of alkaloids:

(A) Mayer Test

To 0.5ml of the extract 2ml of Mayer's reagent (K₂HgI₄)

was added and the reaction mixture was observed for formation of creamy white precipitate.

(B) Wagner test

To 0.5ml of the extract 2ml of wagner's reagent (dilute iodine solution) was added and the reaction mixture is observed for the formation of reddish brown precipitate.

(C) Dragendorffs

To 0.5ml of the extract 2ml of dragendorff's reagent was added, the reaction mixture observed the orange or orange red precipitate indicates the presence of alkaloids.

3.6 Test for anthraquinones (Borntrager's Test)

To 0.5ml of the extract 5-10ml dilute HCL was added and boiled on water bath for 10 minutes and filtered then the filtrate was extracted with carbon Tetra chloride and the equal amount of ammonia was added. After shaking the reaction mixture was observed for the formation of pink red colour in the ammonia layer.

4. Results and discussion

Medicinal plants are being used as valuable sources of food and medicine for the prevention of illness and maintenance of human health. In Sudan many indigenous plants are widely consumed as food or home remedies especially in the treatment or management of common diseases [12].

4.1 Phytochemical screening

Phytochemical screening of ethanolic extracts of studied plants was performed for constituents: Tannins, saponins, flavonoids, terpenoids and/or steroids, alkaloids, anthraquinones (Table1). Phytochemicals are biologically active, naturally occurring chemical compounds found in plants, which provide health benefits for humans further than those attributed to macronutrients and micronutrients [13]. Of all the studied plants the ethanolic extracts were consisted of tannins positive in all plants under study except *Boscia senegalensis*, this indicate used for the treatment of viral diseases. Tannins are stringent bitter plant polyphenols that bind, precipitate and shrink proteins and various organic compounds. Tannins are known to have anti-viral, anti-tumor, anti-inflammatory and healing properties on wounds, kidney etc. [14].

From table 1. The Saponin found in all plants except in *Hydnora abyssinica*, Saponins are steroidal glycosides with foaming characteristics and bitter taste that have beneficial effect on the blood cholesterol levels, fight cancer and help in health and the stimulation of immune system [15]. Saponins have hemolytic properties and are used as starting materials for the synthesis of steroidal drugs like corticosteroids, the sex hormone stimulants and contraceptives [16]. Flavonoids shows in all plants except in *Cymbopogon schoenanthus*, (table.1) this strong indicate can be anticancer., Flavonoids are from the polyphenolic compounds and constitute a large family of plant secondary metabolites with 10,000 known structures [17]. Various plants have been investigated for their flavonoid content and how these compounds affect cancer cells, such as fern species and plants used in traditional Chinese medicines like the litchi leaf. There is a high content of flavonoid compounds such as anthocyanins, flavones, flavonols, chalcones and many more which can be found in just one structure of the plant like its seed [18].

From table 1. Showed terpenoids and steroids in tow plants *Cymbopogom schoenanthus.*, and *Hydnora abyssinica*. Terpenoids and stroids importance in fragrances and treatment disease, essential oils are mostly terpenoid in nature and the majority of them are monoterpenoids and sesquiterpenoids [19]. Alkaloids found in all plants under study in table1. Alkaloids are a group of naturally occurring chemical compounds that containing basic nitrogen atom, it produced by a large variety of organisms; bacteria, fungi, plants and animals. It have varied and important physiological effects on humans and other animals. Well-known alkaloids include: morphine, strychnine, quinine,

ephedrine and nicotine. Alkaloids are found primarily in plants and are especially common in certain families of flowering plants. More than 3000 different types of Alkaloids have been identified in a total of more than 4000 plant species [20].

From table 1. Anthraquinons positive in all plants under studies, they are also used for the treatment of viral diseases. Many phytochemicals found in plants are either the product of plant metabolism or synthesized for defence purposes. The phytochemicals are either useful or toxic to human body [15].

Table 1: Phytochemical screening of ethanolic extracts of plants under study

plants	Tannins	Saponins	Flavonoids	Terpenoids and Stroids	Alkaloias			Anthraquinone
					Mayers	Wagners	Dragendorff	
<i>Boscia senegalensis</i>	-	+++	++	_	+	+	++	+
<i>Cymbopogom schoenanthus</i>	+	+	_	+++	_	_	_	+
<i>Hydnora abyssinica</i>	+++	_	+	++	_	_	+	+
<i>Rhynchosia minima</i>	+++	++	++	_	++	+++	+++	+

Key: + = present; _ = Absent

5. Conclusions

The results obtained showed was a good source of therapeutic. Due to the presence of flavonoids compounds, terpenoids and alkaloids, these tested plants have promising antibacterial and antifungal activities, which require further phytochemical studies to assess its active constituents responsible for those biological actions.

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