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Phytochemical Screening of the Ethanolic Leaves and Root Extract of Scoparia Dulcis

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Abstract: Plants are rich in several secondary metabolites and are a major source of chemical diversity, they are a potential source of new drugs for man whose use to control diseases is a centuries-old practice. Scoparia dulcis is an important medicinal plant, belonging to the family Scrophulariaceae. It is locally known as Rumafada in northern Nigeria. The plant is a small, much branched, glabrous, leafy annual herb or under shrub with erects or ascending branches. The objective of this study was to carry out phytochemical screening of the stem and root extract of S. dulcis. The phytochemicals screened includes; alkaloids, flavonoids, saponins, tannins, anthraquinones, cardiac glycosides, phenols, reducing sugars, and terpenoids using standard methods. The ethanolic root and leaves extract of Scoparia dulcis (Scophulareacea) was investigated phytochemically. Preliminary phytochemical analysis of the extract revealed the presence of tannins, saponins, alkaloids, flavonoids, terpenoids and phenols. Cardiac glycosides, anthraquinones, and reducing sugars were absence in this investigation.

Keywords: Alkaloids, Flavonoids, Ethanol, Scoparia Dulcis, Phytochemical

1. Introduction

Plants have been recognized long ago as rich sources of natural products for the treatment of a wide spectrum of diseases. It has been reported that plant extracts are commonly used in traditional medicine and its contribution with respect to health coverage was estimated for over 80% of the world's population, especially in the developing world [1-2]. Scoparia dulcis Linn (Scrophulariacae) is an important ethnomedicinal plant, commonly called as sweet broom weed is a perennial herb, widely distributed in tropical and subtropical regions of India, America, Brazil, West Indies, and Myanmar [3-4]. India being a tropical country is blessed with best natural resources and ancient knowledge for its judicious utilization. However, in order to make these remedies acceptable to modern medicine, there is a need to scientifically evaluate them to identify the active principles and understand the pharmacological action. Humankind first utilized material found in environment on an empirical basis to cure various ailments. Natural products from plants and animals traditionally have provided the pharmaceutical industry with one of its important sources of lead compounds in search of new drugs and medicines. The search for new pharmacologically active agents from natural resources such as plants, animals and microbes led to discovery of many clinically useful drugs. The aim of this study was to carry out phytochemical screening of the stem and root extract of S. dulcis.

2. Materials and Methods

Chemicals and reagents used were of standard grades. Equipments and apparatus are those available at the department of chemistry and biology, Sa'adatu Rimi College

of education, Kumbotso, Kano.

2.1. Samples Collection and Identification

Fresh leaves of Scoparia dulcis were collected from Gidan Makera and Gidan Tata in Tudunwada local government area of Kano state. The plant were identified by the department of biology, Sa'adatu Rimi College of education, Kumbotso, Kano. The leaves were dried under shade in chemistry laboratory at normal room temperature and ground to powder using mortar and pestle.

2.2. Extraction of Scoparia Dulcis Leaves

Air-dried powder (1 kg) of fresh leaves and roots were extracted by percolation at room temperature with ethanol. The resultant suspension was then filtered. Leaf and root extracts of S. dulcis ware concentrated at room temperature. The extract was evaporated to dryness [5]. The dried mass yielded 58.6g. The crude extract were labeled accordingly.

2.3. Preliminary Phytochemical Screening

The phytochemicals screened includes; alkaloids, flavonoids, saponins, tannins, anthraquinones, cardiac glycosides, phenols, reducing sugars, and terpenoids using standard methods.

2.3.1. Test for Alkaloids

WAGNER'S TEST: A fraction of extract was treated with Wagner's test reagent [1.27 g of iodine and 2 g of potassium iodide in 100 ml of water] and observed for the formation of a reddish brown colour precipitate [6].

DRAGENDROFF'S TEST: A few drops of Dragendroff's reagent were added to a test tube containing 1 ml of extract and a colour change was observed. The appearance of an orange colour was an indication of the presence of alkaloids [7].

2.3.2. Test for Flavonoids

SODIUM HYDROXIDE TEST: Plant extract was treated with dilute NaOH, followed by addition of dilute HCl. A yellow solution with NaOH turns colorless with dilute HCl, which shows the presence of flavonoids [8]. A conclusive test was carried out using the aluminum chloride Test.

ALUMINUM CHLORIDE TEST: A quantity (0.2 g) of each of the extracts was heated with 10 ml of ethyl acetate in boiling water for three minutes, after which 4 ml of the filtrate was shaken with 1 ml of 1% aluminum chloride solution and observed for light yellow colouration. A yellow precipitate indicated the presence of flavonoids [9].

2.3.3. Test for Phenols

In this test, one spots the extract on a filter paper, adds a drop of phoshomolybdic acid reagent and exposes it to ammonia vapours. Blue colouration of the spot indicates the presence of phenols [10].

2.3.4. Test for Tannins

In this test 10% alcoholic ferric chloride is added to 2–3 ml of methanolic extract (1:1). Dark blue or greenish grey colouration of the solution reveals the presence of tannins [10-11].

2.3.5. Test for Terpenoids

In this test, 5 ml of plant extract was added to 2 ml of chloroform and 3 ml of concentrated sulphuric acid. The presence of terpenoids gives a reddish brown colour of interface [12].

2.3.6. Test for Saponins

One adds 0.5 ml of plant extract filtrate to 5 ml of distilled water and shakes it well. Persistence of frothing is an indication of the presence of saponins [11].

2.3.7. Test for Anthraquinones

One milliliter of the plant filtrate were mixed with 10ml of benzene and then shaken; the mixture was filtered and 5 ml of 10 % (v/v) ammonia were added, then shaken and observed. No reaction observed.

2.3.8. Cardiac Glucosides

Legal test and the Keller-kiliani was adopted, 0.5g of the extract were added to 2ml of acetic anhydrate plus H2S04 [13].

2.3.9. Test for Reducing Sugars

One milliliter of the plant filtrate was mixed with Fehling A and Fehling B separately; a brown colour with Fehling B and a green colour with Fehling A indicate the presence of reducing sugars.

3. Results

Investigation on phytochemical analysis of leaves of diverse medicinal plants has been studied by many workers that exposed the presence of phytochemicals like carbohydrates, glycosides, alkaloids, tannins etc., in them [11-14].

Table 1. *Phytochemical Constituents of the Ethanolic Root and stem Extract of S. dulcis.*

S/N	Secondary Metabolites	
1	Alkaloids	+
2	Flavonoids	+
3	Anthraquinones	_
4	Saponins	+
5	Tannins	+
6	Phenols	+
7	Cardiac glycosides	_
8	Reducing sugars	_
9	Terpenoids	+

4. Discussion

Several bio-active substances from S. dulcis have been isolated, identified and contributed due to its observed medicinal effect. The result of the preliminary phytochemical screening carried out on ethanolic extract revealed the presence of a wide range of phytoconstituents as presented in table above and these includes alkaloids, flavonoids, phenols,

terpenoids, tannins, Saponins and also reducing sugars, anthraquinones and cardiac glycosides were absence. The presence of these secondary metabolites in the present study, is in agreement with Zulfiker et al., [15] who previously reported that phytochemical screening of ethanolic extracts of S. dulcis, revealed the presence of flavonoid, alkaloid, tannin, carbohydrate, and glycoside. In another study by Ratnasooriya et al., [16] and Elyaraja et al., [17] reported the presence of phenols, saponins, tannins, amino acids, flavonoids, terpenoids and catechnolamines. These constituents are responsible for the curative nature of S. dulcis against, diarrhea, stomach-ache, kidney stones, kidney problems, fever, hypoglycemic activities and diabetes mellitus [18-19] etc., which make the plant useful for treating different diseases and having a potential of providing valuable and safe drugs which will be beneficial for human utilization.

5. Conclusion

Plants are rich in several secondary metabolites and are a major source of chemical diversity, they are a potential source of new drugs for man whose use to control diseases is a centuries-old practice. Scoparia dulcis is an important medicinal plant, belonging to the family Scrophulariaceae. It is locally known as Rumafada in northern Nigeria. The plant is a small, much branched, glabrous, leafy annual herb or under shrub with erects or ascending branches. The ethanolic root and leaves extract of Scoparia dulcis (Scophulareacea) was investigated phytochemically. Preliminary phytochemical analysis of the extract revealed the presence of tannins, saponins, alkaloids, flavonoids, terpenoids and phenols. Cardiac glycosides, anthraquinones, and reducing sugars were absence in this investigation.

6. Recommendations

Based on the results from this study, the following recommendations were made; Government and other agencies concerned, should provide a research grant to group researchers for further studies.

Pharmacological studies should be carried out to confirm several claims made by Traditional Herbalist.

Structure elucidation should be carried out to determine the compounds present in the study sample.

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