International Journal of Research in Engineering, Science and Management
Volume-2, Issue-10, October-2019
www.ijresm.com | ISSN (Online): 2581-5792

Phytochemical Screening of Primary and Secondary Metabolites of Vachellia Nilotica Bark

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***Abstract*: The study includes phytochemical screening and quantification of primary and secondary constituents like carbohydrates, protein, lipids, phenol, tannin and flavonoids from Vachellia nilotica bark. For these purpose ethanolic extract of bark was prepared by "Soxhlet extraction method". The result of these study suggests that the Vachellia nilotica bark in which presence of primary and secondary metabolites.**

***Keywords*: Phytochemical screening, Primary and Secondary metabolites, Vachellia nilotica bark.**

1. Introduction

Since long time ago, people have been observing the nature particularly medicinal plants in search of new drugs. Medicinal plants are used by 90% of the world population for their essential health needs. India is the birthplace of the renewed system of indigenous medicines such as Siddha, Ayurveda and Unani. Ancient systems of medicines are prepared from a single plant or combinations of more than one plant. This efficacy depends upon the current knowledge about various features of plant species, plant parts and pharmacological property of medicinal plants which in turn depends upon the occurrence of primary and secondary metabolites. Plant synthesize a wide range of chemical compounds which are classified based on their biochemical class, biosynthetic origin and active constituents into primary and secondary metabolites. Primary constituents directly involved in growth and development while secondary metabolites are not engaged directly and they have been worked as biocatalysts. Primary constituents are widely distributed in nature, occurring in one form or another in virtually all organisms. They are like chlorophyll, amino acids, nucleotides, carbohydrates etc. which have a key role in metabolic processes such as photosynthesis, respiration and nutrient assimilation. They are used as production raw materials and food excipients. The drugs selected for this work were Vachellia nilotica these is important herbs are reported to have significant antibacterial, immunomodulatory and anti-inflammatory activities which are complementary to antimicrobial activity. The growing demand of natural and herbal medications, easy availability of raw materials, cost-effectiveness and the paucity of reported adverse reaction [1].

2. Materials and methods

A. Materials

The plants were selected on the basis of their phytochemical screening, qualitative analysis of primary and secondary constituents and their medicinal uses mentioned in the literature. The herbs (Vachellia nilotica) were purchased from the local area of the city and authenticated by Taxonomist in the department of Botany, Shri Rajashri Shahu Science and Arts College, Pathri. All other chemicals were of analytical scale and used without further purification processes.

B. Preparation of the plant extracts

The bark was washed under tap water to eliminate the surface pollutants and the bark was air dried under shade. The powdered bark samples were subjected to successive extraction with chloroform, methanol and acetone using soxhlet apparatus. Bark material was ground using purified water and filtered and used as an aqueous extract. The extracts obtained using solvents were concentrated using vacuum evaporator and then dried. The extract thus obtained was used for various analyzation [1].

C. Phytochemical screening of extracts

Chloroform, methanol, aqueous, ethanol and acetone extracts were used for preliminary phytochemical screening using standard procedures. The following qualitative tests for both the metabolites were done as follows:

1) Test for alkaloids

Wagner's test: About 10 mg of bark extract was taken and few drops of Wagner's reagent was added and the formation of a reddish brown precipitate indicates the presence of alkaloids [1].

2) Test for flavonoids

Shinoda test-5 mg of bark extract was added to a pinch of

Table 1
Preliminary phytochemical screening of vachellia nilotica bark

Plant constituents	Ethanollic extract	Chloroform extract	Acetone extract	Aqueous extract	Methanol extract
1.Alkaloid	-	-	-	-	-
2.Flavonoids	+	-	+	+	+
3.Carbohydrates	+	-	-	-	+
4.Phenol & Tannins	+	-	-	-	+
5.Proteins and Amino acids	+	+	-	-	+
6.Saponins	-	-	+	+	-
7.Anthraquinone	+	+	-	-	+
8.Glycosides	+	-	-	-	+

magnesium turnings and few drops of concentrated. HCl were added. Formation of pink color indicates the presence of Flavanoids [1]. Lead acetate test-5 mg of bark extract was taken and 2-3 drops of 10% lead acetate solution was added. Appearance of yellow colour precipitate indicates the presence of flavonoids [1].

3) Test for phenols and tannins

Lead acetate test: 05 mg of bark extract was taken and 0.5 ml of 1% lead acetate solution was added and the formation of precipitate indicates the presence of tannin and phenol group compounds.

Ferric chloride test-5 mg of bark extract was taken and 0.2 ml of 5% ferric chloride was added. The formation of dark bluish black color indicates the presence of tannins.

Sodium hydroxide test: Five mg of extract was dissolved in 0.5 ml of 20% sulphuric acid solution. Followed by addition of few drops of aqueous sodium hydroxide solution, it turns blue which indicates the presence of phenols.

4) Test for carbohydrates

Fehling's test-5 ml of Fehling's solution was added to 0.5 mg of bark extract and boiled in a water bath. The formation of yellow or red precipitate indicates the presence of reducing power1.

Benedict's test-5 ml of Benedict's solution was added to 0.5 mg of extract and boiled in a water bath. The appearance of red or yellow or green precipitate indicates the presence of reducing sugars [1].

5) Test for saponins

Honeycomb test-1 mg of bark extract was taken in a test tube and few drops of 5% sodium bicarbonate solution was added. The mixture was shaken vigorously and kept for 5 min. Formation of honeycomb like froth shows the presence of saponins [1]. Foam test-1 mg of extract was diluted with 20 ml distilled water and shaken well in a graduated cylinder for 10 min. The formation of foam to a length of 1 cm indicated the presence of saponins [1].

6) Test for glycosides

Glycoside test-0.5 mg of bark extract was dissolved in 1 ml of water and then aqueous NaOH solution was added. Formation of yellow color indicates the presence of glycosides [1].

7) Test for protein and amino acids

Biuret test-To 1 mg of extract equal volume of 40% sodium hydroxide solution and two drops of 1% copper sulphate solution was added. The formation of violet colour indicates the presence of protein. Ninhydrin test-About 0.5 mg of extract was taken and 2 drops of freshly prepared 0.2% ninhydrin reagent were added and heated. The appearance of pink or purple colour indicates the presence of proteins, peptides or amino acids [1].

8) Test for anthraquinone

Borntragers test-About 0.5 gm of the bark extract was taken into a dry test tube and 5 ml of chloroform was added and shaken for 5 min. The extract was filtered and the filtrate was shaken with an equal volume of 10% ammonia solution. A pink violet or red colour in the lower layer indicates the presence of anthraquinone [1].

3. Results and discussion

The phytochemical analysis is of supreme importance in identifying new source of therapeutically and industrially valuable compounds having medicinal plants have been chemically investigated. In the present investigation, primary and secondary metabolites were qualitatively analysed using Vachellia nilotica bark. The results are given in table 1.

4. Conclusion

This paper presented a study on phytochemical screening of primary and secondary metabolites of vachellia nilotica bark.

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