PRELIMINARY PHYTOCHEMICAL SCREENING OF DIFFERENT SOLVENT EXTRACTS FROM CYMBOPOGON CITRATUS LEAF

Mridula Vellore¹, S. Komathi² and G. Rajalakshmi³

¹M.Phil Scholar, PG and Research Department of Biotechnology, Hindusthan College of Arts and Science, Coimbatore-641028.
²Assistant Professor, PG and Research Department of Biotechnology, Hindusthan College of Arts and Science, Coimbatore-641028.
³Head of department PG and Research Department of Biotechnology, Hindusthan College of Arts and Science, Coimbatore-641028.

*Author for Correspondence: S. Komathi
Assistant Professor, PG and Research Department of Biotechnology, Hindusthan College of Arts and Science, Coimbatore-641028.

ABSTRACT
Cymbopogon citratus commonly referred to as “lemon grass” is a widely grown essential oil plant in the world. In this study, the qualitative phytochemical screening of Cymbopogon citratus leaf was studied. Seven solvents that is hexane, petroleum ether, chloroform, ethyl acetate, ethanol, methanol and water were used to obtain extracts from powdered plant parts. The extracts were subjected to qualitative phytochemical screening using standard procedure. Results show that out of eleven phytochemicals eight phytochemicals such as alkaloids, flavonoids, phenols, tannins, phytosterols, terpenoids, reducing sugars and carbohydrates were found in ethanolic extract. Methanol reported presence of five phytochemicals. Chloroform reported the presence of saponins, glycosides and volatile oils other than the phytochemicals reported by methanol. Of the entire phytochemical test, terpenoids were found in all of the solvents. The diversity of phytochemicals found in Cymbopogon citratus could serve as a source of useful drugs.

KEYWORDS: Lemon grass, Cymbopogon citratus, Medicinal plants, Phytochemicals.

INTRODUCTION
Medicinal plants have been identified and used throughout human history. The medicinal value of herbs and natural plants products depend on their phytochemical constituents that elicit definite physiological or pathological effects in the human body.[1] Phytochemicals are bioactive chemicals of plant origin. They are regarded as secondary metabolites. Secondary metabolites are organic molecules that are not involved in the normal growth and development of an organism. These compounds are an extremely diverse group of natural products synthesized by plants, fungi, bacteria, algae and animals. Most of the secondary metabolites, such as terpenes, phenolic compounds and alkaloids are classified based on their biosynthetic origin.[2]

Lemongrass, scientifically classified as Cymbopogon citratus is a tall perennial grass. The term Cymbopogon is derived from the Greek word “kymbë” (boat) and “pogon” (beard), referring to the arrangement of the spike of the flower. The word citratus derived from the old Latin, meaning lemon-scented leaves. Cymbopogon citratus, Stapf (Lemon grass) is commonly used in teas, soups and curries. It is also suitable for poultry, fish and seafood.[3] Cymbopogon species are largely used in folk medicine for many of the diseases, some of which are related to parasitical diseases such as fevers and headaches.[4] The leaves of Lemongrass (Cymbopogon citratus) present lemony characteristic flavor due to its main content, citral which is of commercial importance. Citral with combination of neral and geraniol isomers is used as a raw material for the production of ionone, vitamin A and beta-carotene.[5]

MATERIALS AND METHODS
Collection of Plant Materials
Fresh Cymbopogon citratus leaves were used in this study, which were grown in green house of Hindusthan College of Arts and Science.

Preparation of Plant Extracts
The leaves of Cymbopogon citratus were collected, washed well and shade dried. The dried plant materials were grinded using an electric blender to obtain a fine powder. The powdered sample was further passed
through a 2mm sieve to obtain fine particle. The extraction was done using Soxhlet Apparatus. The extract was prepared by weighing 8g of the sample and extracting it with seven different solvents each 300ml that is Hexane, Petroleum ether, Chloroform, Ethyl acetate, Ethanol and Methanol separately for a period of eight hours, while the solution was kept boiling. The solutions were left to stand at room temperature for 24 hrs. The filtrate was used for the phytochemical screening using the following tests.

A) Test for Alkaloid
I) Mayer’s Test
To 2ml of filtrate, a drop or two of Mayer’s reagent was added by the side of the test tube. A white or creamy precipitate indicates the test positive.

Mayer’s Reagent: Mercuric chloride (1.358g) was dissolved in 60ml of water and potassium iodide (5.0g) was dissolved in 10ml of water. The two solutions were mixed and made up to 100ml with distilled water.

II) Wagner’s Test
To 2ml of filtrate, two drops of Wagner’s reagent was added by the side of the test tube. A reddish-brown precipitate confirms the test as positive.

Wagner’s Reagent: Iodine (1.27g) and potassium iodide (2g) was dissolved in 5ml of water and made up to 100 ml of distilled water.

B) Detection of Flavonoids
Alkaline Reagent test
2ml of extracts were treated with two drops of Sodium hydroxide solution. Formation of intense yellow color which becomes colorless on addition of dilute hydrochloric acid indicates the presence of flavonoids.

C) Detection of Phenol
Ferric Chloride test
1ml of extract was treated with few drops of neutral 5% ferric chloride solution. A dark green color indicates the presence of phenolic compounds.

D) Detection of Tannins
Braymer’s Test
2ml of distilled water was added to 2ml extract and then treated with 2-3 drops of ferric chloride. Green precipitate indicates the presence of tannins.

E) Detection of Phytosterols
Libermann- Burchard’s test
1ml of acetic anhydride was added to 1ml of extract each and followed by 1ml of H₂SO₄. The colour change from violet to blue or green of samples indicates the presence of steroids.

F) Detection of Terpenoids
I) Libermann- Burchard’s test
1ml of extract was treated with 1ml of acetic anhydride, boiled and cooled. Then 1ml concentrated sulphuric acid was added by the side of the test tube, formation of brown ring at the junction two layers and green colour in the upper layer shows presence of steroids and formation of deep red colour indicates presence of Triterpenoids.

II) Salkowski’s test
1ml of extract was treated with 1 ml of chloroform and filtered. The filtrates were treated with few drops of Conc. Sulphuric acid, shaken and allowed to stand. Appearance of golden yellow colour indicates the presence of Triterpenoids.

G) Detection of Saponins
Foam test
1ml of extract was diluted with same amount of distilled water. The suspension was shaken. 2cm layer of foam indicates the presence of saponins.

H) Detection of Glycosides
Keller – Kiliani test
2 ml of the filtrate was mixed with 1 ml glacial acetic acid, three drops of Iron (III) chloride and two drops of concentrated sulphuric acid. Green-blue colour indicated the presence of cardiac glycosides.

I) Detection of Reducing Sugars
Fehling’s solution
1gm of extract was weighed and added into a test tube. This was diluted using 10ml of distilled water. This solution was treated with Fehling’s solution. The mixture was warmed to 40˚C in water bath. Development of brick-red precipitate at the bottom of the test tube indicated the presence of reducing sugar.

J) Detection of Carbohydrates
Bendict’s test
2ml of filtrate was treated with few drops of Benedict’s reagent and heated gently. Orange red precipitate indicated the presence of carbohydrates.

K) Detection of Volatile oils
Volatile oils are characterized by their odour, oil-like appearance and ability to volatilize at room temperature.
RESULTS AND DISCUSSION

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<tr>
<th>Phytochemicals/ Solvents</th>
<th>HEXANE</th>
<th>PETROLEUM Ether</th>
<th>CHLOROFORM</th>
<th>ETHYL ACETATE</th>
<th>ETHANOL</th>
<th>METHANOL</th>
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<td>Volatile oils</td>
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The data shown in Table 1 shows screening of different extracts of Cymbopogon citratus based on phytochemical tests. These tests reveal the presence of various bioactive secondary metabolites which might be responsible for their medicinal attributes. From the seven solvents used, ethanol extract was found to have more phytochemicals that is alkaloids, flavonoids, phenols, tannins, phytosterols, terpenoids, reducing sugars and carbohydrates. Methanol reported presence of five phytochemicals. Chloroform reported the presence of saponins, glycosides and volatile oils other than the phytochemicals reported by methanol. Hexane also reported the presence of glycosides and volatile oils. These secondary metabolites contribute significantly towards the biological activities of medicinal plants such as hypoglycemic, antidiabetic, antioxidant, antimicrobial, antiinflammatory, anticarcinogenic, antimalarial, anticholinergic, antileprosy activities etc. Of the entire phytochemical tests, terpenoids were found in most of the solvents. Terpenoids have been found to be useful in the prevention and therapy of several diseases, including cancer. It is also known to possess antimicrobial, antifungal, antiparasitic, antiviral, anti-allergic, antispasmodic, antihyperglycemic, antiinflammatory and immunomodulatory properties. Flavonoids are also present in three solvents as a potent water-soluble antioxidant and free radical scavenger, which prevent oxidative cell damage and also have strong anticancer activity. It also helps in managing diabetes induced oxidative stress. Other phytochemicals such as saponins have anti-inflammatory effects, hemolytic activity, and cholesterol binding properties. Glycosides are known to lower blood pressure and tannins exhibit antioxidant, antimicrobial and antiviral effects. Alkaloids represent a class which affects the central nervous system, reduces appetite and behaves as diuretic. Steroids are also responsible for cholesterol-reducing properties. It also helps in regulating the immune response. Plants containing carbohydrates and glycosides are known to exert a beneficial action on immune system by increasing body strength and hence are valuable as dietary supplements. Glycosides also have vast therapeutic efficacy as they are found in almost every medicinal plant. Phenolic acids are the most commonly occurring natural products noted for allopathic activities. Volatile oil, also called essential oils gives plant their specific aromas which is confirmed by the aroma produced by this plant and are extracted by solvent Extraction. The presence of volatile oil also confirms the application of Cymbopogon citratus in perfumery, cosmetics and soap industry.

CONCLUSION

Phytochemicals found present in ethanolic, methanolic and chloroform extracts of Cymbopogon citratus indicates that it has potential source that may supply novel medicines. Further studies are therefore suggested to ascertain their antimicrobial, antioxidant and antihelminthic activities. Furthermore, isolation purification and characterization of the phytochemicals present will make interesting studies.

REFERENCES

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