

Phytochemical Screening of Hexane, Chloroform, Methanol, Aqueous extracts and Drug powder of *Alysicarpus longifolius*(Spreng.)Wight & Arn

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ABSTRACT: *Alysicarpus longifolius*(Spreng.)Wight & Arn., a fabaceae herb, unknown of its phytochemical constituents when subjected to phytochemical screening and fluorescence analysis showed promising results. The drug powder and hexane, chloroform, methanol and water extracts of the plant were taken for the screening. All showed the presence of saponin, protein, tannin, sterol, terpenes, sugars, flavones, coumarins, quinine, phenol and alkaloids whereas gum in hexane extract alone. The previous literature reviews on the medicinal properties of these phytochemicals limelight the medicinal potency of the plant taken. Further imminent research on this particular plant would reveal the extent to which the plant can serve in natural therapy of many diseases prevailing in the society.

KEYWORDS: *Alysicarpus longifolius*, fabaceae, phytochemicals, saponin, terpenes, coumarins, fluorescence analysis.

I. INTRODUCTION

Phytochemical constituents determine the biological and medicinal importance of a plant. Many plants in the universe are unplundered pertaining to their phytoconstituents. One among them was *Alysicarpus longifolius*(Spreng.)Wight & Arn. Review done over various literature shows that only root of the plant had been taken for the study¹. Here, the whole plant was suspended for phytochemical and fluorescence analyses.

II. MATERIALS AND METHODS

Fresh and healthy plants were collected from Thanjavur district, Tamilnadu. They were cleaned under tap water and shade dried.

Preparation of various extracts of the drug

The shade-dried plants were trampled into powder form. A weighed amount of dried plant powder was transferred to an extraction thimble. It was then extracted with various solvents in the order of increasing polarity, namely, hexane, chloroform, methanol, and water using a Soxhlet extraction apparatus. The time duration for this procedure was 6 hours. The solvents in the extracts were filtered and evaporated in a tarred evaporating dish and the residue was dried at 105°C. The extracts were then stored and used for various analyses.

Preliminary Phytochemical Screening of various extracts

Preliminary phytochemical screening of various extracts was carried out as per standard textual procedures⁵ **Test for Saponins:** A small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually was shaken well with water. The results were noted. Copious lather formation showed the presence of saponin.

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Test for Proteins: A small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually was mixed with saturated solution of picric acid and the results were noted. Appearance of yellow color showed the presence of proteins.

Test for Tannins: A small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually was mixed with basic lead acetate solution and the results were noted. Formation of orange red precipitate showed the presence of tannins.

Test for Sterols (Liebermann-Burchard test): To a small quantity of dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually, few drops of glacial acetic acid and acetic anhydride were added. One milliliter of concentrated sulfuric acid was added along the sides of the test tubes. The results were recorded. Appearance of bluish green color showed the presence of sterols.

Test for Terpenoids (Salkowski test): A small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually was warmed with tin and thionyl chloride and the color obtained was observed and recorded. Appearance of pink color showed the presence of terpenoids.

Test for Sugars: A small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually was mixed with Fehling's solutions A and B and warmed gently. The color obtained was observed. The formation of a red color precipitate showed the presence of sugars.

Test for Flavonoids (Shinado's test): To a small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually, few magnesium turnings and few drops of concentrated hydrochloric acid were added and boiled for 5 minutes. The color obtained was observed and recorded. The appearance of red color indicated the presence of flavonoids.

Test for Coumarins: A small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually was mixed with few drops of 10% sodium hydroxide. The color obtained was observed. The appearance of yellow color showed the presence of coumarin.

Test for Quinones: A small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually was mixed with few drops of 10% sodium hydroxide solution. The reaction was observed. The appearance of blue, green, or red color showed the presence of quinones.

Test for Phenols: A small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken separately was mixed with few drops of alcoholic ferric chloride solution. The color formed was noted. The appearance of bluish green or bluish black color showed the presence of phenol.

Test for Alkaloids: To a small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken alone, few drops of acetic acid followed by Dragendorff's reagent were added and shaken well. The results obtained were noted. The formation of orange red precipitate showed the presence of alkaloids.

Test for Gum: To a small quantity of the dried plant powder, hexane, chloroform, methanol, and aqueous extracts taken individually, few drops of water were added. The reaction was observed. The formation of a swollen precipitate showed the presence of gum.

Fluorescence Analysis of the dried plant powder²

Fluorescence analyses of the dried plant powder were carried out after 24 and 48 hours and observed under day and UV light (254 nm) by treating with solvents such as acetone, alcohol, hexane, chloroform, benzene, and ethyl acetate, and acids such as hydrochloric acid and sulfuric acid, and bases such as aqueous and alcoholic sodium hydroxide. The results were observed and tabulated.

III. RESULTS

Phytochemical screening of extracts and dried plant powder

Phytochemical screening of dried plant powder, hexane, methanol, chloroform, and aqueous extracts shows the presence of saponin, protein, tannin, sterol, terpenes, sugar, flavones, coumarins, quinone, phenol, and alkaloid in all, and presence of gum only in hexane extract. The result is tabulated in Table 1a.

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Table 1a Phytochemical screening of extracts and drug powder

S.NO	Test	Drug powder	Hexane extract	Chloroform extract	Methanol extract	Aqueous extract
1	Saponin	+	+	+	+	+
2	Protein	+	+	+	+	+
3	Tannin	+	+	+	+	+
4	Sterol	+	+	+	+	+
5	Terpenes	+	+	+	+	+
6	Sugar	+	+	+	+	+
7	Flavones	+	+	+	+	+
8	Coumarins	+	+	+	+	+
9	Quinone	+	+	+	+	+
10	Phenol	+	+	+	+	+
11	Alkaloid	+	+	+	+	+
12	Gum	-	+	-	-	-

Fluorescence analysis of the dried plant powder after 24 and 48 hours in day and UV light

This analysis reveals the presence of sterols, flavonoids, alkaloids, and quinones by different colorations and the results are tabulated in Tables 1b and 1c, respectively.

Table 1b Fluorescence analysis of drug powder after 24 hours

S.NO	Treatment	Day light	UV light
1	Drug powder	Green	Light green
2	Drug powder + 50% H ₂ SO ₄	Reddish brown	Reddish brown
3	Drug powder + aq. 1N NaOH	Dark brown	Brown
4	Drug powder + Chloroform	Green	Green
5	Drug powder + Ethyl Acetate	Yellow	Green
6	Drug powder + Hexane	Light green	Green
7	Drug powder + Acetone	Greenish yellow	Green
8	Drug powder + Benzene	Light brown	Dark green
9	Drug powder + 1N HCL	Green	Green
10	Drug powder + alc.1N NaOH	Greenish yellow	Dark green
11	Drug powder + Alcohol	Light yellow green	Green
12	Drug powder + Water	Yellow	Green

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Table 1c Fluorescence analysis of drug powder after 48 hours

S.No	Treatment	Day light	UV light
1	Drug powder	Green	Light green
2	Drug powder + 50% H ₂ SO ₄	Brown	Brown
3	Drug powder + aq. 1N NaOH	Dark brown	Brown
4	Drug powder + Chloroform	Yellow	Green
5	Drug powder + Ethyl Acetate	Light yellow	Green
6	Drug powder + Hexane	Green	Green
7	Drug powder + Acetone	Brown	Green
8	Drug powder + Benzene	Dark green	Dark green
9	Drug powder + 1N HCL	Yellow	Green
10	Drug powder + alc. 1N NaOH	Greenish brown	Brown
11	Drug powder + Alcohol	Green	Green
12	Drug powder + Water	Light yellow	Green

IV. DISCUSSION AND CONCLUSION

Many bioactive natural compounds have been identified and isolated from a number of plants through phytochemical screening¹. These include alkaloids, phenols, flavonoids, triterpenoids, coumarins, saponins, and tannins. These active constituents contribute to the therapeutic value of plants, which are being investigated to ensure a hale and healthy life to the human race. Literature review provided the medicinal importance of these phytochemicals.

Phenolic compounds were found to neutralize free radicals in various *in vitro* model systems⁹. Flavonoids not only increase the capillary permeability but also inhibit a number of stages in inflammation. They ensure high marginal safety and lack of side effects over other classical anti-inflammatory drugs. Flavonoids inhibit the MCF-7 cell propagation or proliferation in culture⁸. Saponins are natural glycosides possessing cytotoxic activity⁷. One of the therapeutically active compounds is the cardiac drug, digoxin.

Coumarins have antioxidant potential and inhibit lipid peroxidation⁶. Phytosterols reduce cholesterol levels in humans, control blood sugar and blood cholesterol, help in weight reduction, and are also found to exhibit strong cytotoxic effects³. Triterpenes have anticancer nature; for example, betulinic acid is an anticancer drug⁴.

In this perspective, phytochemical screening of dried plant powder, methanol, hexane, chloroform, and aqueous extracts of *A. longifolius* and fluorescence analysis of dried plant powder were carried out (Tables 1a–1c). The presence of saponin, protein, tannin, sterol, terpenes, sugars, flavones, coumarins, quinone, phenols, alkaloids, and gum was confirmed through preliminary phytochemical screening tests and fluorescence analyses. All these compounds in the dried plant powder, methanol, hexane, chloroform, and aqueous extracts of *A. longifolius* are akin to those in other medicinal plants.

To conclude, the presence of the phytochemicals substantiates the medicinal potential of the plant, *Alysicarpus longifolius*. Further extent of research would prove the importance of this medicinal plant in curing various diseases prevailing in the society.

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