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Qualitative and Quantitative phytochemical analysis of the flowers of *Pergularia daemia*

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R. Nithyatharani[1] and U.S.Kavitha[2]

Department of Microbiology, Cauvery College for Women, Trichy, Tamil Nadu, India.

Abstract

Medicinal plants play an important role in the traditional medicine. One such ethanomedicinal plant is *Pergularia daemia.* It is a perennial twinning herb found commonly in tropical and subtropical regions. The whole plant is used to cure many diseases the present study the phyto chemical compounding the flowers of *pergularia daemia* were determined both qualitatively and quantitatively using in different solvents such as methanol, ethanol, chloroform, petroleum ether and water. The qualitative analysis of the flower showed the presence of alkaloids, steroids, flavonoids, phenols, tannins, aminoacids, cardiac glycosides, reducing sugars and proteins. The quantification of the compounds showed the presence of alkaloids, flavonoids and phenols higher than other compounds. The result confirms that the flowers of *Pergularia daemia* possess significant phytocomponents which could acts as the source of many pharmacological studies and a curative for various ailments.

Key words: Alkaloids, Flavonoids, Flower, Methanol, Medicinal plant

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INTRODUCTION

Medicinal plants play an important role in the traditional medicine as they are readily available and cheaper than modern medicine (Ramachandran and Sankaranarayanan, 2013). It is estimated that there are more than 45,000 species of medicinal plants present in our country. They are possessed to have various properties like antioxidant, anti inflammatory, anti cancer etc. Of these only 60% of plants are officially used by practitioners and 40% of plants are used traditionally (Vyas *et al*, 2011). One such plant is *Pergularia daemia*.

Pergularia daemia is latex plant, fetid smelling, hispid perennial herb found commonly in tropical regions. It is belonged to the family Asclepiadaceae (Karthishwaran and Mirunalini, 2011) and commonly known as "Veliparuthi" in Tamil and "Hariknot" in English. The whole plant has various properties like antifertility (Golam *et al*, 2001), wound healing (Kumar *et al*, 2006) antidiabetic (Wahi *et al*, 2002), and cardiovascular effect (Sureshkumar and Mishra, 2007). The flowering occurs mostly between August and February. The flowers are greenish yellow or dull white, and sweet-scented. The five petals are hairy and spreading outwards. Aerial parts of this plant are used for various pharmacological activities like hepatoprotective, antifertility, anti-diabetic, analgesic, antipyretic and anti-inflammatory (Bhaskar and Balakrishnan, 2009). The present study qualitative and quantitative analyses of phytocomponents present in the flowers of *Pergularia daemia* using were different solvents such as methanol, ethanol, chloroform, petroleum ether and water carried out and the results are discussed.

*Corresponding Author :
email:

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MATERIALS AND METHODS

Collection of plant sample

The fresh flowers were collected from Tirukoilur, Villupuram district, Tamilnadu, India.

Preparation of the extract

The flowers of *Pergularia daemia* were washed thoroughly in tap water to remove dust particles. The flowers were then dried in shade at room temperature and coarsely powdered by a mechanical grinder. The dried powdered sample was soaked in different solvents like methanol, ethanol, chloroform and petroleum ether for 3 to 5 days. Aqueous extract of the flowers was also prepared by soaking the dried powder in distilled water. After 5 days, the extracts were filtered using No.1 Whatman filter paper and stored in air tight container for further analysis.

Qualitative analysis of phytochemicals

Preliminary phytochemical screening was carried out following the methods described Bhaskar and Balakrishnan (2009) and Kokate (1986).

Test for alkaloids (Mayer's test)

To 1ml of the extract, 1 ml of Mayer's reagent (Potassium iodide solution) was added. Formation of whitish yellow or cream coloured precipitate indicated the presence of alkaloids.

Test for steroids (Libermann Burchard test)

To 1ml of the extract, 2ml of acetic anhydride and 2ml of concentrated sulphuric acid were added. Formation of violet to blue or green colour indicated the presence of steroids.

Test for terpenoids (Salkowski test)

To 1 ml of the extract, 2ml of chloroform and few drops of sulphuric acid were added. Formation of reddish brown ring indicated the presence of terpenoids.

Test for flavonoids (Alkaline reagent test)

To 1 ml of the extract, few drops of dilute ammonium solution and few drops of concentrated hydrochloric acid were added. A yellow colouration indicated the presence of flavonoids.

Test for saponins (Froth test)

To 1 ml of the extract, 5 ml of distilled water was added and shaked vigorously. Formation of froth indicated the presence of saponins.

Test for phenols

To 1ml of the extract, 1 ml of lead acetate solution was added. Formation of precipitate indicated the presence of phenols.

Test for tannins

To 1ml of the extract, 1ml of lead acetate was added. A formation of white precipitate indicated the presence of tannins.

Test for tannins

To 1ml of the extract, 1ml of ferric chloride solution was added. Formation of blue, black or brownish green colour indicated the presence of tannins.

Test for cardiac glycosides

To 1ml of the extract, 5ml of distilled water was added and evaporated to dryness. Then to the Sample 2ml of glacial acetic acid containing trace amount of ferric chloride solution was added. Then 1ml of the concentrated sulphuric acid was added along the sides of the tube. Formation of brown ring underlayed with blue colour indicated presence of cardiac glycosides

Test for aminoacids (Ninhydrin test)

To 1ml of the sample, 3 to 4 drops of Ninhydrin solution was added and boiled in water bath for 10 minutes. Formation of purple or blue colour indicated the presence of amino acids.

Test for proteins

To 1ml of the extract, 1ml of 40% sodium hydroxide solution and 2 drops of 1% copper sulphate solution were added. Formation of violet colour indicated the presence of proteins.

Test for carbohydrates

2ml of the extract was added with 1ml of Barfoed's reagent was added and boiled in water bath for few minutes. Formation of reddish brown precipitate indicated the presence of carbohydrates.

Test for reducing sugars

To 1ml of the extract, equal quantities of Fehling solution A and B were added and heated. Formation of brick red precipitate indicated the presence of reducing sugars.

Quantitative estimation of phytochemicals

Alkaloid determination

5 gm of the sample was added to 200 ml of 10% acetic acid in ethanol in a beaker. The beaker was tightly covered and allowed to stand for 4 hours. This was filtered and the extract was concentrated on a water bath to one quarter of the original volume. The entire solution was precipitated by the drop wise addition of concentrated ammonium hydroxide solution. The precipitate was collected and washed with dilute ammonium hydroxide and filtered. The residue is alkaloid, which was dried and weighed (Kokate, 1986).

Flavonoid determination

10 gm of the sample was added to 100 ml of 80% aqueous methanol in a beaker. The whole solution was filtered through Whatman filter paper No.42 (125mm). The filtrate was then evaporated to dryness and weighed (Kokate, 1986).

Determination of total phenols

Few grams of sample were boiled with 50 ml of ether for 15 minutes for the extraction of phenols. To 5ml of the extract, 10 ml of distilled water, 2ml of ammonium hydroxide solution and 5ml of concentrated amyl alcohol were added. The samples were left for 30 minutes. This was measured at 505 nm (Kokate, 1986).

RESULTS AND DISCUSSION

The qualitative phytochemical analysis of the flowers of *Pergularia daemia* is summarized in the Table 1. The quantification of important phytocompounds of the flowers is summarized in Table 2. The methanolic extract of flowers showed the presence of high number of phytocomponents when compared with ethanol, petroleum ether, and chloroform and water. The methanolic extracts revealed the presence of alkaloids, steroids, flavonoids, phenols, tannins, cardiac glycosides, aminoacids, proteins and reducing sugars. Phytochemicals such as flavonoids and alkaloids have hypoglycemic activities (Karthiswaran *et al*., 2010). The flowers showed the presence of high amount of tannins, which play a major role in the treatment of intestinal disorders like diarrhoea and dysentery

(Cherian and Augusti, 1995). The flowers also have flavonoid which acts as antioxidants (Akinpelu and Onakoya, 2006). These extracts are further undertaken for isolation and identification of specific phytocomponents for pharmacological studies.

Table. 1. The results of qualitative analysis of flowers of *Pergularia daemia*

Tests	Methanol	Ethanol	Petroleum ether	Chloroform	Aqueous
Alkaloid	+	+	+	+	+
Steroids	+	+	-	-	+
Flavonoids	-	+	-	-	+
Terpenoids	-	-	-	-	-
Saponins	-	-	-	-	-
Phenols	+	-	+	-	-
Tannins	+	-	+	+	-
Cardiac glycosides	+	+	+	+	-
Aminoacids	+	+	+	+	+
Proteins	+	+	+	+	+
Carbohydrates	-	-	-	-	-
Reducing sugars	-	+	-	-	+

Table.2. The results of quantitative analysis of flowers of *Pergularia daemia*

Tests	Methanol	Ethanol	Petroleum ether	Chloroform	Aqueous
Alkaloid	6.48 ± 1.18	5.596 ± 0.20	3.25 ± 1.67	2.52 ± 0.30	6.35 ± 1.03
Flavonoid	0.43 ± 0.12	7.01 ± 1.54	0.085 ± 0.14	0.09 ± 0.12	8.15 ± 1.18
Phenols	15.33 ± 0.25	2.25 ± 1.3	12.09 ± 1.92	1.09 ± 0.12	1.72 ± 0.32

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