

Phytochemical Analysis And Anti-Inflammatory Activity of *Pisonia umbellifera* Leaf Extract

Kaviya priya. P¹, Sangeetha.N², Kalaiyarasi.S³ and Sowmiya.S⁴

^{1, 2, 3, 4} Dept of Biochemistry
^{1, 2, 3, 4} kongu Arts and Science college, Erode.

Abstract- Medicinal Plants are gifts of nature which are the sources of bioactive constituents. Medicinal plants have played an essential role in the development of human culture. They are the resources of traditional medicines and many of the modern medicines are produced indirectly from plant. Medicinal plants have long played an important role in the treatment of diseases all over the world. *Pisonia umbellifera* is a traditional medicinal plant. It is commonly known as *Leeachai kottai keerai* in tamil, is widely used plant which belongs to *Nyctaginaceae* family. The present investigation focus on screening of phytochemical constituents, anti-inflammatory activity of *Pisonia umbellifera* leaf extracts.

Keywords- Medicinal plants, phytochemicals, anti-inflammatory.

I. INTRODUCTION

The term of medicinal plants include a various types of plants used in herbalism and some of these plants have a medicinal activities. These medicinal plants consider as a rich resources of ingredients which can be used in drug development and synthesis (Vishnupriya C *et al.*, 2017) [1].

According to the World Health Organization state that traditional medicine is used in plant parts such as a leaf, stem, bark, and flowers estimated to be used medicine by 80% of the population most of developing countries (Kalisdha A 2013) [2].

Plants are important source of drugs; especially in traditional medicine. It is a common practice in Nigeria and other parts of the world to use the plant in the form of crude extracts, decoction, infusion or tincture to treat common infection and chronic conditions (Tamizhazhagan V 2017) [3].

Pisonia umbellifera belongs to the *Nyctaginaceae* family, commonly known as Lettuce Tree, is an evergreen tree of 9-12m height found wild in the beach forests of Andaman Islands and cultivated to a small extent in South India and Ceylon. It is used as a diuretic. A perusal of literature revealed that *Pisonia umbellifera* is an untapped candidate for

antidiabetic activity though it is extensively used in traditional healing in Kerala for diabetes (Prabu D 2008) [4].

Pisonia umbellifera is a large evergreen shrub. Leaf: Long, bounty, and fresh green in color. If planted in good sunlight, the leaf may acquire a light yellow color. Flowers: The tree rarely flowers in India. The flowers are small, green, and inconspicuous. Uses: The leaf is edible. Young leaf is used as a vegetable. Leaf make good cattle feed too and are mostly used to treat rheumatism or arthritis (Tamizhazhagan pugazhendy.v 2017) [5].

It is also used in the treatment of ulcer, dysentery and snake bite. The leaves are edible and mostly used to treat wound healing, rheumatism and arthritis (Shubashini and Poongothai, 2010) [6]. This study is also focused on antioxidant antibacterial antidiabetic and anti-inflammatory activity of *Pisonia umbellifera*.

II. MATERIALS AND METHODS

Pisonia umbellifera leaf extract were selected for these studies. The materials and methods pertaining to the current study “phytochemical screening and Antioxidant activities in the ethanolic leaf extract of *pisonia umbellifera* are discussed under the following phases:

PHASE I

1.1 Collection of plant sample

1.2 Preparation of plant materials

1.3 Extraction Procedure

1.1.1 Preparation of Aqueous extract

1.1.2 Preparation of Ethanol extract

PHASE II

2.1 Phytochemical Screening

2.2 *In vitro* Anti-inflammatory Activity

Albumin Denaturation Assay

PHASE I

1.1 Collection of plant sample

Healthy fresh leaf of *Pisonia umbellifera* were collected from the nearby areas of karur, district.

1.2 Preparation of plant material

The plant sample is rinsed with distilled water and dried at room temperature for 15 days. The dried leaf were powdered and stored in air-tight container for further analysis.

1.2 Extraction Procedure

1.1.1 Preparation of aqueous extract

Taken 3gm of *Pisonia umbellifera* powder and to it add 60 ml of distilled water. Then mixed it well using a glass rod and it is filtered. Then the filtrate is used for phytochemical analysis.

1.1.2 Preparation of Ethanol extract

Taken 30 gm of *Pisonia umbilifera* powder was packed in filter paper and extracted in Soxhlet's apparatus using 150 ml of ethanol. The samples in the apparatus was kept boiling till the solution becomes clear and the dark colored extract was collected at the bottom of the apparatus. The extract was stored in a container for further use.

PHASE II

2.1 Phytochemical Screening

2.1.1 Test for Phenol

Taken 1ml of the plant leaf extract added 20 μ l of 1% ferric chloride. The appearance of bluish black precipitate indicates the presence of phenol (Tiwari P 2008) [7].

2.1.2 Test for Flavonoids

Taken 1ml of the plant leaf extract added few drops of 1% sodium hydroxide solution. The appearance of yellow colour indicates the presence of flavonoids. (Tiwari P 2008) [7].

2.1.3 Test for Terpenoids

Taken 0.5ml of the plant leaf extract added 2ml of chloroform and 3ml of concentrated sulphuric acid along the sides of the test tubes. The appearance of reddish brown colour at the interface indicated the presence of terpenoid (Marka R 2013) [8].

2.1.4 Test for Quinones

To 1ml of the plant leaf extract added few drops of concentrated hydrochloric acid. The presence of yellow precipitate indicated the presence of quinines (Marka R 2013) [8].

2.1.5 Test for Glycosides

To 2ml of the plant leaf extract added 1ml of glacial acetic acid. To that added 1% ferric chloride solution drop by drop and then added concentrated sulphuric acid along the sides of the test tube. The appearance of greenish blue color indicates the presence of glycosides (Nandagopalan *et al.*, 2016) [9].

2.1.6 Test for Tannins

To 1ml of the leaf extract added 10ml of distilled water. The solution was then filtered and then added few drops of 0.1% ferric chloride slowly to the filtrate. The appearance of brownish green colour indicated the presence of tannins (Tiwari P 2008) [7].

2.1.7 Test for Saponins

To 1ml of the plant leaf sample added 2ml of distilled water. The solution was shaken and then added three drops of coconut oil; the solution was shaken again and then observed for formation of emulsion. The formation of emulsion indicated the presence of saponins (Marka R 2013) [8].

2.1.8 Test for Steroids

Taken 1ml of the plant leaf extract added few drops of chloroform, acetic anhydride and concentrated sulphuric acid. The appearance of dark pink or red colour indicates the presence of steroids (Marka R 2013) [8].

2.1.9 Test for Alkaloids

Taken 1ml of the leaf extract added 1ml of saturated picric acid solution (Hager's solution). The appearance of yellow precipitate indicates the presence of alkaloid (Marka R 2013) [8].

2.1.10 Test for Reducing Sugars

Taken 1ml of the plant leaf extract added equal volume of Benedict's reagent and allowed to stand in a water bath for 10 minutes. The appearance of brownish red precipitate indicates the presence of reducing sugars (Marka R 2013) [8].

2.2 In vitro Anti-inflammatory Activity

2.2.1 Albumin Denaturation Assay

The anti-inflammatory activity was studied by using inhibition of albumin denaturation technique which was studied according to Mizushima *et al* and Sakatet *al* followed with minor modifications. The reaction mixture consists of test extracts and 1% aqueous solution of bovine albumin fraction, pH of the reaction mixture was adjusted using small amount of 1N HCl. The sample extracts were incubated at 37°C for 20 minutes and then heated to 51°C for 20 minutes, after cooling the samples the turbidity was measured at 660nm. The experiment was performed in triplicate. The percentage inhibition of protein denaturation was calculated as follows:

$$\text{Percentage inhibition} = \frac{(\text{Abs Control} - \text{Abs Sample}) \times 100}{\text{Abs controls}}$$

III. RESULT AND DISCUSSION

The results obtained in current study entitled, "Evaluation of the phytochemical components, anti-inflammatory activity in ethanolic leaf extract of *Pisonia umbellifera*."

3.1 PHYTOCHEMICAL SCREENING RESULT:

Table: 1 Phytochemical screening of *Pisonia umbellifera* leaf extract

TESTS	ETHANOL	AQUEOUS
ALKALOIDS	+	-
FLAVONOIDS	+	+
TERPENOIDS	+	-
PHENOL	+	+
TANNINS	+	+
REDUCING SUGAR	+	+
SAPONINS	+	+
STEROIDS	-	+
QUINONES	+	-
GLYCOSIDES	+	+

The phytochemical screenings of *Pisonia umbellifera* leaf extract were done by aqueous and ethanol the results are as follows:

From the table 1 shows that *Pisonia umbellifera* leaf extract has the presence of flavonoids, phenol, tannins, reducing sugar, saponins, steroids, glycosides in the aqueous extract. The ethanolic extract of *Pisonia umbellifera* shows the presence of alkaloids, flavonoids, terpenoids, phenol, tannins, glycosides, reducing sugar, saponins, and glycosides.

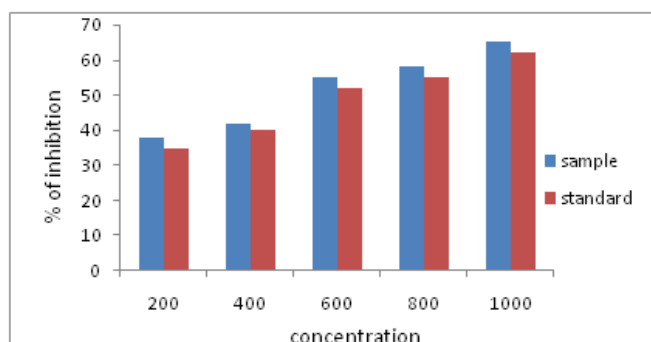
3.2 IN VITRO ANTI-INFLAMMATORY ACTIVITY:

Inflammation is a part of the complex biological response of vascular tissues to harmful stimuli, such as pathogens, damaged cells or irritants. It is characterized by redness, swollen joints, joint pain, its stiffness and loss of joint function. The developments of potent anti-inflammatory drugs from the natural products are now under considerations. Natural products are rich source for discovery of new drugs because of their chemical diversity. A natural product from medicinal plants plays a major role to cure many diseases associated with inflammation.

The present study focused on anti-inflammatory activity in ethanolic extract of *Pisonia umbellifera* using following methods,

Table: 2 Anti inflammatory activity of *Pisonia umbellifera* leaf extract

Name of the extract	Concentration (ul/mg)	Inhibition of albumin denaturation assay	
		% of inhibition	
		% Inhibition of standard	% Inhibition of sample
Ethanol	200	35	38
	400	40	42
	600	52	55
	800	55	58
	1000	62	65

**Fig: 1 Anti inflammatory activity of *Pisonia umbellifera* leaf extract**

The table 2 and figure 1 shows that the anti-inflammatory activity was carried out by using different concentration of ethanolic leaf extract of *Pisonia umbellifera*. The studies are necessary to identify and isolate the active constituents responsible for its anti-inflammatory and also there is a need to elucidate its mechanism of anti-inflammatory property of *Pisonia umbellifera* (R.Radha et al., 2008) [10]. The present study indicates that the *Pisonia umbellifera* plant extract contains potential anti-inflammatory compounds that may use for development of phytomedicine for the therapy of inflammatory.

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