

# PHYTOCHEMICAL INVESTIGATION OF THE LEAF EXTRACTS OF *CARICA PAPAYA* AND *CISSAMPELOS PAREIRA*.

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**Abstract:** Medicinal plants play an important role in traditional system of medicines due to its broad spectrum of activity. *Carica papaya* popularly known as 'papaya' or 'paw paw' and *Cissampelos pareira*, commonly known as 'Abuta' were used for treating various ailments since time immemorial. This study was carried out to screen the leaf extracts of *Carica papaya* and *Cissampelos pareira* for phytochemicals. Different solvents such as acetone, methanol, ethanol and water were used to screen phytochemicals using standard procedures. Phytochemical screening confirmed the presence of alkaloids, carbohydrates, amino acids, glycosides, phenols and flavonoids in these plants. The presence of these phytochemicals is an indicator of the pharmacological property as well as the nutritive value of the leaves of both plants.

**Index Terms:** *Carica papaya*, *Cissampelos pareira*, leaves, solvents, phytochemical screening.

## 1. INTRODUCTION:

India is known as the largest producer of medicinal herbs and is called as 'Botanical Garden of the World'. These medicinal herbs have been in use for thousands of years in the traditional system of medicines like Ayurveda, Siddha and Unani (Choudri, 1999). Medicinal plants can not only act as therapeutic agents but are also considered as a big source of wide variety of chemical constituents which could be developed as drugs with precise selectivity (Vijyalakshmi and Ravindran, 2012). These chemical constituents are known as phytochemicals. Phytochemicals such as alkaloids, flavonoids, tannins and phenolic compounds are responsible for the medicinal properties of plants that produce a definite physiological action on the body (Hemashenpagam *et al.*, 2009). Phytochemical screening of medicinal plants by qualitative methods will help to identify a wide variety of phytochemicals produced by these plants and quantification of those metabolites will help to extract, isolate, purify and characterize the bioactive compounds present in them (Santhi and Sengottuvel, 2016). Knowledge of these chemical constituents in these plants is gaining importance nowadays because such information will lead to the synthesis of new bioactive compounds for treating the specific disease (Geetha and Geetha, 2014).

*Carica papaya*, commonly known as papaya or pawpaw belongs to the family *Caricaceae* is widely grown all over the world. It is a large, tree-like plant, with a single stem growing from 5 to 10 m tall, with spirally arranged leaves (Onibon *et al.*, 2007). The leaves are large, 50-70 cms in diameter, deeply and palmately lobed, with seven lobes (Ikeyi *et al.*, 2013). The roots of papaya are used to treat renal bladder problems and its seeds possess antihelminthic activity (Doughari *et al.*, 2007). Traditionally, the leaves are used to treat urinary tract infections (Yusha *et al.*, 2008), and are also used as a tumor destroying agent, antiseptic and blood purifier (Ezugwu, 2008). Papain enzyme of papaya are used to control arthritis, intestinal worms, bloating, chronic indigestion, etc (Baur *et al.*, 2008) (Cordell, 2008). The leaves also possess antimalarial and anti-plasmodial activities (Udoh and East, 2014). The green fruits are used to treat high blood pressure, roundworm infections, skin diseases, dyspepsia, constipation, amenorrhoea and genito-urinary disorders (Burkill, 1985). The fruits are popularly used for making juice and wine, and are also used as vegetable (Grayson, 2001).

*Cissampelos pareira* belongs to the family *Menispermaceae* is a medicinal climber of great demand in Ayurveda found on moist soils of tropics and sub-tropics (Bapalal, 1998). The root system consists of flexible, light brown lateral roots with abundant fine roots. The stem is woody, flexible and slender with twines for support (Dandiya and Chopra, 1970). The leaves of the plant are palatate or orbicular-reniform with truncate cordate base, glabrous or hairy above up to 3-12cm long and is light green in colour. Fruits are juicy red or yellow, hairy drupes 4 to 5 mm in diameter (Samantha and Bhattacharya, 2011) (Long and Lakela, 1976). *Cissampelos pareira* is widely employed as an herbal medicine as a diuretic, as well as to reduce fever and relieve pain. It is often employed for menstrual cramps, difficult menstruation, excessive bleeding and uterine hemorrhages, fibroid tumors, pre- and postnatal pain, colic, constipation, poor digestion, and dyspepsia (Mukerji and Bhandari, 1959). The roots of *Cissampelos pareira* are used in the treatment of dysuria and renal calculi whereas a decoction of leaf and stem is used as an oral analgesic. In Ayurveda, the leaves are used for the treatment of indolent ulcers and diarrhea and also are eaten as potherb, as a coolant. Crushed leaves are boiled along with rice and given as a tonic for heart problems whereas fresh juice is applied for eye-diseases (Kirtikar and Basu, 1933). Traditionally it is used in muscle inflammation, snakebite, rheumatism, diarrhea and dysentery (Mokkhasmit, 1971). The plant is considered to be antiseptic and is used in the treatment of urinary tract infections (Amresh *et al.*, 2003).

The present study was carried out to test the presence of phytochemicals in various solvents of the leaf extracts of the medicinal plants, *Carica papaya* and *Cissampelos pareira*.

## 2. MATERIALS AND METHODS:

### 2.1. Collection of plants:

Fresh, healthy leaves of *Carica papaya* and *Cissampelos pareira* were collected from the hilly regions of Malayadi, Kanya Kumari district, Tamil Nadu. The leaves of both plants were washed thoroughly under running tap water, then with

distilled water and shade dried at room temperature to remove the moisture completely. The dried leaves are then homogenized into fine powder using a mixer grinder and stored in airtight containers for further study.

## 2.2. Preparation of leaf extracts:

10 gm of the dried powder of leaves of *Carica papaya* and *Cissampelos pareira* were taken separately in labelled airtight bottles and 50 ml of solvents such as acetone, methanol, ethanol and water were individually added. The contents were kept undisturbed under dark. After two days, the contents were stirred well and kept undisturbed. Again the contents were stirred well after two days and filtered using Whatmann no. 1 filter paper. The filtrates were collected and evaporated using water bath and stored in refrigerator at 4°C for further studies.

## 2.3. Phytochemical analysis:

The presence of phytochemicals in various solvent extracts of leaves of *Carica papaya* and *Cissampelos pareira* were analyzed using standard procedures (Anupa *et al.*, 2014) (Baghel and Sandip, 2017).

### 2.3.1. Test for Alkaloids (Dragendroff's test):

To each of the extracts, dilute Hydrochloric acid was added, shaken well and filtered. To this few drops of Dragendroff's reagent was added. The presence of alkaloids was indicated by the formation of a red precipitate.

### 2.3.2. Test for Carbohydrates (Fehling's test):

To 1 ml of each extracts, 1 ml of Fehling's A and 1 ml of Fehling's B solutions were added in a test tube and heated in the water bath for 10 minutes. Formation of red precipitate indicates the presence of carbohydrates.

### 2.3.3. Test for Saponins (Foam test):

1 ml of the each extract was diluted with 2 ml of distilled water and shaken vigorously for 15 minutes. The formation of persistent foam indicates the presence of saponins.

### 2.3.4. Test for Steroids (Salkowski's test):

The extracts were treated with chloroform and then to the chloroform layer, sulphuric acid were added slowly by the sides of test tube. Formation of red color indicates the presence of steroids.

### 2.3.5. Test for Glycosides (Keller-Killiani test):

To 2 ml of the extracts, 3 ml of glacial acetic acid and 1 drop of 5% ferric chloride solution were added in a test tube. About 0.5 ml of concentrated sulphuric acid was added along the sides of the test tube carefully. Formation of blue color in the acetic acid layer indicates the presence of glycosides.

### 2.3.6. Test for Tannins (Ferric chloride test):

To 1 ml of plant extracts, few drops of 1% ferric chloride solution were added. The presence of blue, black, green or blue green precipitate indicates the presence of tannins.

### 2.3.7. Test for Terpenoids (Salkowski's Test):

To 1 ml of the plant extracts, 2 ml of chloroform was added. 3 ml of concentrated Sulphuric acid was carefully added along the sides of the test tube to form a layer. A reddish brown coloration of the interface indicates the presence of terpenoids.

### 2.3.8. Test for Flavonoids (Lead Acetate Test):

The plant extracts were treated with few drops of lead acetate solution. Formation of yellow precipitate indicates the presence of flavonoids.

### 2.3.9. Test for Phenols (Ferric chloride test):

To the 1 ml of the plant extracts, 3 ml of distilled water was added. To this few drops of 5% of ferric chloride solution were added. A dark green colour indicates the presence of phenolics.

### 2.3.10. Test for Amino acids (Ninhydrin Test):

To the plant extracts, few drops of 0.25 % Ninhydrin reagent was added and boiled for few minutes. The presence of amino acids was confirmed by the formation of blue colour.

## 3. RESULT AND DISCUSSION:

Leaves of *Carica papaya* and *Cissampelos pareira* were analyzed qualitatively for the presence of phytochemicals using various phytochemical tests. Acetone, methanol, ethanol and water were used for solvent extraction of the leaves of above said plants. The phytochemical analysis of various solvent extracts of leaves of *Carica papaya* and *Cissampelos pareira* were performed and the results were tabulated in Table 1 and 2.

The detailed analysis of all the four solvent extracts of leaves of *Carica papaya* showed the presence of alkaloids, amino acids, glycosides and saponins whereas tannins were found absent in all the four extracts. The methanolic and ethanolic extracts showed the presence of steroids, phenols, terpenoids and flavonoids, whereas steroids, flavonoids, terpenoids and phenols were found absent in water extracts. Carbohydrates were present only in ethanol and water extracts.

The phytochemical analysis of all the four solvent extracts of leaves of *Cissampelos pareira* revealed the presence of alkaloids, amino acids and tannins. Saponins and terpenoids were found absent in all the four extracts. Steroids and glycosides

were present in all the extracts except in water extracts. Carbohydrates, phenols and flavonoids were found present in both methanolic and ethanolic extracts.

Qualitative analysis of phytochemicals of both plants indicates the presence of maximum number of compounds in methanol and ethanol extracts. The phytochemicals of *Carica papaya* showed its presence to a great extent in all the solvents used, there by convincing their use to treat various diseases.

**Table-1: Phytochemical screening of *Carica papaya* leaves**

S.No.	Phytochemical test for	Leaf extracts prepared from solvents			
		Acetone	Methanol	Ethanol	Water
01.	Alkaloids	+	+	+	+
02.	Carbohydrates	-	-	+	+
03.	Saponins	+	+	+	+
04.	Steroids	+	+	+	-
05.	Glycosides	+	+	+	+
06.	Tannins	-	-	-	-
07.	Terpenoids	+	+	+	-
08.	Flavonoids	+	+	+	-
09.	Phenols	-	+	+	-
10.	Amino acids	+	+	+	+

**Table-2: Phytochemical screening of *Cissampelos pareira* leaves**

S.No.	Phytochemical test for	Leaf extracts prepared from solvents			
		Acetone	Methanol	Ethanol	Water
01.	Alkaloids	+	+	+	+
02.	Carbohydrates	-	+	+	+
03.	Saponins	-	-	-	-
04.	Steroids	+	+	+	-
05.	Glycosides	+	+	+	-
06.	Tannins	+	+	+	+
07.	Terpenoids	-	-	-	-
08.	Flavonoids	-	+	+	-
09.	Phenols	-	+	+	-
10.	Amino acids	+	+	+	+

#### 4. CONCLUSION:

The present study was designed to screen phytochemicals present in the leaf extracts of various solvents of traditionally significant plants, *Carica papaya* and *Cissampelos pareira*. The presence of phytochemicals such as alkaloids, amino acids, phenols, glycosides, flavonoids, etc, evidenced that these plants possess significant properties to cure disease. Thus this study proved the use of these plants in traditional systems of medicine. From the study it can be concluded that both plants possess many phytochemicals which indicates that these medicinal plants should be further investigated to isolate, purify and characterize the active phytochemicals to confirm its pharmacological and therapeutic efficacies.

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