

## Qualitative Phytochemical Analysis of *Kalanchoe pinnata*

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**ABSTRACT:** *Kalanchoe pinnata*, commonly known as Ranakalli, which possesses various pharmacological activities like antioxidant, anticancer, antimicrobial, antiviral, urolithiatic and antidiabetic activity. Hence the study is carried out to determine the presence of various bioactive compounds in *Kalanchoe pinnata*. In the present study, the three solvent extract such as methanol, hexane and aqueous extract were used. The study shows that the plant possess alkaloids, phenol, glycosides, carbohydrates and also hexane, which is the most effective solvent extract than the other two. Hence, the plant *Kalanchoe pinnata* that possess excellent source of phytochemicals, can be used in the treatment of various ailments.

**Keywords:** *Kalanchoe pinnata*, Phytochemical, aqueous extract, hexane.

### INTRODUCTION

Medicinal plants synthesize lot of bioactive compounds for various functions, including defense and protection against insects, fungi, diseases and herbivorous mammals (Gershenson and Ullah 2022). Those plants, which have large number of bioactive substances can be used for treatment of many diseases and are called medicinal plants (Sofowora, 1993). Medicinal plants are largely used as traditional medicine in underdeveloped societies, mainly because, it is cheaper than allopathic medicines. It is estimated that around US\$60 billion medicinal plants can be exported globally per annum and growing at the rate of 6% per year. In many countries, there is little regulation of folk medicine, but the World Health Organization uses a network to encourage safe and rational use of traditional medicine. However, all plants synthesize phytochemicals, which are good for our health because they cannot be synthesized by the human body (Kumar and Wani 2015). Medicinal plants are known for thousands of years before and are highly prestigious all over the world due to its richest source of therapeutic agents for the prevention of diseases and various ailments (Sharma *et al.*, 2008). *Kalanchoe pinnata* (Lam) (syn. *Bryophyllum pinnatum*) is a succulent plant native to Madagascar. This is also called Divine plant. Its leaf, stem and root portions possess high bioactive compounds which has high index in therapeutic values. *K. pinnata* is commonly known as a Master herb, that cures people of large community from Tribal and help the Herbal practitioners (Nayak *et al.*, 2010) of various countries. *Kalanchoe pinnata* is also popularly known by several names such as Ranakalli, Miracle leaf, Mexican Love plant, Katakataka, Cathedral Bells, Air plant, etc., and it belongs to the family Crassulaceae. It is also called

“Mother of thousand” because new plantlets develop from the leaf margins which can be cut off and removed from the parent plant and grown separately on different pots (Kaur *et al.*, 2014). Most commonly it is seen in plains, tropical and temperate regions of Africa, Australia and America. It is one of the conventionally used medicinal plants among the folklore of Asia (Afzal *et al.*, 2012b). It possesses various pharmacological abilities like antimicrobial, antioxidant, urolithiatic, antiproliferative activity etc. (Afzal *et al.*, 2013; Yadav *et al.*, 2003). As informed by Bopda *et al.* (2014); Ghazi *et al.* (2011); Ojewole (2002), the plant *K. pinnata* also possess gastroprotective, nephroprotective, thrombolytic, haemoprotective, antihistamine, antihypertensive and immunosuppressant ability (Cruz *et al.*, 2008; Rossi-Bergmann *et al.*, 1994). *K. pinnata* has also been widely used in theosophic therapy for about 90 years, based on Rudolf Steiner’s indications and understanding of its action in human beings. The juice from these leaves is widely used as conventional medicine for treating kidney stones. The French Antilles *Kalanchoe pinnata*, called zebmaltet, is also used as medicine for headaches.

### MATERIALS AND METHODS

#### *Kalanchoe pinnata*

The traditionally used medicinal plant is selected as the material for the present study and it was collected from the tropical areas of Kanyakumari district, Tamilnadu. The is used as a conventional medicine against gastric ulcers, kidney stones, boils, wounds and infections.

#### Scientific classification

Kingdom: Plantae

Order : Saxifragels

Family : Crassulaceae

Genus : *Kalanchoe*

Species : *K.pinnata*

### Phytochemical analysis of *Kalanchoe pinnata*

The phytochemical analysis of *K. pinnata* analysed by the following procedures they are Harborne (1973); Trease and Evans (1989); Sofowora (1993).

#### (a) Test for Alkaloids

In this test, when 2ml of extract is added with 0.2ml of HCL and 1ml of Dragendorff's reagent, there appears an orange brown precipitate which indicates the positive test for alkaloids.

#### (b) Test for Anthracene

Few ml of the extract was shaken with equal volume of chloroform, which allows a formation of Brick red precipitate. This indicates a positive test for anthracene.

#### (c) Test for Phenol

2ml of test solution is added with a few drops of ferric chloride solution, there appears a bluish green or red colour precipitate that indicates a positive test for phenol.

#### (d) Test for Saponin

In this test, 5ml of extract is treated with 10ml of distilled water in a test tube. A frothing occurs when it is vigorously shaken for 2 minutes. It indicates the presence of saponin.

#### (e) Test for Phlobatannins

When an aqueous layer was boiled with 1% of aqueous HCL, a red precipitate is deposited, which is taken as a positive test for the presence of phlobatannins.

#### (f) Test for Reducing sugar

In this test, 2ml of the extract is treated with 1ml of distilled water and few drops of Fehling's solution A and B. It is then boiled in water bath for 10-15 minutes. There appears an orange red precipitate that indicates a positive test for reducing sugar.

#### (g) Test for Steroids (Liebermann-Burchard Test)

2ml of the test solution is treated with few drops of chloroform, 3-4 drops of acetic anhydride and one drop of concentrated sulphuric acid. A change in color from purple to blue or green indicates a positive test for steroids.

#### (h) Test for Anthraquinone

To the filtrate, 5ml of ammonium solution is added and shaken properly. A bright pink colour is formed in the upper layer and violet colour is formed in lower layer, that indicates the positive test for anthraquinone.

#### (i) Test for Catechin

In this test, 2ml of the test solution is treated with few drops of Ehrlich reagent and concentrated HCL. The formation of pink colour indicates the presence of catechin.

#### (j) Test for Xanthoprotein

To the test solution, a few drops of conc. HNO<sub>3</sub> and few ml of NH<sub>3</sub> were added. A formation of a red precipitate indicates the presence of xanthoprotein.

#### (k) Test for Glycosides

A few ml of plant extract is added with few drops of glacial acetic acid, ferric chloride and conc H<sub>2</sub>SO<sub>4</sub>. It is then allowed to stand for the formation of a reddish brown coloration at the junction of the two layers and for a bluish green color in the upper layer indicates the presence of glycosides.

#### (l) Test for Coumarin

2ml of the test solution was added with a few drops of alcoholic NaOH and is observed for the formation of yellow colour which indicates the presence of coumarin.

#### (m) Test for Flavonoids

With a 2ml of the test solution, a few magnesium turnings and a few drops of concentrated HCL were added and is boiled for 5 minutes. Appearance of red or orange colour indicates the presence of flavonoids.

#### (n) Test for Quinone

When a few ml of test solution is treated with a few drops of conc. H<sub>2</sub>SO<sub>4</sub> or aqueous NaOH solution, there forms a color that indicates the presence of quinoid compound.

## RESULT AND DISCUSSION

**Phytochemical Analysis** The three solvent extracts such as methanol, hexane and distilled water extract are used for the phytochemical screening of *Kalanchoe pinnata*. The results clearly indicate that, phenol is present in all the three solvent extracts. Tannin and Glycosides are present in both methanol and hexane extract, Alkaloids and carbohydrates are present in both aqueous and hexane extract, Steroids and proteins were only present in methanol extract, flavonoids and terpenoids are present only in hexane extract. Catechin is present only in aqueous extract. From this result, it is clearly studied that hexane is the most effective solvent. *Kalanchoe pinnata* is endowed with large amount of secondary metabolites, alkaloids, triterpenes, glycosides, flavonoids and steroids that are the few phytochemicals. Same study was also conducted by Gai and Gupta (1972). They studied the divine herb *Kalanchoe pinnata*, and reported the active compounds, including alkaloids, triterpenes, glycosides, flavonoids, steroids and organic acids. Kamboj and Saluja (2009) also reported the presence of phytochemicals in *K. pinnata* and revealed that, this plant is a major source for lipids, alkaloids and flavonoids. Kenderson *et al.* (2021) studied the phytochemical profile of *K. pinnata* and their study revealed the presence of alkaloids, flavonoids, glycosides, phenolics, steroids/terpenes and tannin. Similar result was also opined by Pers *et al.* (2013).

**Table 1: Phytochemical screening of *Kalanchoe pinnata*.**

Sr No.	Phytochemical Name	Aqueous Extract	Methanol Extract	Hexane Extract
1.	Alkaloids	+	-	+
2.	Phenol	+	+	+
3.	Tannin	-	+	+
4.	Catechin	+	-	-
5.	Steroids	-	+	-
6.	Glycosides	-	+	+
7.	Flavonoids	-	-	+
8.	Terpenoids	-	-	+
9.	Carbohydrate	+	-	+
10.	protein	-	+	-

+ Presence; - Absence

## CONCLUSIONS

From this present study, it can be concluded that the hexane is the most effective solvent than other two extract. Also the plant possess various phytochemicals and also it possess lot of medicinal properties like anticancer, antidiabetic, etc. The study provides scientific evidence for the traditionally used medicinal plants.

## FUTURE SCOPE

*Kalanchoe pinnata* has highest medicinal properties. So this plant can be used to produce drugs for many ailments.

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