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# Analysis of the Phytochemical Content of *Jatropha gossypifolia L.*

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Abatract -

The use of plants to cure diseases is an age-old practice. The medicinal value of plants lies in chemical substances that produce physiological actions on the human body. Medicinal plants have traditionally occupied an important position in the health area of rural, urban and tribal India. The most important plant of *'Eurphorbiaceae'* family i.e. one of the largest families of angiosperm is *'Jatropha gossypifolia'*. Commonly it is known as 'bellyache bush'. It's majorly found in parts of Africa and America. Its leaves are predominantely used for antihypertensive, anti-inflammatory, antimicrobial, antianemic, antidiabetic, and antihemorrhagic. In the recent research work, the leaves of *J. gossypifolia* L. were used in various solvents such as Petroleum ether, Chloroform, Acetone, Alcohol and Water. The results confirmed the presence of saponin, tannin, flavonoid, organic acid, glycosides, diterpene, alkaloids, steroids, xanthoprotein, and starch. The overview of the study showed the presence of various secondary metabolites with medicinal value.
Key words **:** Phytochemical, Euphorbiaceae*, Jatropha gossipifolia*, Saponin, Flavonoid

## 1. INTRODUCTION

India possesses a variety of medicinal plants and it is one of the richest countries in the world in regard to genetic resources of medicinal plants. India exhibits a wide range in topography and climate, which bears varietal emporium of vegetation and floristic composition. Moreover, the agro-climatic conditions are favorable for introduction and domestication of new exotic plant varieties [2]. Since time immemorial, man has used various parts of plants in the treatment and prevention of various ailments [8]. In recent years, secondary plant metabolites (phytochemicals), previously with unknown pharmacological activities, have been extensively investigated as a source of medicinal agents [4]. Thus, it is anticipated that phytochemicals with adequate antibacterial efficacy will be used for the treatment of bacterial infections [11] in near future.

*J. gossypifolia* is used as a therapeutic agent in different ways. The leaf decoction of this is used for bathing wounds [9]. The leaf bath is used for sores, sprains, rash and bewitchment in Latin America and the Caribbean [11, 15]; the poultices are used for sores and pain in Trinidad [11].The stem sap stops bleeding and itching of cuts and scratches [10, 16]. In Southern Nigeria, the extract from fresh leaf applied with crushed leaf is routinely used by herbalists and local people to stop bleeding from the skin and nose. The young stem of the plant is used as toothbrush as well as to clean the tongue in the treatment of thrush. The tuber of the plant grinded into a paste is locally used in the treatment of hemorrhoids in Nigeria.

*Jatropha gossypifolia* Linn. Belongs to the family Eurphorbiaceae and the order, "Geraniale". A number of other species of Jatropha like *Jatropha curcas*, *Jatropha multifida*, *Jatropha podagrica* are also known. The common name for *J. gossypifolia* is bellyache bush, pignut or fignut, and in Yoruba land it is commonly known as "Lapalapa" [13]. It grows wild in different parts of India. The plant is known to possess various medicinal and pesticidal properties. It is a bushy, gregarious shrub, up to 1.8m, 3-5 lobed, approximately 20 cm long and wide, with leaves having a long petiole, covered with glandular hairs. The seed are greenish capsule-like seeds. The leaf stalks are covered with coarse dark brown hairs and the young leaves are sticky. It has thin, often greenish bark, which exudes copious amount of watery sap when cut. The fruits are three-celled with one seed per cell. *J. gossipifolia* is widely cultivated as ornamental plant. It is the common red species planted around houses. It is also planted to control the soil erosion along the slopes. It prefers arid environment. The aim of this study is to investigate the Phytochemical activity of *J. gossypifolia* leaves extracts as well as to identify the bioactive constituents of it.

## 2. MATERIALS AND METHODS

### a. Collection of plant material.

The fresh, mature healthy leaves of *Jatropha gossipifolia* Linn (Euphorbiaceae) were collected from campus of Sri Sathya Sai College for women, Bhopal (M.P.)

**b. Sample preparation**

Fully grown leaves and bark of *J. gossipifolia* were weighed (1kg). The plant samples were shade dried ground and sieved with 2mm rubber sieve to form uniform powder and stored in airtight bottles.

**c. Preparation of plant extract by solvent extraction method**

The dried plant material was pulverized into fine powder using a grinder (mixer). About 50 g of powdered material was extracted in soxhlet extraction apparatus with 250 ml of each of the following solvents; petroleum ether, chloroform, and alcohol [19]. The extracts obtained with each solvent were filtered through Whatman filter paper No. 1 and the respected solvents were evaporated (at 40ºC) with the help of heating mantle. The sticky greenish-brown substances were obtained and stored in refrigerator for futher use [5]. Some of the extracts of each solvent were used for the qualitative phytochemical screening for then identification of the various classes of active chemical constituents, using standard prescribed methods. [7, 17, 1, 6]

***d.* Phytochemical test for *Jatropha gossipifolia***

Phytochemical analysis was done by referring standard protocol [6,12,3]

**1 .Detection of alkaloids:** Extracts were dissolved individually in dilute Hydrochloric acid and filtered.

**a. Mayer's Test:** Filtrates were treated with Mayer's reagent (Potassium Mercuric Iodide). Formation of a yellow coloured precipitate indicates the presence of alkaloids.

**b.Wagner's Test:** Filtrates were treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown/reddish precipitate indicates the presence of alkaloids.

**2. Detection of carbohydrates:**

Extracts were dissolved individually in 5 ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

**a. Molisch's Test:**Filtrates were treated with 2 drops of alcoholic α-naphthol solution in a test tube. Formation of the violet ring at the junction indicates the presence of Carbohydrates.

b. **Fehling's Test:** Filtrates were hydrolysed with dil. HCl, neutralized with alkali and heated with Fehling's A & B solutions. Formation of red precipitate indicates the presence of reducing sugars.

**c. Benedict's Test:** Filtrates were treated with Benedict's reagent and heated gently. Orange red precipitate indicates the presence of reducing sugars. brown ring at the junction indicates the presence of phytosterols.

**3. Detection of phenols**

**a. Ferric Chloride Test:**

Extracts were treated with 3-4 drops of ferric chloride solution. Formation of bluish

black colour indicates the presence of phenols.

**4. Detection of tannins**

**a. Gelatin Test:** To the extract, 1% gelatin solution containing sodium chloride was added. Formation of white precipitate indicates the presence of tannins.

**5. Detection of flavonoids**

**a .Lead acetate Test:** Extracts were treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of flavonoids.

**6. Detection of proteins and aminoacids**

**a. Xanthoproteic Test:** The extracts were treated with few drops of conc. Nitric acid. Formation of yellow colour indicates the presence of proteins.

**7. Detection of diterpenes**

**a. Copper acetate Test:** Extracts were dissolved in water and treated with 3-4 drops of Copper acetate solution. Formation of emerald green colour indicates the presence of diterpenes [6, 12, 3].

**8. Detection of glycosides:**

Extracts were hydrolysed with dil. HCl, and then subjected to test for glycosides.

**a.Keller killani Test:** Extracts were treated with Ferric Chloride solution and immersed in boiling water for about 5 minutes. The mixture was cooled and extracted with equal volumes of benzene. The benzene layer was separated and treated with ammonia solution. Formation of rose-pink colour in the ammonical layer indicates the presence of anthranol glycosides.

**9. Detection of saponins**

**a.Foam Test:** 0.5 gm of extract was shaken with 2 ml of water. If foam produced persists for ten minutes it indicates the presence of saponins.

**10. Detection of phytosterols**

**a.Salkowski's Test:** Extracts were treated with chloroform and filtered. The filtrates were treated with few drops of Conc. Sulphuric acid, shaken and allowed to stand. Appearance of golden yellow colour indicates the presence of triterpenes.

## 3. RESULT & DISCUSSION

Phytochemical analysis of all the five solvent extract was done screening of the presence of various, bioactive phytochemical compounds. In methanol extract carbohydrate, alkoloids, glycosides, phenol, starch, organic acid, steroids were present. Flavonoids, protein, amino acid, diterpene, saponin, tannic acid were absent. In acetone extract alkoloids, phenol, flavanoid, organic acid, saponin, diterpene were positive. Carbohydrate glycoside, protein,

amino acid, starch, tannic acid were absent. In petroleum ether extract carbohydrate, alkaloids, phenol, flavonoid, protein, diterpene were present. Glycosides, organic acid, amino acid, starch, saponin, tannic acid steroids were absent. In chloroform extract, Phenol, protein, diterpene, flavonoid, were present. Carbohydrate, alkoloids, glycoside, organic acid, amino acid, starch, saponin, tannic acid and steroid were absent. In Aqueous extract phenol, starch, saponin were present. Carbohydrate, alkaloids, glycosides, flavanoids, protein, amino acid, diterpine, steroids and tannic acid were absent.

Table no. 1 Behaviour of the Leaf crude of *Jatropha gossipifolia* with different chemical reagent.

| S.NO. | Reagent | Colour of the powder |
|---|---|---|
| 1 | Powder as such | Dark Green |
| 2 | Powder+ 2% $Fecl_3$ | Black |
| 3 | Powder + 10% NaoH | Orange brown |
| 4 | Powder+5% KOH | Dark brown |
| 5 | Powder +Water | Dark brown |
| 6 | Powder+ Iodine | Red |
| 7 | Powder+NaOH+$H_2O$ | Brown |
| 8 | Powder+$C_2H_5OH$ | Light green |
| 9 | Powder+$HNO_3$ | Orange |
| 10 | Powder+$H_2SO_4$ | Black |

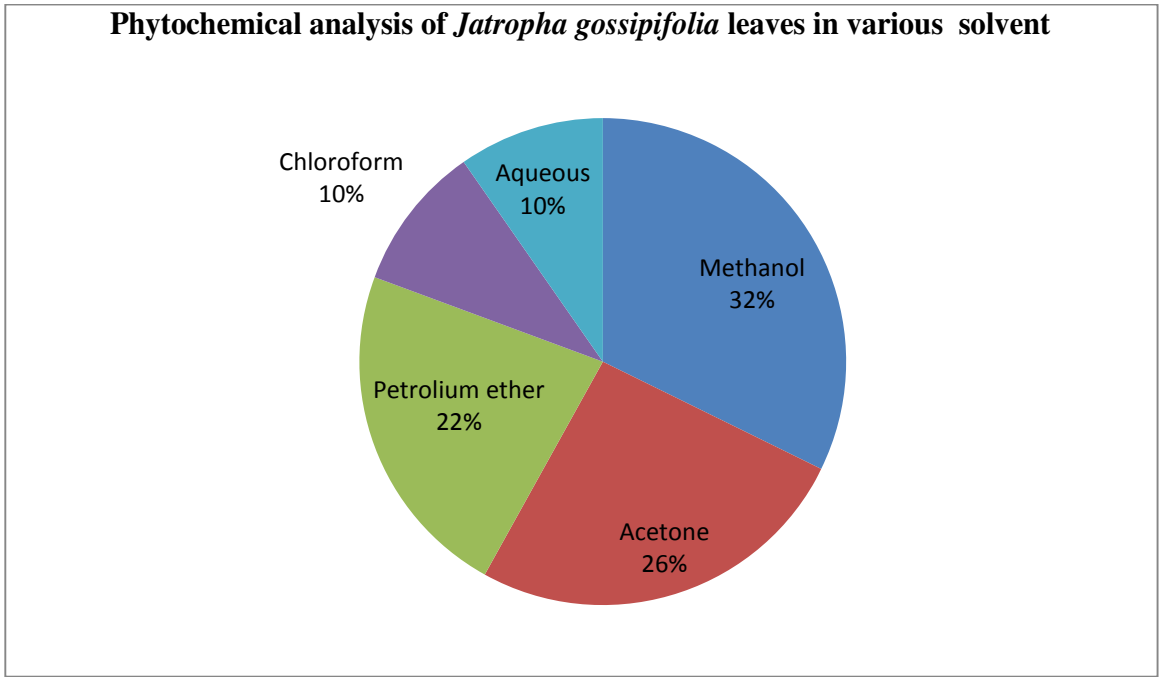
From table no 1 it was observe that when the crude leaf powder of plant were treated with different chemicals various shades of yellow, green and brown colour were obtained. Various colour changes were observed when treated with different reagents as shown in table.

**Table :- 2 Phytochemical analysis of *Jatropha gossipifolia* leaves in various solvent**

| TESTS | METHANOL | ACETONE | PET.ETHER | CHLOROFORM | AQUEOUS |
|---|---|---|---|---|---|
| 1.**Carbohydrate** | | | | | |
| a.Molish test | + | - | - | - | - |
| b.Iodine | - | - | + | - | - |
| 2.**Protein** | | | | | |
| a.Biuret test | - | - | + | + | - |
| b.Millons test | - | - | - | - | - |
| c.Xantho test | - | - | - | - | - |
| **3.Steroid** | - | + | - | - | - |
| **4.Glycisides** | | | | | |
| a.keller-kilani | - | - | - | - | - |
| b.Salkowski | + | - | - | - | - |
| **5.Tannic & phenolic** | | | | | |
| a.Acetic acid | - | - | - | - | - |
| b.5% Fecl3 | + | + | - | + | + |
| c.Lead acetate | + | + | + | + | - |
| **6.Flavonoid** | | | | | |
| a.Lead acetate | - | + | - | - | - |
| **7.Alkaloid** | | | | | |
| a.Mayer test | + | + | + | - | - |
| b.Wagner test | + | + | + | - | - |

| | | | | | |
|---|---|---|---|---|---|
| **8.Saponin** | | | | | |
| a.Foam test | + | - | - | - | + |
| **9.Amino acid** | | | | | |
| a.Cysteine | - | - | - | - | - |
| **10.Starch** | | | | | |
| a.Iodine test | + | - | - | - | + |
| **11.Organic test** | | | | | |
| a.Oxalic acid | - | + | - | - | - |
| **12.Diterpene** | | | | | |
| a.Copper acetate | + | - | - | - | - |




Solvent methanol showed the maximum extraction of phytochemical compound.

The presences of alkaloids, flavonoids, saponins and tannins in *J. gossypifolia* were reported by earlier workers also.[21, 16] the role of these phytochemicals in analgesic activity by various mechanisms have also been reported by other researchers. [2, 24] Flavonoids were reported to have a role in analgesic activity primarily by targeting prostaglandins.[24] Findings in this study justify the use of *J. gossypifolia* as an analgesic in traditional medicine [7] and hence further detailed investigations are needed to determine the actual mechanism by which the plant shows its non-narcotic analgesic activity. Flavonoids present in the plant extract are reported to inhibit release of autacoids and prostaglandins, thereby inhibit motility and secretion induced by castor oil [8]. Tannins can evoke an anti-diarrheal effect since these substances may precipitate proteins of the enterocytes; reduce peristaltic movement and intestinal secretions [21] and hence the anti-diarrheal property of the extract found in the present study could be useful owing to the presence of these phytochemicals in the plant.

## 4. CONCLUSION

Results provide the information that leaves of *J. gossipifolia* have a large number of chemical constituents, which can be responsible for various pharmacological activities. Much more work is required in future to test the extracts of leaves of *J. gossypifolia* for a number of pharmacological activities before its commercilisation for the profits of human and economic world.

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