

## Phytochemical Screening, In-Vitro Antioxidant and Anti-Inflammatory Activity of Ethanolic Extract of *Jatropha Gossypifolia* Fruit

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### Abstract

There are two subgenera under the genus *Jatropha*: *Jatropha* and *Curcas*. Of these, *Jatropha* is the most widely dispersed, with species found in Africa, India, South America, the West Indies, Central America, and the Caribbean. The *Jatropha Gossypifolia* fruit's crude extract, known as JGET, was made using a Soxhlet device with ethanol as a solvent. The crude extract JGET underwent phytochemical screening. Phytochemical screening revealed that the crude extract JGET contained phytochemicals such as flavonoids, tannins, phenols, saponin, carbohydrates, and steroids. The DPPH and FRAP assay methods were used to measure the antioxidant activity. Vitamin C serves as the standard in the DPPH Assay technique. When compared to regular vitamin C, the crude extract JGET exhibited notable antioxidant activity. Vitamin C was used as the standard in the FRAP Assay. By raising the concentrations of the standard vitamin C and the sample JGET, the absorbance value was raised. When compared to vitamin C, the crude extract JGET exhibited notable antioxidant activity in the FRAP Assay. Diclofenac sodium was used as the standard in the protein denaturation method used to measure the anti-inflammatory activity. When compared to the conventional Diclofenac sodium, the crude extract JGET shown good anti-inflammatory action.

**Keywords:** DPPH Assay, FRAP assay, Egg albumin denaturation method, Soxhlet apparatus.

### I. Introduction

Its traditional therapeutic uses are reflected in the name *Jatropha*, which comes from the Greek words *jatros* (doctor) and *trophe* (food) [1]. *Jatropha* and *Curcas* are the two subgenera that make up the genus *Jatropha*. With species found throughout Africa, India, South America, the West Indies, Central America, and the Caribbean, the

subgenus *Jatropha* has the widest range among these [2]. *Jatropha gossypifolia* is widely used in traditional medicine to treat a variety of illnesses. The plant's leaves, stems, roots, seeds, and latex are prepared in a variety of ways (fresh juice, infusions, decoctions, macerations, etc.) and used topically or orally. It has long been used as an antihypertensive, anti-inflammatory, analgesic, hemostatic, and anti-diabetic medication [3]. Studies have shown that *J. gossypifolia* has comparatively low toxicity in some in vitro and in vivo trials, despite the fact that *Jatropha* species are normally known for their toxicity. In particular, acute oral administration of ethanolic leaf extracts to rats was determined to be safe; nevertheless, long-term use may have harmful effects [4]. This review offers a thorough and current description of the traditional uses, phytochemical composition, pharmacological actions, and toxicity profile of several portions of *J. gossypifolia* in light of the plant's potential uses. These observations are meant to assist current and upcoming studies, especially in confirming its ethnopharmacological significance and investigating its potential as a source of herbal remedies and/or bioactive natural compounds. This species' importance in pharmacology, medicine, and biotechnology is also covered. The tropical garden plant *Jatropha gossypifolia* (JG) (Euphorbiaceae) has long been used in traditional medicine. Traditional healing methods have their roots in the use of plants as a vital source for illness prevention and treatment since ancient times. Among them, *Jatropha gossypifolia* is used to treat fever, pain, and diarrhea in Chinese, Ayurvedic, and Thai medicine [5]. When the body's capacity to eliminate free radicals is exhausted, the condition known as oxidative stress results. Increased oxidation processes in cells may result from this state, which may be linked to an obviously diseased situation. Oxidative stress situations can lead to a number of diseases, including diabetes, cancer, heart disease,

ischemia, and aging. When the body is unable to neutralize the quantity of free radicals present, the ailment manifests. Antioxidants can scavenge or resist the harmful effects of free radicals in the body. Many plants are rich in nitrogen compounds (alkaloids, chlorophyll derivatives, amino acids, amines), derivatives of cinnamic acid, ascorbic acid, and carotenoids, as well as phenolic compounds (flavonoids, phenolic acids, tocopherols). The plant *Jatropha* sp. is a member of the Euphorbiaceae family. It contains secondary metabolites such as alkaloids, tannins, flavonoids, steroids, saponins, and phenolic compounds. If it contains metabolites of anthocyanins, carotenoids, and phenolic compounds, it has antioxidant potential. Thus, according to the metabolites [6]. The use of antioxidants in pharmacology is heavily researched, especially as therapies for stroke and neurological illnesses, since oxidative stress may play a significant role in many human diseases. Nevertheless, it's unclear if oxidative stress causes or results from illness. In an effort to preserve health and fend against illnesses like cancer and coronary heart disease, antioxidants are also frequently employed as components in dietary supplements. While some research has indicated that antioxidant supplements are beneficial for health, other extensive clinical trials found no effect for the studied formulations, and taking too many supplements could be detrimental. Antioxidants have numerous industrial applications in addition to these medical ones, such as preservatives in food and cosmetics and stopping the deterioration of rubber and fuel [7]. Redness, heat, swelling, discomfort, and loss of function are all signs of inflammation, which is the body's essential defensive reaction to damage, infection, or damaging stimuli. Excessive or persistent inflammation can cause tissue damage and the emergence of chronic diseases like arthritis, asthma, cardiovascular issues, and autoimmune ailments, even though it is essential for healing and defense. Substances that lessen or prevent the inflammatory response are known as anti-inflammatory agents. They work by obstructing particular chemical mediators that cause inflammation, such as prostaglandins, cytokines, and leukotrienes. These substances include naturally occurring substances like curcumin, omega-3 fatty acids, and flavonoids, as well as non-steroidal anti-inflammatory medications (NSAIDs), corticosteroids, and biological agents. The treatment of pain, swelling, and other symptoms related to both acute and chronic inflammatory diseases requires the use of

anti-inflammatory medications. They aid in preventing long-term tissue and organ damage in addition to enhancing patient comfort and quality of life [8]. Vascular tissues' intricate biochemical reaction to hostile substances like infections, irritants, or damaged cells is called inflammation. It can be categorized as either acute or chronic and entails a series of biochemical processes involving the immune system, the local vascular system, and several cell types present in the damaged tissue [9]. *Jatropha gossypifolia* L. [Euphorbiaceae], commonly referred to as "bellyache bush," is a medicinal plant that is native to Mexico, South America, India, and many West African nations, including Nigeria. The many parts of this plant are used in tropical folklore to treat a variety of illnesses. Some of its folklore benefits have been supported by pharmacological investigations that have shown the considerable action of various extracts and isolated compounds as hemostatic, anticholinesterase, antibacterial, anti-inflammatory, antidiarrheal, antihypertensive, and antiproliferative agents, among others. Alkaloids, coumarin-lignans, and terpenes—essential oils—are the main secondary metabolites found in a variety of extracts [10]. Due to the numerous biological activities associated with its various parts, including its leaves, roots, and latex, *Jatropha gossypifolia* L. (Euphorbiaceae), commonly known as bellyache bush or black physic nut, is extensively utilized in local and traditional medicine [11]. The genus *Jatropha* (Euphorbiaceae) is thought to be a promising source of biodiesel, and several of its members are known for their therapeutic qualities. *J. curcas*, *J. gossypifolia*, *J. glandulifera*, *J. multifida*, and *J. podagrica* are some of the species that have been investigated thus far. There is still little scientific research on the therapeutic potential of *Jatropha* species, despite their widespread occurrence [12]. The antioxidant and antibacterial properties of the essential oils (EOs) derived from the leaves and stem of *Jatropha gossypifolia* were investigated in vitro, along with their efficacy against illnesses associated with oxidative stress and infection [13]. Northern Australia's agricultural and natural habitats are seriously threatened by the invasive shrub known as bellyache bush (*Jatropha gossypifolia* L.) [14]. This species, which is indigenous to Central and South America, is a member of the Euphorbiaceae family and is used as a decorative and therapeutic plant [15]. The milky shrub *Jatropha gossypifolia* L. (Euphorbiaceae), sometimes known as cotton-leaf physicnut, is well known for its therapeutic uses [16]. Bellyache bush,

or *Jatropha gossypifolia* (Euphorbiaceae), is a native of Brazil that is now grown in tropical locations all over the world. Throughout West Africa, traditional medicine makes considerable use of the plant's roots, stems, leaves, seeds, and fruits. The young stem is used to treat thrush and acts as a natural toothbrush and tongue cleaning. Furthermore, the tuber is traditionally used to treat hemorrhoids when mashed into a paste [17]. There is a long history of using plants to treat illnesses. The chemical substances that have physiological impacts on the human body are what give them their therapeutic worth. Medicinal plants have long been an important part of India's rural, urban, and tribal healthcare systems. One of the most significant of them is *Jatropha gossypifolia*, which belongs to the Euphorbiaceae family, one of the biggest families of angiosperms. Often called the "bellyache bush," this plant is mostly found in portions of America and Africa. The antihypertensive, anti-inflammatory, antibacterial, antianemic, antidiabetic, and antihemorrhagic qualities of its leaves are well known [18]. Numerous studies have demonstrated the plant's biological and therapeutic qualities.[19]. *Jatropha gossypifolia* L. (Euphorbiaceae) is also referred to by several names in various parts of the world, including black physic-nut and belly ache bush. However, it is frequently referred to as the "ratanjot" or "lal-bherenda" plant in India. In addition to 36 other nations, including India, it is primarily found in America and Africa [20]. The phytochemical screening, in vitro antioxidant activity, and anti-inflammatory properties of the ethanol extract of *Jatropha Gossypifolia* fruit (JGET) are the main topics of this study.

## II. Methodology

### Collection and identification of *Jatropha gossypifolia* :

The fruit portion of *Jatropha gossypifolia* was gathered from the Tenkasi region of Tamilnadu, India's Kadayanallur. The Sri Parasakthi College of Women in Outrallam, Tenkasi district, Tamilnadu, was used to create taxonomic differentiating evidence. The *Jatropha gossypifolia* plant's fruits were dried in the shade, separated, and crushed by a mechanical processor before passing through a 40 lattice sifter. The materials used to make fruit powder were stored in a hermetically sealed container. Figure 1 showed the *Jatropha gossypifolia* plant.

### Extraction

A Soxhlet extraction thimble was filled

with fifty grams of precisely weighed powdered *Jatropha gossypifolia* fruits that had been shade-dried for fifteen days. After assembling the Soxhlet apparatus, the round-bottom flask was filled with 300 mL of ethanol. Heating the apparatus to permit constant solvent reflux for six to eight hours—or until the solvent in the siphon tube turned colorless, signifying exhaustive extraction—was how the extraction was completed. The ethanol extract was carefully collected for additional processing or analysis when the device was finished and allowed to cool.

### Determination of Percentage Yield

The following formula was used to determine the ethanolic extract's percentage yield: % yield = weight in grams of extracts / weight in grams of plant material X 100. JGET is the name given to the ethanolic crude extract of *Jatropha gossypifolia* fruits. The yield of crude extract was determined to be 6.5 grams. 13% w/w was determined to be the yield percentage.

### Preparation of Extract Stock Solution:

Sufficient amount of the dried ethanolic extract was dissolved in ethanol to produce a stock solution with a concentration of 1 mg/mL. Antioxidant tests and phytochemical screening were conducted using this solution.

### Phytochemical Studies

The method used to identify different chemicals present in plant extracts is called phytochemical screening. Many chemical components found in plants can cause various physiological reactions and have medicinal benefits. As a result, it is common practice to assess plants for the presence of phytochemicals that are both physiologically active and important for medicine. components in charge of a specific biological action. Alkaloids, steroids, sugars, saponins, tannins, flavonoids, and more are examples of phytoconstituents.

### Alkaloid Testing

#### i. Mayer's Test:

0.2 mL of diluted hydrochloric acid and 1 mL of Mayer's reagent were added to a 2 mL test tube. The presence of alkaloids was verified by the production of a yellow precipitate.

#### ii. Dragendorff's Test:

In a test tube, 2 mL of the extract solution and 0.2 mL of diluted hydrochloric acid were combined. Alkaloids were detected by the formation of an orange-brown precipitate following the addition of 1 mL of Dragendorff's reagent.

#### Glycoside Testing

The existence of glycosides was confirmed by combining 5 mL of the extract with glacial acetic acid, a few drops of ferric chloride, and concentrated sulfuric acid. This mixture produced a bluish-green color in the upper layer and a reddish-brown color at the interface of the two layers.

#### Flavonoid Testing

##### *i. Alkaline Reagent Test:*

The extract was mixed with a few drops of sodium hydroxide solution. The presence of flavonoids was detected by the development of a bright yellow color that faded when mild hydrochloric acid was added.

##### *ii. Lead Acetate Test:*

The presence of flavonoids was verified by the production of a yellowish-blue precipitate when sodium hydroxide solution was added to the extract.

#### Saponin Testing

##### *i. Froth Test:*

In a graduated cylinder, the extract was diluted with 20 milliliters of deionized water and stirred for 15 minutes. The presence of saponins was verified by the development of a 1 cm thick layer of "honeycomb" foam.

#### Steroid Testing:

A test tube containing 10 mL of chloroform and 1 milligram of crude extracts was filled with concentrated sulfuric acid. Both the sulfuric acid layer and the top layer displayed red fluorescence.

#### Test for Tannins:

##### *i. Ferric chloride test:*

Water was used to dilute the extract. Following filtering, a 10% ferric chloride solution was mixed with the clear filtrate. There was a shift to a more blue-black color palette.

##### *ii. Lead acetate test:*

The concentration was diluted with water and a 10% lead acetate solution. The appearance of a yellow precipitate indicates the presence of tannins.

#### Phytochemical analysis

The ethanol extract from *Jatropha gossypifolia* (JGET) fruits contains flavonoids, phenols, carbohydrates, saponins, steroids, and tannins, according to preliminary phytochemical study.

#### Antioxidant Activity Assay:

Antioxidant assays are techniques used to evaluate a compound's capacity to mitigate the effects of free radicals and reactive oxygen species (ROS), which can harm cells and cause a variety of diseases. These tests are essential for assessing the possible health advantages of diets, nutraceuticals, and extracts from natural products.

#### DPPH (2,2-Diphenyl-1-Picryl-Hydrazyl-Hydrate) Assay:

The DPPH test is a commonly used technique to evaluate the effectiveness of antioxidants. In this process, a plant extract is mixed with DPPH, a stable free radical, and the color shift that results is observed. Stronger antioxidant capabilities are indicated by a more noticeable color shift. The DPPH solution, which initially has a violet or purple hue, turns yellow if antioxidants are present in the crude extract.

#### Procedure:

Two milligrams of DPPH reagent were combined with one hundred milliliters of methanol to create a 20 µg/ml DPPH solution. It was kept in a dry, dark, and cool environment. Three test tubes containing 500 µl of JGET at concentrations of 50 mg/ml, 100 mg/ml, and 150 mg/ml each were filled with 500 µl of the DPPH solution. Two milliliters of methanol were then added to each test tube. At 520 nm, the absorbance was measured. This measurement was carried out three times. Similarly, 500 µl of the DPPH solution was added to each of the three test tubes that held 500 µl of vitamin C at concentrations of 50 mg/ml, 100 mg/ml, and 150 mg/ml. Two milliliters of methanol were then added to each test tube. At 520 nm, the absorbance was measured. This measurement was carried out three times. The JGET and vitamin C IC<sub>50</sub> values were determined. Table 2 contained the absorbance and IC<sub>50</sub> values for JGET and vitamin C. The % Inhibition was calculated by using the following formula. % Inhibition =  $\frac{\text{O.D of Control} - \text{OD of Test or Std}}{\text{O.D of Control}} \times 100$

### FRAP (Ferric Reducing Antioxidant Power) Assay

The FRAP assay is used to assess antioxidants' capacity to change ferric ions into ferrous ions. By measuring the reduction potential, this technique makes it possible to estimate the antioxidant capacity of a sample. An increase in reduction potential is a sign of increased antioxidant efficacy.

#### Method:

In separate test tubes, 1 ml of JGET and vitamin C were ingested at concentrations of 50 mg/ml, 100 mg/ml, and 150 mg/ml using ethanol as a solvent. 2.5 ml of phosphate buffer (0.2 M, pH 6.6) was added to each tube. The contents of each tube were mixed together. In this manner, each test tube contained 2.5 ml of a 1% potassium ferricyanide. A vortex shaker was used to dynamically disturb each response blend. The test tubes were allowed to hatch for around 20 minutes at 50 °C. Following hatching, each test tube received 2.5 ml of 10% trichloroacetic acid (TCA). For ten minutes, the test tubes were centrifuged at 3,000 rpm. 2.5 milliliters of the supernatant from the subsequent centrifugation tests were transferred into the new different test tubes. 0.5 ml of Ferric chloride ( $\text{FeCl}_3$ ) was introduced in to all those new test tubes. This resulted in a somewhat blue colour. As a result absorbance was measured at 700 nm. The positive control was ascorbic acid, while the negative control was distilled water. The tests were conducted three times. Table 2 contained the absorbance values for JGET and ascorbic acid at concentrations of 50 mg/ml, 100 mg/ml, and 150 mg/ml. An increased antioxidant capacity is shown by a greater absorbance value.

#### Anti- Inflammartory Assays :

The ability of substances or extracts to lessen inflammation is assessed using anti-inflammatory tests.

#### Principle of In vitro Egg Albumin Denaturation Method:

Finding out whether specific operators or chemicals may prevent or slow down the process of egg whites becoming denatured under specific conditions is the main goal of the denaturation measure. Denaturation refers to the structural change that causes a protein's natural function to be negatively impacted. Egg whites are used as a test protein in this experiment, and denaturation occurs

when it is exposed to extreme heat, shifting pH levels, or other denaturing agents. Egg whites' original shape is altered during denaturation, which affects their physical characteristics and results in a disaster for their useful mobility. The test evaluates a medication's or compound's ability to prevent or reduce egg white denaturation, which is important for determining its anti-inflammatory effects. The basic tenet of the egg white denaturation test is that anti-inflammatory compounds may balance out protein structures and predict denaturation, a process frequently associated with discomfort and tissue damage. Therefore, substances or operators that completely reduce the denaturation of egg whites in this test may have anti-inflammatory effects. It is acknowledged that one of the factors causing discomfort is protein denaturation. NSAIDs, or non-steroidal anti-inflammatory medicines, not only prevent protein denaturation but also inhibit the COX enzyme. Various test concentrations can be mixed with egg whites in a controlled exploration setting, allowing the responses to happen at some point. The absorbance can then be measured to determine the rate of restraint.

#### Inhibition of Albumin Denaturation Procedure:

A test tube containing 100µl of the sample (JGET) at a concentration of 100 mg/ml, 5.6 ml of phosphate-buffered saline (PBS, pH 6.4), and 0.4 ml of egg albumin (from a fresh hen's egg) made up the reaction mixture (10 ml). As a control, the same amount of double-distilled water is used. After 15 minutes of incubation at (37°C + 2), the mixtures were heated to 70°C for five minutes. Their optical density was measured at 660 nm using solvent as a blank after cooling. For the purpose of determining absorbance, diclofenac sodium at a concentration of 100 mg/ml was utilized as a reference medication and handled identically. The experiments were conducted three times. Table 4 displays the percentage inhibition of protein denaturation that was determined using the following formula. % Inhibition = Control OD – Test or Standard OD / Control OD X 100

### III. Result and Discussion

The goal of this study was to assess the ethanolic fruit extract of *Jatropha gossypifolia*'s anti-inflammatory and antioxidant properties in vitro. Flavonoids, phenolic chemicals, tannins, alkaloids, and glycosides—all of which are known to have anti-inflammatory and antioxidant qualities—were found in the ethanolic fruit extract after preliminary phytochemical screening. Standard

in vitro techniques including the Ferric Reducing Antioxidant Power assay and the DPPH radical scavenging assay were used to assess the antioxidant activity. Vitamin C serves as the standard in the DPPH Assay. JGET and vitamin C were found to have IC<sub>50</sub> values of 95.85 µg/ml and 88.41 µg/ml, respectively. According to the DPPH Assay, JGET exhibited strong antioxidant activity. By increasing the concentration of the sample JGET and standard Vitamin C in the FRAP Assay, the absorbance value increased. The FRAP Assay revealed that JGET had a significantly higher Ferric Reducing Power than Vitamin C. Strong antioxidant potential was indicated by the extract's notable free radical scavenging activity. The presence of phenolic and flavonoid molecules may be responsible for this effect. The protein denaturation method was used to measure the anti-inflammatory activity. The standard was Diclofenac sodium. The average % inhibitions for JGET and diclofenac sodium were 41.37 and 73.57, respectively. The JGET extract showed a strong anti-inflammatory impact when compared to the traditional Diclofenac sodium.

#### IV. Conclusion

Ethanol was used as a solvent in a soxhlet apparatus to create JGET, the crude extract of *Jatropha Gossypifolia* fruit. Phytochemical screening was used to the crude extract JGET. The phytochemical screening revealed that flavonoids, tannins, phenols, saponin, polysaccharides, and steroids were among the phytochemicals included in the crude extract JGET. The antioxidant activity was measured using the DPPH and FRAP test techniques. The DPPH Assay method uses vitamin C as the reference. The crude extract JGET showed significant antioxidant activity when compared to standard vitamin C. In the FRAP Assay, vitamin C served as the standard. The absorbance value was increased by increasing the concentrations of the sample JGET and the standard vitamin C. In the FRAP Assay, the crude extract JGET showed significant antioxidant activity when compared to vitamin C. The anti-inflammatory activity was measured using the protein denaturation method using diclofenac sodium as the reference. The crude extract JGET shown strong anti-inflammatory effects when compared to the traditional Diclofenac sodium.

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#### Conflict of Interest:

The author has not disclosed any conflicts of interest. The author is solely responsible for the writing and content of this article.

#### References

- [1]. Sabandar CW, Ahmat N, Jaafar FM, Sahidin I, Medicinal property, phytochemistry and pharmacology of several *Jatropha* species (Euphorbiaceae): a review, *Phytochemistry*, 2013 Jan 1;85:7-29.
- [2]. Crislaine Kieva Abreu LEAL and Maria de Fátima AGRA, Estudo Farmacobotanico Comparativo das folhas de *Jatropha molissima* (Pohl) Baill e *Jatropha ribifolia* (Pohl) Baill (Euphorbiaceae), *Acta Farm. Bonaerense*, 2005;24(1):5-13.
- [3]. Felix-Silva J, Giordani RB, Silva-Jr AA, Zucolotto SM, Fernandes-Pedrosa MD, *Jatropha gossypifolia* L.(Euphorbiaceae): a review of traditional uses, phytochemistry, pharmacology, and toxicology of this medicinal plant, *Evidence-Based Complementary and Alternative Medicine*, 2014(1):369204.
- [4]. Mariz SR, Cerqueira GS, Araújo WC, Dantas JG, Ramalho JA, Palomaro TV, Duarte JC, Santos HB, Olveira K, Araújo MS, Diniz MD, Chronic toxicologic study of the ethanolic extract of the aerial parts of *Jatropha gossypifolia* in rats, *Revista Brasileira de Farmacognosia*, 2012 Jun;22(3):663-8.
- [5]. Jain S, Choudhary GP, Jain DK, Pharmacological evaluation and antifertility activity of *Jatropha gossypifolia* in rats, *BioMed research international*, 2013;2013(1):125980.
- [6]. Rofida S, Antioxidant activity of *Jatropha curcas* and *Jatropha gossypifolia* by DPPH method, *Farmasains*, 2015;2(6):281-4.
- [7]. Becker P, Maurer B, Schirmacher P, Waldherr R, Parlesak A, Bode C, Seitz HK. Vitamin A-induced cholestatic hepatitis: a case report. *Zeitschrift für Gastroenterologie*. 2007 Oct; 45(10):1063-6.

- [8]. Nathan C, Points of control in inflammation, Nature, 2002 Dec 19;420(6917):846-52.
- [9]. Ferrero-Miliani L, Nielsen OH, Andersen PS, Girardin S. Chronic inflammation: importance of NOD2 and NALP3 in interleukin-1 $\beta$  generation, Clinical & Experimental Immunology, 2007 Feb;147(2):227-35.
- [10]. Fatokun O, Liberty O, Esievo K, Okhale S, Kunle O, Phytochemistry, ethnomedicine and pharmacology of *Jatropha gossypifolia* L : a review, Arch Curr Res Int. 2016 Jan 10;5:1-21.
- [11]. Wu Q, Patocka J, Nepovimova E, Kuca K. *Jatropha gossypifolia* L. and its biologically active metabolites: A mini review. Journal of ethnopharmacology. 2019 Apr 24;234:197-203.
- [12]. Sharma SK, Singh H. A review on pharmacological significance of genus *Jatropha* (Euphorbiaceae). Chinese Journal of Integrative Medicine. 2012 Nov;18(11):868-80.
- [13]. Okoh SO, Iweriebor BC, Okoh OO, Nwodo UU, Okoh AI. Antibacterial and antioxidant properties of the leaves and stem essential oils of *Jatropha gossypifolia* L. BioMed research international. 2016;2016(1):9392716.
- [14]. Bebawi FF, Campbell SD, Mayer RJ. Persistence of bellyache bush (*Jatropha gossypifolia* L.) soil seed banks. The Rangeland Journal. 2012 Dec 17;34(4):429-38.
- [15]. Dubey R, Rajhans S, Mankad AU. Preliminary phytochemical screening, quantitative estimation of total phenolic and flavonoid content of *Jatropha gossypifolia* (L.). Research Journal of Pharmacognosy and Phytochemistry. 2020;12(2):83-6.
- [16]. de Almeida PM, de Sousa Araújo S, Marin-Morales MA, Benko-Iseppon AM, Brasileiro Vidal AC. Genotoxic potential of the latex from cotton-leaf physicnut (*Jatropha gossypifolia* L.). Genetics and Molecular Biology. 2015;38(01):93-100.
- [17]. Rasheed SK, Kunapareddy S, Karthikeyan R. Local anesthetic activity of *Jatropha gossypifolia* L. on frogs. Biomedical and Pharmacology Journal. 2015 Apr 26;5(2):395-7.
- [18]. Saini V, Mishra R, Mandloi S, Yadav N. Analysis of the phytochemical content of *Jatropha gossypifolia* L. Chem Eng Process. 2015;35:99-104.
- [19]. Ashrafuzzaman, Zannatul Naim, Mustahsan Billah, Masud Rana SM, Biomedical and medicinal properties of *Jatropha gossypifolia* plants: a short review, MOJ Bioequiv Availab, 2019;6(1):7-8.
- [20]. Shelke Karan Balaji , Khajekar Vikas Ramesh,Rathod Ajit Madhukar, Bankar A.S, Dr.Kolhe S.D, Pharmacognostic and Phytochemical Investigation of *Jatropha* L. (Euphorbiaceae), International Journal of Scientific Development and Research, February 2023, Volume 8 Issue 2, 645-648.

**Table 1: Phytochemical Studies - JG ET [- absence; + presence]**

S.NO	Phytochemical Test	Extraction Solvent - Ethanol
1	Alkaloids	-
2	Flavonoids	+
3	Tannins	+
4	Phenols	+
5	Protein	-
6	Saponin	+
7	Carbohydrates	+
8	Steroids	+
9	Terpenoids	-

**Table 2: In-Vitro Antioxidant activity by DPPH Assay**

Sample Name	Conc. (mg/ml)	OD of Control	OD of Standard	% Inhibition (I)	Average (%I)	IC <sub>50</sub> (mg/ml)
	50	0.28	0.03	89	89	
		0.28	0.03	89		
		0.28	0.03	89		
	100	0.28	0.04	85	87.3	

<b>JGET</b>		0.28	0.04	85		<b>95.85</b>
		0.28	0.02	92		
	<b>150</b>	0.28	0.03	89	<b>86.3</b>	
		0.28	0.04	85		
<b>Vitamin C</b>	<b>50</b>	0.28	0.02	92	<b>92</b>	
		0.28	0.02	92		
		0.28	0.02	92		
	<b>100</b>	0.28	0.04	85	<b>87.3</b>	
		0.28	0.02	92		
		0.28	0.04	85		
	<b>150</b>	0.28	0.04	85	<b>86.3</b>	
		0.28	0.04	85		
		0.28	0.03	89		

**Table 3: In-Vitro antioxidant activity by FRAP Assay**

Sample Name	Conc. (mg/ml)	OD	Average OD
<b>JGET</b>	<b>50</b>	1.45	<b>1.45</b>
		1.63	
		1.53	
	<b>100</b>	1.53	<b>1.57</b>
		1.57	
		1.62	
<b>150</b>	1.57	<b>1.58</b>	
	1.60		
	1.59		
<b>Vitamin C</b>	<b>50</b>	0.75	<b>0.77</b>
		0.79	
		0.78	
	<b>100</b>	0.82	<b>0.81</b>
		0.86	
		0.77	
	<b>150</b>	1.22	<b>1.23</b>
		1.25	
		1.23	

**Table 4: In-Vitro Anti-inflammatory activity by protein denaturation method**

Sample Name	Concentration (mg/ml)	O.D	% Inhibition	Average (% I)
<b>Control</b>	-	0.29	-	-
<b>JGET</b>	100	0.16	44.8	<b>41.37</b>
	100	0.18	37.9	
	100	0.17	41.4	
<b>Diclofenac sodium</b>	100	0.08	72.4	<b>73.57</b>
	100	0.07	75.9	
	100	0.08	72.4	



**Fig 1 : *Jatropha Gossypifolia* Plant**