



# REVIEW ON: BUTTERFLY PEA PLANT (*Clitoria ternatea* L)

Mr. Saurabh Balasaheb Sakore<sup>1</sup>, Mr. Vishal S. Madankar<sup>1</sup>, Mr. Anil B. Panchal<sup>2</sup>

1. Research Scholar, Department of Quality Assurance, Delight College of Pharmacy, Koregaon Bhima, Pune, Maharashtra, India-412216.

1. Assistant Professor, Department of Quality Assurance, Delight College of Pharmacy, Koregaon Bhima, Pune, Maharashtra, India-412216.

2. Assistant Professor, Department of Pharmaceutics, Delight College of Pharmacy, Koregaon Bhima, Pune, Maharashtra, India-412216.

Address for correspondence

Mr. Vishal S. Madankar, Assistant Professor, Department of Quality Assurance, Delight College of Pharmacy, Koregaon Bhima, Pune, Maharashtra, India-412216

## Abstract

The Butterfly Pea plant (*Clitoria ternatea*) is a traditional medicinal herb widely used in Ayurvedic and folk medicine. It possesses various pharmacological properties, including antioxidant, anti-aging, antimicrobial, anti-inflammatory, and neuroprotective effects. The plant is rich in bioactive compounds such as flavonoids, anthocyanins, and phenolic acids, which contribute to its therapeutic potential. This review summarizes its botanical characteristics, phytochemical profile, pharmacological activities, and potential applications in modern medicine and cosmetics.

## Keyword

Anthocyanins, Kaempferol, Quercetin, Saponins, Terpenoids, and fatty acids.

## Introduction

The Fabaceae family includes the butterfly pea, or *Clitoria ternatea* L. It is extensively cultivated in other tropical regions, including Southeast Asia. The oldest and best-known medical system is Ayurveda. Indian medicine, which has been practiced for centuries [1]. This method uses therapeutic herbs to treat a variety of illnesses and could even be used to make medications. Medhya medications are a kind of The Ayurvedic medical system uses herbal medicine to improve cognitive function [2]. Butterfly pea is one of the medicinal plants that contain natural antioxidants that could be used in the future. Recently, the plant has gained scientific attention [3]. It has long been used in Ayurveda for skin health, stress reduction, and memory enhancement. It is a variant blue blooms contain bioactive compounds this are protection against oxidative stress and aging and degenerative diseases [4].



Figure 1: Butter fly pea plant flower

## Classification of *Clitoria ternatea* species Kingdom Plantae

Division: Magnoliophyta

Class: Magnoliosida

Subclass: Rosids

Order: Fabales

Family: abaceae

Subfamily: Papilionoideae

Genus: *Clitoria*

Species: *Ternatea* (Linnaeus)

## Morphology

**Plant Type:** It's a vine that climbs or spreads out on the ground. It can grow into a woody plant as it gets older[5]

**Leaves:** Leaves are compound, which means each leaf is made of several smaller leaflets.

There are usually 5 to 7 leaflets on each leaf. The leaflets are oval-shaped with a smooth edge.

**Flowers:** The most striking feature is the bright blue, pea-shaped flowers, though some varieties have white flowers. The flowers bloom on their own or in pairs. Each flower has five petals, with one very large petal at the top, called the "banner". The petals are not all the same size and shape. In the center of the blue flower, there is often a patch of lighter yellow or white.

**Fruits and Seeds:** The fruit is a flat, long pod. These pods are typically 5–11 cm long and contain 6–10 seeds. The pods can burst open to scatter the seeds when they are ripe[6].

**Roots:** The plant has a deep and strong root system. Like other peas, its roots form special lumps called nodules. These nodules have helpful bacteria that take nitrogen from the air and put it into the soil, which helps the plant grow[7].

## Pharmacological Activity and Applications of Butterfly Pea in Anti-Aging and Antioxidant Therapy

The Butterfly Pea plant (*Clitoria ternatea*) has gained much attention in recent years because of its strong antioxidant and anti-aging properties. The plant is rich in natural compounds such as flavonoids, anthocyanins, and polyphenols, which help protect the body from damage caused by free radicals[8]. These antioxidants reduce oxidative stress, one of the main reasons for skin aging, wrinkles, and cell damage. Regular use of Butterfly Pea extracts in creams, serums, and oral supplements can improve skin elasticity and slow down the signs of aging[9]. Studies have also shown that the plant helps improve blood circulation and collagen formation, promoting healthy and youthful skin. In traditional medicine, Butterfly Pea is used for its cooling, rejuvenating, and healing effects[10]. Because of its natural origin and safety, it is now widely studied as a potential ingredient in anti-aging formulations and natural antioxidant therapies[11].

**Table 1: Parts, Chemical Constituents and Uses of Butterfly Pea Plants.**

| Sr No. | Parts of plants | Chemical constituent       | Pharmacological Uses             |
|--------|-----------------|----------------------------|----------------------------------|
| 1.     | Flower          | Anthocyanins, Quercetin    | Anti-aging , Anti-stress         |
| 2.     | Leaves          | Kaempferol ,Quercetin      | Anti-pyretic , Anti-diabetic     |
| 3.     | Roots           | Taraxerone, Stigmasterol   | Anti-helminthic, Anti-asthmatic  |
| 4.     | Seeds           | Palmetic acid, Gallic acid | Laxative, purifying agent        |
| 5.     | Stem            | Kaempferol                 | Anti-inflammatory , Anti-oxidant |

## Extraction of Butterfly Pea Flower

### Water Extract of *Clitoria ternatea* L. (WEC)

Fresh BPF are cleaned completely and then dried for 12 hours at 40°C. The distilled water is then mixed with the flowers after they have been chopped and smoothed. After filtering them via double-sided filter paper, they are put in an ultrasonic for fifteen minutes, pausing every five minutes to avoid overheating. A rotary evaporator was used to compress the extract, and a freeze-dryer was used to dry it.[12]

### Ethanol Extract of *Clitoria ternatea* L. (EEC)

Fresh BPF are cleaned completely and then dried for 12 hours at 40°C. After that, the blossoms are submerged in 96% ethanol, chopped, and ultrasonically processed for 15 minutes, pausing every 5 minutes to avoid overheating. Afterward, they are filtered through two layers of filter paper. A rotary evaporator was used to compress the extract [13]

## Phytochemical screening of extract

To determine the type of bioactive chemical components found in the plant material, several tests were performed on the water and ethanol extract of *Clitoria ternatea* L. flower. The phytochemical contents of the crude extracts were qualitatively screened using established analysis techniques 15–18.[14]

### Test for Alkaloids

After homogenizing 40 mg of extract with 9 mL of water and 1ml of 2N HCl, three portions were produced. Success was indicated by the formation of a white or yellowish-white precipitate when Part 1 was introduced to Mayer's reagent. In Part 2, Wagner's reagent was administered, and the formation of a brown precipitate was encouraging. Part three was treated with Dragendorf reagent, and the development of a reddish-orange precipitate was a sign of a successful reaction.[15]

### Test for Flavonoids

Forty milligrams of the extract were dissolved in boiling water, boiled for five minutes, and then filtered. After diluting the filtrate to no more than 5 ml, 0.05 mg of magnesium powder, 1 ml of concentrated HCl, and a vigorous shake were added. Positive outcomes occur if the solution turns red, yellow, or orange.[16]

### Test for Saponins

40mg of the extract was dissolved in boiling water, cooked for 5 minutes, and then filtered. The filtrate was diluted to a maximum of 5ml, then 1ml of concentrated HCl and 0.05mg magnesium powder were added, and the mixture was quickly agitated. If the solution turns red, yellow, or orange, it has achieved positive results.[17]

### Test for Terpenoids

40 mg of the extract was dissolved in water. Two milliliters of the extract solution were mixed with three drops of concentrated HCl and one drop of concentrated H<sub>2</sub>SO<sub>4</sub>. Success is shown by the growth of red or purple.[18]

## Health Benefits of Butterfly Pea Flower

- 1.Blue Tea for weight loss
- 2.Boost your Metabolism
- 3.A Natural Pain Reliever
- 4.A mood enhancer
- 5.Butterfly pea flower for skin
- 6.Enhances digestive system
- 7.Fights against cancer cells
- 8.Beneficial for hair growth
- 9.Good for a Healthy Eyesight
- 10.Promotes Cardiac Health
- 11.Good for a Healthy Brain



## Future Scope of Butterfly Pea Plant (*Clitoria ternatea*)

1. Development of novel herbal formulations for antioxidant and anti-aging therapy.
2. Research on nanoparticle-based drug delivery to enhance bioavailability.
3. Use a natural colorant in food, cosmetics, and pharmaceuticals.
4. Exploration of new pharmacological activities through advanced studies.
5. Clinical trials to confirm safety and efficacy.
6. Development of cosmeceutical products for skin and hair care.

## Conclusion

Butterfly Pea (*Clitoria ternatea*) is a valuable medicinal and cosmetic plant with a wide range of therapeutic properties. Its phytochemical constituents, particularly anthocyanins and flavonoids, contribute to its antioxidant and anti-aging activities. Further research and formulation development could expand its applications in natural product-based health and beauty industries.

## Result

The butterfly pea plant shows strong antioxidant and anti-aging activity. It helps protect cells from damage, improves memory, and supports liver and skin health. It has also shown anti-inflammatory and antimicrobial effects. Also, the water extraction and ethanol extraction and sum test are seen of butterfly pea plant. Overall, it is a promising medicinal herb useful for future herbal, cosmetic, and pharmaceutical preparations.

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