ANTIDIABETIC ACTIVITY OF *CLITORIA TERNATEA* LINN

ABSTRACT

In recent years, interest in plant study has expanded all over the world and a substantial body of evidence has been collected to illustrate the great potential of medicinal plants utilized in diverse traditional systems. Plant-based medications and chemicals have been used to treat various diseases and for personal adornment since the beginning of human civilization. *Clitoria ternatea* Linn, (butterfly pea) Fabaceae family. *Clitoria ternatea* is used to treat a variety of ailments and symptoms. It possesses antidepressant, anticonvulsant,anticancer, hypolipidemic, anti-inflammatory, analgesic and antipyretic qualities, as well aslocal anesthetic, purgative, and anti-diabetic effects.It's also used to treat snake bites and scorpion stings in India.

Keywords:*Clitoria ternateaLinn*, anti-diabetic, medicinal uses, traditional uses

1. INTRODUCTION

Clitoriaternatea has long been used in traditional medicine, primarily as supplementation to improve cognitive function and relieve symptoms of a wide range of illnesses such as fever, inflammation, pain, and diabetes[1].*Clitoria ternatea* is available in two flower colors: white and blue. Shankhpushpi is the local name for *Clitoriaternatea* Linn.It has potential uses in modern health and agriculture, as well as as a natural source of food organic dyes and antioxidants[2,3,4].*Clitoriaternatea* has been often used as a memory enhancer, antidepressant, antistress, sedative agent, anxiolytic, and tranquilizing agent in traditional medicine such as Ayurvedic medicine[5].

2. PLANT PROFILE

2.1 TAXONOMIC CLASSIFICATION

Kingdom: Plantae

Subkingdom: Viridaeplanta

Infrakingdom: Streptophyta

Division: Tracheophyta

Subdivision: Spermatophytina

Infrodivision: Angiospermae

Class: Magnoliopsida

Superorder: Rosanae

Order: Fabales

Family: Fabaceae

Genus: Clitoria L.

Species: *Clitoriaternatea*[6].

2.1.1 TRADITIONAL USES

Seeds and leaves	→	used as a brain tonic, promote memory and intelligence
Juice and flowers	→	used as an antidote for snake bite
Seeds	→	used in swollen joints
Crushed seeds	→	urinary problems
Root	→	ascetics, enlargement of the abdominal viscera, sore throat and skin diseases. also used as purgative, but because, they cause griping and tenderness, they were not recommended. Root was administered with honey and ghee as a general tonic to children for improving mental faculties, muscular strength and complexion tonics. Roots were also used in epilepsy and insanity

Fig. 1. *ClitoriaternateaLinn* plant image and plant parts traditional uses

3. Plant parts used

For medicinal purposes plant Leaves, seeds, bark, fruits, sprouts and stems were used[7].

3.1 Food colorants

Clitoriaternatea Flowers might be white, deep blue, or any shade in between. This coloring largely stems from the anthocyanin content and degree of fragrant acylation [8]. *Clitoriaternatea*'s rich blue pigment is very popular in Asia, where flower petals are used to color beverages, desserts, and clothing. *Clitoriaternatea* flower extracts have already been utilized to make colorful blue alcoholic gins that change color according to the pH, like when mixed with tonic water or lime. The rich blue color of *Clitoriaternatea* flowers, in particular, is a popular substitute for synthetic blue food colorants, which are becoming less popular owing to health concerns [9].

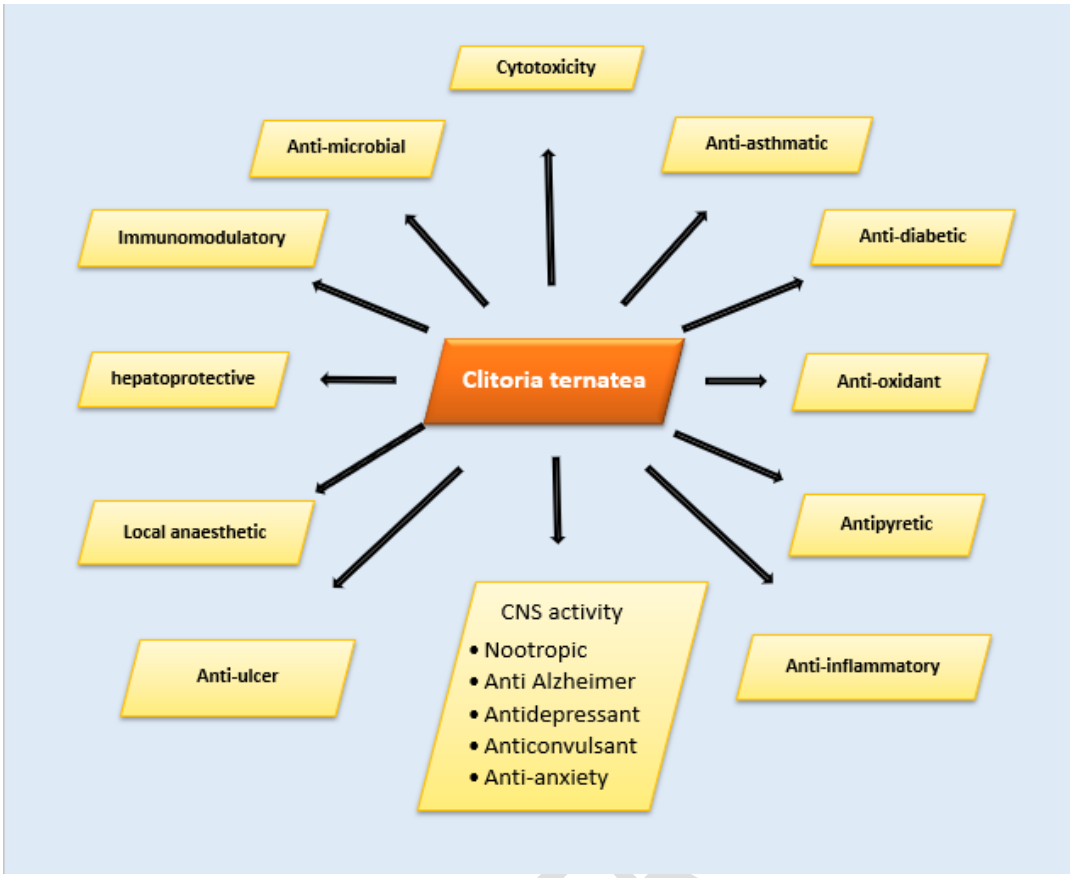

Fig.2. The pharmacologicalactivity of*clitoriaternatea*Linn

4. Antidiabetic activity

Diabetes mellitus is a condition characterized by persistent hyperglycemia and difficulties with carbohydrate, lipid[10] and protein metabolism connected with a total or relative lack of insulin action or insulin secretion[11,12,13,14,15]. almost 800 species of plants showing antidiabetic activity and *Clitoriaternatea* is one of them[16,17].*Clitoriaternatea* leaf extracts have recently shown promise as an anti-diabetic [18,19]. Wistar rats given 400 mg *Clitoriaternatea*ethanolic leaf extract per kg body weight every day for 28 days had considerably lower blood glucose, insulin, glycosylated haemoglobin, urea, and creatinine levels than diabetic controls. Moreover, the levels of liver enzymes (serum glutamate oxalate transaminase, serum glutamate pyruvate transaminase, lactate dehydrogenase, and alkaline phosphatase) in treated rats were relatively low than diabetic control rats and were comparable to the normal control rats [19].

Current research has concentrated on the impact of *Clitoriaternatea* extracts on glycemic response and antioxidant capacity in humans. In short clinical research involving 15 healthy males, it was shown that when 1 or 2 grams of *Clitoriaternatea* extract were combined with 50 g of sucrose, plasma glucose and insulin levels were reduced [18]. Suganya et al, [20] also observed that an ethanolic extract of *Clitoriaternatea* leaves and flowers has an anti-diabetic effect in vitro**.**In alloxan-induced diabetic rats, the hypoglycemic effects of methanol extract of *Clitoriaternatea* leaves (200 and 400 mg/kg) were studied. 12 hrs after injection, the extract of *Clitoriaternatea* substantially (P<001) decreased blood glucose levels in alloxan-induced diabetic rats [21].For 84 days, oral treatment of aqueous extracts of *Clitoriaternatea* leaves (400mg/kg body weight) and flowers (400mg/kg body weight)showed significantly reduced serum glucose, glycosylated hemoglobin, total cholesterol, triglycerides, urea, creatinine and the activity of gluconeogenic enzyme glucose-6-phosphatase, but

increased serum insulin, HDL-cholesterol, protein, liver and skeletal muscle glycogen content and the activity of glycolytic enzyme glucokinase*Clitoriaternatea* leaves treated diabetic rats performed somewhat better than *Clitoriaternatea* flowers treated diabetic rats in all of the following biochemical parameters studied[22,23]. In comparison to the diabetic control group, chronic administration of plant extracts (100mg/kg) for 14 days decreases the blood glucose levels in diabetes-induced animals (Wistar Albino rats)[24].

The extracts of *Clitoriaternatea* was tested against P. aeruginosa, E. coli, K. pneumonia, B. subtilis, A. formicans, A. hydrophila and S. agalactiae by the agar well diffusion method. P. aeruginosa, E. coli, K. pneumoniae, B. subtilis, A. formicans, A. hydrophila, and S. agalactiae have all been inhibited by different preparations of C. ternatea. Ethanol extract showed *clitoriaternatea* maximum of inhibition zone against A. formicans (19 mm), A. hydrophilia (20 mm), B. subtilis (20 mm) and P. aeruginosa (22 mm) next to that ethanol extract of C. ternatea showed A. formicans (19 mm) and E. coli (15 mm)[25].

The pancreatic regeneration capacity of various fractions of an ethanol extract of *Clitoriaternatea* L. aerial parts was investigated. In streptozotocin-induced diabetic rats, the antidiabetic and antihyperlipidemic potential was assessed and linked with antioxidant activity in vivo and in vitro. The extract and its fractions were first tested in the dosage range of 100-200 mg/kg for acute and sub-chronic antidiabetic activities. The most effective extracts and fractions were then tested for their ability to regenerate pancreatic β-cells, as well as their safety. It has antioxidant and antihyperlipidemic properties. The most significant pancreatic regeneration activity, antidiabetic and antihyperlipidemic activity was shown by ethanol extract and butanol soluble fraction at a dose level of 200mg/kg[26,27].

5. CONCLUSION

The organic and aqueous extracts of *Clitoriaternatea* might be used in the pharmaceutical sector in the future as a source of beneficial phytochemical substances, and the antioxidant mechanisms and anti-proliferative capabilities of the extracts should be explored further to obtain further applicability for usage as antioxidant compounds. The above Review indicates that the leaf and flower extracts of *Clitoriaternatea* have a hypoglycaemic effect. At the same time, the aqueous and organic extracts of *Clitoriaternatea* could be further utilized in the future as a source of useful phytochemicals substances for the pharmaceutical industry.

NOTE:

The study highlights the efficacy of "AYURBEDIC" which is an ancient tradition, used in some parts of India. This ancient concept should be carefully evaluated in the light of modern medical science and can be utilized partially if found suitable.

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