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Original Article

IN VITRO ANTIDIABETIC, ANTIOXIDANT AND ANTI-INFLAMMATORY ACTIVITY OF *CLITORIA TERNATEA* L

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ABSTRACT

Objective: To investigate the *in vitro* Antidiabetic, Antioxidant and Anti-inflammatory activity of *Clitoria ternatea* L. leaves and flowers.

Methods: Phytochemicals of leaves and flowers were analysed by using standard methods. *In vitro* antioxidant studies were carried out for the ethanolic extract of the *Clitoria ternatea* leaves and flowers using various free radical models such a DPPH, Reducing power assay and Hydrogen peroxide scavenging assay. *In vitro* antidiabetic assay such as Non-enzymatic glycosylation of haemoglobin assay, Glucose uptake in Yeast cells and Inhibition of salivary-amylase enzyme were carried in ethanolic extract.. *In vitro* anti-inflammatory activity such as inhibition of albumin denaturation and membrane stabilization assay were performed in ethanolic extract**.**

Results: Preliminary phytochemical screening of ethanolic extract of the *Clitoria ternatea* revealed the presence of various bioactive components like alkaloids, flavonoids, steroids, glycosides, phenol, saponin, terpenoids and tannin in both leaves and flowers. Anthroquinone is absent in both the parts studied. The *in vitro* antidiabetic potential of plant extract was confirmed through non enzymatic glycation, glucose uptake by yeast cells and amylase inhibition methods. Antiinflammatory activity of *Clitoria ternaea* was also confirmed.

Conclusion: The result of the present study concluded that the ethanolic extracts of *Clitoria ternaea L.* leaves and flowers possess significant antidiabetic, antioxidant and anti-inflammatory activity. The potential pharmacological activity of *Clitoria ternaea L.* leaves and flowers might be due to the presence of phytochemicals.

Keywords: *Clitoria ternaea L.***,** Antioxidant, Phytochemicals, Antidiabetic, Anti-inflammatory.

INTRODUCTION

Diabetes mellitus is a metabolic disorder characterized by a loss of glucose homeostasis with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. According to WHO, it is estimated that 3% of the world's population have diabetes and the prevalence is expected to double by the year 2025 to 6.3%[1].

Many research and investigation of oral anti-hyperglycaemic agents of natural plant origin were used in traditional medicine have been studied and many of them have been found to possess the positive activity [2]. Different types of reported diabetes mellitus can be classified under following two categories: Type 1 is insulin-dependent diabetes mellitus (IDDM), in which the body does not produce any insulin. It most often occurs in children and young adults. Type 1 diabetes accounts for 5-10% of diabetes [3]. Type 2 is noninsulin-dependent diabetes mellitus (NIDDM), in which the body does not produce enough, or improper use of secreted insulin is the most common form of the disease, accounting for 90-95% of diabetes is nearing epidemic proportions, due to an increased number of elderly people, and a greater prevalence of obesity and sedentary lifestyles. There are a variety of risk factors for type 2 diabetes, any all of which increase the chances of developing the condition. These include: Obesity, Living a sedentary lifestyle, Increasing age, and Bad diet.

Many plants have shown their immense potential to fight against dreadful diseases including diabetic and cancer. Hence the traditional herbal medicines are mainly obtained from plant are used in the management of diabetes mellitus. In recent years herbal medicines have started to gain importance as a source of hypoglycaemic agents. It is estimated that more them thousand plant species are being used as folk medicine for diabetes. Biological actions of the plant products used as alternative medicines to treat diabetes are in relevance to their chemical composition. Herbal products or plant products are rich in flavonoids, phenolic compounds [4]. The present investigation is aimed to find out the *in vitro* antidiabetic and antioxidant potential of *Clitoria ternatea*.

Clitoria ternatea is a vigorous, strongly persistent, herbaceous perennial legume. Almost all parts of this plant are reported to have medicinal properties. Flowers of this plant has been using in a number of religious purposes since the ancient times. The plant has been using traditionally to treat infertility, worn infestation, skin disease, tonsillitis, appetizer, digestant, vermicide, cough, asthma etc. Many of the medicinal values are evaluated by many workers such as Anthelminitic, Anti-hyperglycaemic, Anti-inflammatory, Anti-diarrhoeal, Antioxidant, hepatoprotective, Immunomodulatory, Anti-histamic, cholinergic activity and many more. *Clitoria ternatea* is reported to be a good "Medhya" but it is also said to be useful in hectic fever, severe bronchitis, asthma and remedy for snakebite and scorpion sting. A preliminary study using fresh flower of *Clitoria ternatea* showed hypolipidemic effects [5].

MATERIALS AND METHODS

Collection of plant material

Healthy fresh leaves and flowers of *Clitoria ternatea* were collected from near by areas of Thirunageshwaram, Thanjavur Dt. The leaves and flowers were dried at room temperature under well ventilated shade for 10 days. The dried leaves and flowers were powdered.

Preparation of extraction (Cold percolation method)

The powdered sample materials were extracted using 99% ethanol by cold percolation method. The powdered materials were soaked in ethanol (1:4) for 48 hours at 37^{0}C. Then the filtrate was filtered and distilled for recovering the solvent and then it was evaporated under reduced pressure at 50°C [6].

Qualitative analysis

Phytochemical analysis was carried out qualitatively to identify the presence of various secondary metabolites [7].

In-vitro antidiabetic activity

Non-enzymatic glycosylation of haemoglobin assay

Antidiabetic activity of *Clitoria ternatea* were investigated by estimating degree of non-enzymatic haemoglobin glycosylation, measured colorimetrically at 520nm. Glucose (2%), haemoglobin (0.06%) and Sodium azide (0.02%) solutions were prepared in phosphate buffer 0.01 M, pH 7.4. 1 ml each of above solution was mixed. 1 ml of each concentrations of plant sample were added to above mixture. Mixture was incubated in dark at room temperature for 72 hrs. The degree of glycosylation of haemoglobin was measured colorimetrically at 520nm. Alpha-Tocopherol (Trolax) was used as a standard drug for assay. % inhibition was calculated as previously published protocol [8]. All the tests were performed in triplicate.

Glucose uptake in Yeast cells

Yeast cells were prepared according to the method of Yeast cells[9] briefly, commercial baker's yeast was washed by repeated centrifugation (3,000×g; 5 min) in distilled water until the supernatant fluids were clear and a 10% (v/v) suspension was prepared in distilled water. Various concentrations of extracts (1–5 mg) were added to 1mL of glucose solution (5, 10 and 25 mM) and incubated together for 10 min at 37°C. Reaction was started by adding 100 µl of yeast suspension, vortex and further incubated at 37°C for 60 min. After 60 min, the tubes were centrifuged (2,500 × g, 5 min) and glucose was estimated in the supernatant. Metformin was taken as standard drug. The percentage increase in glucose uptake by yeast cells was calculated using previously published protocol. All the tests were performed in triplicate [10].

Inhibition of salivary-amylase enzyme

A starch solution (0.1% w/v) was obtained by stirring 0.1g of potato starch in 100 ml of

16 mM of sodium acetate buffer. The enzyme solution was prepared by mixing 27.5 mg of salivary-amylase in 100 ml of distilled water. The colorimetric reagent is prepared by mixing sodium potassium tartarate solution and 3, 5 dinitro salicylic acid solution 96 mM. Both control and plant extracts were added with starch solution and left to react with alpha- amylase solution under alkaline conditions at 25ºC. The reaction was measured over 3 minutes. The generation of maltose was quantified by the reduction of 3, 5 dinitro salicylic acid to 3- amino-5- nitro salicylic acid. This reaction is detectable at 540 nm [11].

In vitro antioxidant activity

Antioxidant activity measured by using DPPH radical scavenging assay method [12], Reducing Power assay[13], and Hydrogen peroxide radical scavenging activity [14]. Tests were carried out in triplicate for 3–5 separate experiments. The amount of extract needed to inhibit free radicals concentration by 50%, IC_{50}, was graphically estimated using a nonlinear regression algorithm.

In-vitro anti-inflammatory activity

Inhibition of albumin denaturation:

The assay was done followed by the method of was followed. The reaction mixture consisted of extracts at different concentrations (10-50µg/ml) and 1% aqueous solution of bovine albumin fraction. The pH of the reaction mixture was adjusted to 6.5 using 1N HCl and incubated at 37^0 C for 20 min and then heated at 57^0C for 30 min. The denaturation process is stopped by cooling the samples and finally the turbidity was measured using colorimeter 660 nm. Aspirin was used as the reference standard and the control was taken without the extract. The denaturation of protein inhibition by the extract and standard were expressed as percentage by using the formula.

Membrane stabilization assay

Blood was collected freshly and mixed with equal volume of Elsevier's solution. It was then centrifuged at 3000g for 15 minutes. The cells were washed with isosaline and a 10 %suspension was made with isosaline. Different concentrations of ethanolic extract (100-500µg/ml) were prepared in isosaline. To 0.5 mL of the extract, 1 mL phosphate buffer, 2 mL hyposaline and 0.5mL HRBC suspension was added and incubated for 30 minutes at 37^0C and then centrifuged at for 20 minutes. Absorbance was measured at 560 nm[15]. Aspirin was used as the standard and control was taken without the extract served as negative control.

RESULT AND DISCUSSION

The results of qualitative analysis of secondary metabolites of the leaves and flowers of *Clitoria ternatea* is presented in Table 1. Preliminary phytochemical screening of ethanolic extract of the *Clitoria ternatea* revealed the presence of various bioactive components like alkaloids, flavonoids, steroids, glycosides, phenol, saponin, terpenoids and tannin in both leaves and flowers. Anthroquinone is absent in both the parts studied.

Flavonoids are a group of polyphenolic compounds with known properties which include free radical scavenging, inhibition of hydrolytic and oxidative enzymes and anti-inflammatory action. Flavonoids are 15 carbon compounds generally distributed throughout the plant kingdom. Some isoflavones widely used in insecticides. They might also play a role in disease resistance. Some flavonoids such as quercetin and rutin, are known to support humam health by serving antiinflamatory, antihistaminic and antiviral agents [16]. Flavonoid compounds exhibit inhibitory effects against multiple viruses. Numerous studies have documented the effectiveness of flavonoids, such as glycyrrhizin and chrysin [17], against HIV. Flavonoids are potent water soluble antioxidants and free radical scavengers which prevent oxidative cell damage and have strong anticancer activity [18]. Flavonoids have been referred to as nature's biological response modifiers, because of inherent ability to modify the body's reaction to allergies and virus and the showed their anti-allergic, anti-inflammatory, anti-microbial and anti-cancer activities [17].

Table 1: Phytochemical screening of ethanolic extracts of *Clitoria ternatea*

S. No.	Phyto-Constituents	Ethanolic extract	
		Leaves	Flower
1.	Alkaloids	+	+
2.	Flavanoids	+	+
3.	Tannins	+	+
4.	Glycosides	+	+
5.	Phenols	+	+
6.	Steroids	+	+
7.	Terpenoids	+	+
8.	carbohydrate	+	+
9.	Protein	+	+
10.	phlobatannins	+	+
11.	Anthroquinone	-	-

(+) Present (-) Absent

It has been recognized that alkaloids and flavonoids shows antioxidant property and their effects on human nutrition and healthcare are considerable. Flavonoids also known as nature's tender drugs possess numerous biological and pharmacological activities. The anti-inflammatory capacity of flavanoids has been long utilized in Chinese medicine and the cosmetic industry as a form of crud plant extracts [17]. Anthroquinones possess antiparastic[19], bacteriostatic, antidepressant and antimicrobial and antioxidant activities. Their potential effects against cancer through different mechanisms have been studied. Many human physiological activities such as stimulation of phagocytic cell host mediated tumour activity and a wide range of anti-infective actions have been assigned to tannins. Tannins have stringent properties, hastening of wounds and inflamed mucous membrane. Tannins are responsible for colour changes in food [20].

Alkaloids have established broad spectrum antibacterial activity and are also used as analgesics and narcotics for pain relief. Alkaloids are

very important in medicine and constitute most of the valuable drug. They have marked physiological effect in animals [21]. Alkaloids such as solasodium have been indicated as a starting material in the manufacture of steroidal drug. Pure isolated alkaloids and their synthetic derivatives are used as basic medicinal agents for their analgesic, antispasmodic and bactericidal effects. They exhibited marked physiological activity when administered to animals [22].

Table 2: *In-vitro* non- enzymatic glycosylation of haemoglobin by *Clitoria ternatea*

S. No.	Concentration (µg/ml)	Glycosylation of haemoglobin (%)		
		Standard (Vitamin E)	Ethanolic extract of leaves	Ethanolic extract of flowers
1	10	46.34±3.24	12.96±0.90	59.0±4.13
2	20	64.68±4.52	66.22±4.35	79.18±5.58
3	30	75.74±5.30	76.26±53.38	87.90±6.15
4	40	79.94±5.59	80.24±5.61	87.96±6.15
5	50	84.94±5.94	86.51±6.05	89.24±6.24

Values were expressed as mean ± SD

Table 3: Glucose uptake in yeast cells by *Clitoria ternatea*

S. No.	Concentration (µg/ml)	Inhibition of glucose uptake (%)		
		Standard (Metformin)	Ethanolic extract of leaves	Ethanolic extract of flowers
1	10	27.16±1.90	37.5±2.62	81.38±5.69
2	20	58.28±4.07	66.88±4.68	85.44±5.98
3	30	80.72±5.65	81.3±5.69	89.56±6.26
4	40	87.78±6.14	84.76±5.93	90.98±6.36
5	50	90.28±6.31	87.48±6.12	93.56±6.54

Values were expressed as mean ± SD

Human bodies possess enzymatic and non- enzymatic antioxidative mechanisms which minimize the generation of reactive oxygen species, responsible for many degenerative diseases including diabetes. Increased concentration of glucose in the blood leads to its binding to haemoglobin which may result in the formation of the reactive oxygen species [23].

Plant extracts play an important role the inhibition of the glycosylation end products. An increase in the glycosylation was observed on incubation of haemoglobin with the increasing concentration of the glucose over a period of 72hrs (Table 2). However, the plant extracts significantly inhibited the haemoglobin glycosylation which is indicated by the presence of increasing concentration of haemoglobin. *Clitoria ternatea* exhibited higher inhibition of glycosylation as compared with the standard drug. The plant extracts also displayed the inhibition of haemoglobin glycosylation at different physiological concentrations of the glucose over the period of 72 hrs, indicating that the plant extracts decreases the formation of the glucose- haemoglobin complex and thus amount of free haemoglobin increases.

The ethanolic extracts of *Clitoria ternatea* exhibits potent antidiabetic activity. The percentage inhibition of glycosylation was found to be dose dependent. As the concentration of drug increases formation of glucose-haemoglobin complex decreases and free haemoglobin increases, which show the inhibition of glycosylated haemoglobin

A study of ancient literature indicates that diabetes (Madhumeha/Prameha) was fairly well known and well conceived as an entity in India. Regulation of glucose level in the blood of the diabetic patient can prevent the various complications associated with the disease. The maintenance of plasma glucose concentration for a long term under a variety of dietary conditions is one of the most important and closely regulated processes observed in the mammalian species [24]. The i*n vitro* assays of the present study indicated that ethanolic extract possess good anti diabetic activity. The rate of glucose transport across cell membrane in yeast cells system is presented in Table 3. In Yeast (*Saccharomyces cerevisiae*) glucose transport takes place through facilitated diffusion. Type 2 Diabetes is characterised by the deficiency of insulin causing increased amount of glucose in blood. After the treatment of the yeast cells with these plant extracts, the glucose uptake was found to increase in a dose dependent manner.

The % increase in glucose uptake by the yeast cell at different glucose concentrations i.e. 25mM, 10mM and 5mM respectively. The ethanolic extract of *Clitoria ternatea* exhibited significantly higher activity at all glucose concentrations showing the maximum increase in 10mM Glucose concentration. Results also indicated that *Clitoria ternatea* had greater efficiency in increasing the glucose uptake by yeast cells as compared to standard drug metformin.

The intestinal digestive enzymes alpha-amylase plays a vital role in the carbohydrate digestion. One antidiabetic therapeutic approach reduces the post prandial glucose level in blood by the inhibition of alpha-amylase enzyme. These can be an important strategy in management of blood glucose [25]. The in-vitro **α-**amylase inhibitory studies demonstrated that *Clitoria ternatea* has well anti diabetic activity (Table 4). The percentage inhibition at 100, 80, 60, 40, 20 µg/ml concentration of crude plant extracts shown concentration dependent reduction in percentage inhibition. At a concentration of 20µ/ml of *Clitoria ternatea* extract showed a % inhibition 54% and 58.48% and for 100 µg/ml extracts showed inhibition of 81.40% and 86.16%.

Alpha amylase is an enzyme that hydrolyses alpha-bonds of large alpha linked polysaccharide such as glycogen and starch to yield glucose and maltose. Alpha amylase inhibitors bind to alpha- bond of polysaccharide and prevent break down of polysaccharide in to mono and disaccharide. In our experimental study it was observed that ethanolic and aqueous extract of *Clitoria terntea* demonstrated significant Alpha amylase inhibition activity as compared to standard drug acarbose.

Table 5 Shows the antioxidant potential of ethanol extract of *Clitoria ternatea* at different concentration. The result showed the maximum DPPH scavenging activity of ethanol extract of *Clitoria ternatea* appeared to be potent as standard ascorbic acid with inhibition of 32%, 36%, 40%, 44%, 48% and 44%, 48%, 56%, 60%, 62% at 200, 400, 600, 800 and 1000mg. These activities are lesser than ascorbic acid.

DPPH assay is one of the most widely used methods for screening antioxidant activity of plant extracts [26]. DPPH is stable, nitrogen – centered free radical which produces violet in ethanol solution. It was reduced to a yellow coloured product, diphenyl picryl hydrazine, with the addition of the fractions in a concentration – dependent manner. The reduction in the number of DPPH molecules can be correlated with the number of available hydroxyl groups. All the fractions showed significantly higher inhibition percentage (Stronger hydrogen – donating ability) and positively correlated with total phenolic content.

Table 6 shows the similar capabilities of ethanol extracts of both leaves and flowers of *Clitoria ternatea* when compared to the standard ascorbic acid. Like the antioxidant activity, the reducing power increased with increasing the concentration. The transformation of Fe^{3+} into Fe^{2+} in the presence of various fractions was measured to determine the reducing power ability.

The reducing ability of a compound generally depends on the presence of reductones. Which exert the antioxidant activity by breaking the free radical chain by donating a hydrogen atom [13]. The antioxidant principles presents in the fraction of *Clitoria ternarea* caused the reduction of Fe^{3+}/ ferricyanide complex to the ferrous from, and thus proved the reducing power assay.

Table 7 revealed that the ethanol fraction of *Clitoria ternatea* leaves and flower scavenged hydrogen peroxide in a concentration dependent manner. The ethanol extract of *Clitoria ternatea* showed strong hydrogen peroxide scavenging activity.

Table 4: Salivary amylase inhibition by C*litoria ternatea*

S. No.	Concentration (µg/ml)	Inhibition of salivary amylase (%)		
		Standard (Metformin)	Ethanolic extract of leaves	Ethanolic extract of flowers
1.	10	59.58±4.17	54.0±3.78	58.68±4.10
2.	20	73.56±5.14	65.88±4.61	73.72±5.16
3.	30	76.42±5.34	73.22±5.12	81.72±5.72
4.	40	79.38±5.55	78.7±5.50	84.14±5.88
5.	50	81..80±5.72	81.40±5.69	86.16±6.03

Values were expressed as mean ± SD

Table 5: Antioxidant activity of ethanolic extract of *Clitoria ternatea* by DPPH method

S. No.	Concentration (mg)	Standard (Ascorbic acid) (%)	DPPH radical scavenging activity (%)	
			Leaves	Flowers
1.	200	2.0±0.14	32±2.24	44±3.08
2.	400	18.0±1.26	36±2.52	48±3.36
3.	600	40.0±2.8	40±2.8	56±3.92
4.	800	60.0±4.2	44±3.08	60±4.20
5.	1000	92.0±6.44	48±3.36	62±4.30

Values were expressed as mean ± SD

Table 6: Antioxidant activity of ethanolic extract of *Clitoria ternatea by* FRAP method

S. No.	Concentration (mg)	Standard (Ascorbic acid) (Unit %)	Reducing power(%)	
			Leaves	Flowers
1.	200	25±1.75	25±1.75	50±3.5
2.	400	40±2.8	40±2.8	57.5±4.02
3.	600	57.1±3.99	50±3.5	66.2±4.63
4.	800	66.6±4.66	57.1±3.99	70±4.9
5.	1000	72.7±5.08	66.6±4.66	75±5.25

Values were expressed as mean ± SD

Table 7: Antioxidant activity of ethanolic extract of *Clitoria ternatea* by H_2O_2 method

S. No.	Concentration (mg)	Standard (Ascorbic acid) (Unit %)	H_2O_2 radical scavenging activity (%)	
			Leaves	Flowers
1.	200	22.2±1.55	30.3±2.12	43.1±3.01
2.	400	33.3±2.33	44.5±3.11	55.5±3.88
3.	600	50±3.5	61.2±4.28	66.4±4.64
4.	800	66.6±4.66	77.2±5.40	83.3±5.83
5.	1000	77.7±5.43	88.5±6.19	88.9±6.22

Values were expressed as mean ± SD

Table 8: Anti inflammatory activity of ethanolic extract of *Clitoria ternatea*

S. No.	Concentration (mg)	Standard (Aspirin) (Unit %)	Inhibition (%)	
			Leaves	Flowers
1.	10	30.6±2.14	32±2.24	20±1.4
2.	20	46.6±3.26	40±2.80	40±2.8
3.	30	49.3±3.45	60±4.20	53.3±3.73
4.	40	64±4.48	64±4.48	66±4.62
5.	50	73.3±5.13	89.3±6.25	80±5.60

Values were expressed as mean ± SD

Table 9: Anti inflammatory activity of ethanolic extract of *Clitoria ternatea* by Membrane stabilization

S. No.	Concentration (mg)	Standard (Aspirin) (%)	Stabilization (%)	
			Leaves	Flowers
1.	10	2.0±0.14	45.4±3.17	29±2.03
2.	20	10±0.7	52.7±3.68	40±2.8
3.	30	30±2.1	65.3±4.57	50.9±3.56
4.	40	42±2.94	72.1±5.04	63.6±4.45
5.	50	62±4.34	80±5.60	72.7±5.08

Values were expressed as mean ± SD

Hydrogen peroxide itself is not particularly reactive with most biologically important molecules, but is an intracellular precursor of hydroxyl radicals which is very toxic to the cell [27]. Thus, scavenging of hydrogen peroxide is a measure of the antioxidant activity of the fraction. The fraction of *Clitoria ternatea* scavenged hydrogen peroxide which may be attributed to the presence of phenolic groups that could donate electrons to hydrogen peroxide, thereby neutralizing it into water.

Inflammation is a bodily response to injury, infection or destruction characterized by heat, redness, pain, swelling and disturbed physiological functions. Inflammation is a normal protective response to tissue injury caused by physical trauma, noxious chemical or microbial agents. Protein denaturation is a process in which proteins lose their tertiary structure and secondary structure by application of external stress or compound, such as strong acid or base, a concentrated inorganic salt, an organic solvent or heat. Most biological proteins lose their biological function when denatured. Denaturation of proteins is well documented cause of inflammation. As part of the investigation on the mechanism of the anti inflammation activity, ability of extract protein denaturation was studied [28]. It was effective in inhibiting heat induced albumin denaturation. Maximum inhibition was observed from ethanolic extract showed (Table 8) at the concentration of Aspirin, a standard anti-inflammation drug showed the maximum inhibition 96.04% at the concentration of 250 µg/ml. The value of extract in higher than standard (Aspirin) value.

The HRBC membrane stabilization has been used as a method to study the invitro anti inflammatory activity because the erythrocyte membrane is analogous to the lysosomal membrane and its stabilization implies that the extract may well stabilize lysosomal membranes. Stabilization of lysosomal is important in limiting the inflammatory response by preventing the release of lysosomal constituents of activated neutrophil, such as bacterial enzymes and proteases, which causes further tissue inflammation and damage upon extra cellular release. The lysosomal enzymes released during inflammation produce a various disorders. The extra cellular activity of these enzymes are said to be related to acute or chronic inflammation. The non steroidal drugs act either by inhibiting these lysosomal enzymes or by stabilizing the lysosomal membrane.Stabilization of RBCs membrane was studied [28] for further establishes the mechanism of anti-inflammatory action of different extracts of *Bauhinia purpurea*. Both the extracts were shown inhibiting the heat induced hemolysis compared with standard Aspirin (Table 9). These results provide evidence for membrane stabilization as an additional mechanism of their anti inflammatory effect.

The results of the present study demonstrated that the qualitative analysis of ethanolic leaves and flowers extract of *Clitoria ternatea* confirmed the presence of alkaloids, flavanoids, tannins, phenols, terpenoids, protein, carbohydrates, glycosides, saponin and amino acids. The *in vitro* antidiabetic potential of plant extract was confirmed through non enzymatic glycation, glucose uptake by yeast cells and amylase inhibition methods. Antiinflammatory activity of *Clitoria ternaea* was also confirmed. The biological activity of the plant may be due to the phytochemicals present in it.

CONFLICT OF INTERESTS

Declared None

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