ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

PHYTOCHEMICAL STUDIES OF SIAM QUEEN (THAI BASIL) PLANT EXTRACT

Yukti Dewangan[1], Radha Krishnan[2]*

School of Sciences, MATS University, Raipur (CG) India[1,2]

Email: ***yuktidewangan99@gmail.com1***

radhakrishnan2200@gmail.com

Abstract:

Medicinal herbs have been utilized for thousands of year for different purpose such as herbal remedies, prescription drugs, and alternative medicines. Most Phytochemicals present in plant like carotenoids, flavonoids, and polyphenols have antimicrobial activity and serve as a source of antimicrobial agents. In this research we used one medicinal plant of basil family which is Ocimum basilicum var. thyrsiflora common name Siam queen (Thai Basil). Siam queen contain many kinds of phytoconstituents which act as antimicrobial agent.

Keywords: Phytochemical, Ocimum basilicum var. thyrsiflora, antimicrobial activity.

1. INTRODUCTION

Medicinal plants have been used for thousands of years for a different purpose, such as natural medicine, pharmaceuticals, food preservation, and alternative medical treatments. pathogenic microorganisms have become resistant to numerous drugs in both humans and plants in recent years, as a result the use of commercial antimicrobial medicines for the treatment of infectious diseases[1]. It is believed that 60% of people on the world's depend on natural remedies like herbs and plant products, which makes them a major source of medications. Naturally occurring compounds are usually thought to biodegrade more readily than artificially generated ones, making them more environmentally friendly[2].The compounds that plants produce are referred to as phytochemicals. They are produced by the plant's primary and secondary metabolisms. Plants require these phytochemicals to either survive or resist other plants, animals, insects, and microbiological pests and diseases[3]. Additionally, phytochemistry confirms these chemicals' physiological activity, biosynthesis, distribution in nature, and structure. Plants provide the basic ingredients required by animals and humans growth such as lipids, carbohydrates, proteins, vitamins, and minerals. all the phytochemicals, primary and secondary metabolites are the most prevalent. Chlorophyll, sugars, proteins, amino acids, nucleic acids,

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

and other essential metabolites are necessary for the plant's basic development[4]. the metabolites classified as secondary are necessary for plants to survive under harsh conditions. Flavonoids, tannins, saponins, alkaloids, steroids, and phytosterols are examples of secondary metabolites with a variety of commercial uses, including coloring agents, flavoring agents for medicines, insecticides, pesticides, and products with antibacterial and antifungal properties.

Aromatic plants are distinguished by their unique combination of two different volatile compounds, mono sesquiterpenes and sesquiterpenes. They may also be identified by the presence of phenolic chemicals, primarily coumarins and phenylpropanoids and essential oils[5]. Researchers are now increasingly worried about secondary biomolecules after learning that certain commercial synthetic antioxidants are hazardous, carcinogenic, and mutagenic. Numerous plant species, particularly aromatic plants, have been examined because of their antiradical and antioxidant properties[6-11].Because of its antioxidant properties, the genus Ocimum is especially well-known. Ocimum basilicum is used both as a culinary herb and as a significant medicinal plant. It has been used for a very long time to treat neuropathic issues, anxiety, fevers, headaches, coughs, and common colds. It is also used to treat gastrointestinal disorders, insect bites, cramping, heart issues, inflammatory illnesses, depression, and a number of neurological conditions[12].

2. Materials & Methods

2.1 Plant description

The plant Ocimum basilicum var thyrsiflora were collected from different places of Dhamtari Chhattisgarh India. Mr. N.K. Dehari Assistant Professor GOVT. P.G. Collage Dhamtari Chhattisgarh India Authenticated the plant.

2.2 Classification of Thai basil

Kingdom – Plantae

Division- Magnoliophyta

Class- Magnoliopsida

Order-Lamiales

Family- Lamiaceae

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

Genus- Ocimum

Species- basilicum

Fig 1.1 (A) Image of Full plant (B) Seed of Siam queen (C) Leaf extract of Siam queen (D) Stem extract of Siam queen

2.3 Extraction of plant –

Ethanolic extract were prepared by following process -The course powder of Siam queen leaves, stem, root, seed were weighed out 10 gm and steeped in 200 ml of ethanol in a conical flask. After that, the mixture was rapidly stirred with a glass rod to ensure complete extraction. The mixture was allowed to settle for 24 hours at room temperature. Following their filtration using Whatman No. 1 filter paper, the extracts were used in further experiments[13]. (Hmid et al.,2017)

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

Fig 1.2- Ethanolic extract of Siam queen

Fig 1.3 Ethanolic extract of Leaf & Seed of Siam queen (Thai basil

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

Table 1. Qualitative examination of Primary metabolite-

TEST	SOLUTION	RESULT
Protein test	– In 2ml of extract 0.5% con. HNO3 was added. After it had been mixed with 2ml of H_2O	The presence of protein is shown by yellow coloring
Amino acids test	for test of amino acid 100mg extract has been dissolved in 10ml of distilled water and filtered through whatman filter paper no. 1	
Ninhydrin test	Two drops of ninhydrin solution (10 mg of ninhydrin in 200 ml of acetone) are added to 2 ml of aqueous filtrate	Purple colour indicates the presence of amino acid.
Carbohydrate test- **Molish test**	Add two drops of an alcoholic naphthol solution to 2ml of plant extract. Once the liquid has been thoroughly stirred, a few drops of strong H2SO4 are gradually added around the walls of the test tube	A violet ring indicates the presence of carbohydrates
Starch test	- After adding 0.01 g of iodine and 0.075 g of KI to around 5 ml of distilled water, the solution was added to approximately 2-3 ml of the extract	Starch is indicated by the production of a blue color

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

Fatty acid test	1 ml of the extract was mixed with 5 ml of ether the extracts were let to evaporate on a filter paper, Before the paper was dried	Transparency is a sign of fatty oil content

Table 2. QUALITATIVE EXAMINATION OF SECONDRY METABOLITES –

TEST	SOLUTION	RESULT
Test for Alkaloids	Add two drops of Mayer's reagent along the test tube's sidewalls to a few milliliters of extract	White, creamy ppt indicate the presence of alkaloid
Quinones test	1 ml of extract is mixed with alcoholic KOH	Quinines are identified by the presence of red to blue color
Glycosides test	2 milliliters of the extract are mixed with half a milliliter of concentrated H2SO4 and approximately 0.4 milliliter of glacial acetic acid containing FeCl3 traces.	Blue color indicate the presence of glycosides
Anthraquinones test	5 ml of extract combined with a few milliliters of concentrated H2SO4 and 1 milliliter of diluted ammonia.	The appearance of rose pink indicates the presence of anthraquinones.

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

Test for phenol • **Gelatine test**	in 5ml of extract, 2ml of a 1% gelatine solution containing 10% NaCl is added	White ppt formation indicate the presence of phenol
• **Phytosterol test**	After dissolving the extract in two milliliters of (CH3CO)2O, add two drops of concentrated H2SO4	Phytosterols are shown by a range of color changes along the sides.
• **Polyphenol test**	5ml of ethanolic extract was mixed with 3ml of a 0.1% gelatine solution	Polyphenols were present in the precipitate during its formation.
• **Flavonoid test**	10% ammonia solution is heated and added in few ml of extract's aqueous solution.	The production of fluorescent yellow indicates the presence of flavonoids**.**
• **Saponins test**	0.5 milligrams of extract were properly mixed with a few milliliters of distilled water.	Foaming development is favorable for saponins.
• **Tannins test**	5 milliliters of the extract were mixed with a few drops of FeCl3 solutions.	Dark green colour indicate the presence of tannins
• **Steroid test**	2 mililiters of the extract added with 2 ml of con H_2SO_4 after that added 2 ml CH_3Cl	The emergence of red color and yellowish-green fluorescence indicates the presence of steroids

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

• **Anthocyanin test**	When 2 ml of an aqueous extract is added to 2N HCl and NH3	the color changes from pink-red to blue-violet, indicating the presence of anthocyanins
• **Xanthoprotein test**	1 milliliter of the extract is mixed with a few drops of NH3 and HNO3	A reddish-brown precipitate indicates the presence of xanthoproteins.

Table 3. QUALITATIVE ANALYSIS OF VITAMINS

TEST	SOLUTION	RESULT
Test for Vitamin – A	250 mg of the powdered extract is mixed in 5 ml of chloroform, filtered, and then 5 ml of antimony trichloride solution is added to the filtrate	The presence of vitamin A is indicated by the brief appearance of blue color.
Test for vitamin – C	1 ml of the sample was diluted in 5 ml of distilled water & few drop of 5% sodium nitroprusside and 2ml of NaOH were added. After that few ml of HCl added dropwise	the yellow color changes to blue. This suggests that vitamin C is present.
Test for vitamin – D	500 mg of the powdered extract is dissolved in 10 milliliters of chloroform after filtration added 10 milliliters of antimony trichloride	the mixture becomes pinkish-red, signifying the presence of vitamin D

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

• **Test for vitamin –E**	The sample was extracted and fusing an ethanolic solution (500 mg in 10 ml) and filtered. A little amount of 0.1% ferric chloride was added, and 1 ml of 2'-2'dipyridyl (0.25%) was mixed with 1 ml of the filtrate.	The bright-red color was formed and confirmed the presence of vitamin E

3. RESULT

Phytochemical Screening of *Siam queen* extract

The result of the phytochemical screening of ethanolic extract of SIAM queen leaf, seed, stem, was obtained as follows

Observation			
		Leaf	**Seed**
Primary Metabolites	**Fatty Acid**	-	-
	Starch	-	-
	Proteins	+	+
	Amino Acid	+	+
	Carbohydrate	+	+
Secondary Metabolites	**Alkaloids**	-	+
	Anthraquinones	-	+
	Glycosides	+	-
	Phenol	+	-
	Polyphenol	-	-
	Tannins	+	-

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

	Flavonoids	-	+
	Steroids	+	+
	Xanthoproteic	+	+
	Anthocyanins	_	_
	Saponins	+	-

(+) Positive → Presence

(-) Negative → Absence

Observation			
S.No.		**Leaf**	**Seed**
1.	**Vitamin A**	+	+
2.	**Vitamin B**	+	-
3.	**Vitamin C**	+	+
4.	**Vitamin D**	-	-

(+) Positive → Presence

(-) Negative → Absence

4. Biomedical Application of O. Basilicum

Antimicrobial Activity -

According to studies, O. basilicum possesses potent antibacterial properties. Its essential oils were demonstrated to have antibacterial properties toward a variety of mold, yeast, and gram +ve and gram -ve bacteria[14]. It is reported that O.basilicum species act as antibacterial agent for 9 kinds of bacterial strains & the genera are Bacillus, Staphylococcus, Escherichia, and Acinetobacter, Micrococcus, Brucella etc[15].

Antiproliferative/anticancer activity –

Thai medicinal plants' essential oils was investigated for antiproliferative efficacy in human oral epidermal carcinoma and murine leukemia (P388) cell lines. Basil oil had the best

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

antiproliferative activity in the KB cell line when compared to the P388 cell line. The results suggest that Thai medicinal herbs have the potential for cancer treatments[16].

Antioxidant activity-

The antioxidant characteristics of O. basilicum polyphenols are widely recognized. In a particular investigation, polyphenols obtained from O. basilicum methanol extract were evaluated for their antioxidant qualities and discovered to possess the highest antioxidant activity in addition to a remarkable synergistic effect on α-tocopherol[17]. Kim et al. found that O. basilicum's highest antioxidant components were rosmarinic acid and caffeic acid[18].

Anti-inflammatory activity –

According to a research, O. basilicum aerial parts methanol extract significantly reduced inflammation in human primary chondrocytes1, human chondrosarcoma (SW1353), and macrophages (RAW264.7)[19].

Antiviral activity –

In one research, crude aqueous and ethanolic extracts of O. basilicum were used to extract apigenin, ursolic acid, and linalool. These extracts were found to have antiviral properties against a variety of viruses, including enterovirus 71 and coxsackievirus B1. apigenin had the best activity against hepatitis B, hepatitis B antigen, ADV-3, HSV-2, and surface antigens. but linalool demonstrated the most activity against AVD-II. Ursolic acid showed the strongest action against HSV-1 and EV71[20]

.

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

Fig 1.4 Application of Ocimum basilicum plant species in various field.

5. Discussion

Plant-based phytoconstituents are important for shielding the antioxidant defense system. (Umamaheswari et al 2008) Various methods have been used to examine the antioxidant features of the plant. and it has been shown that the best synthetic substitutes are phytoconstituents. The essential oil and active phytoconstituents including alkaloids, carbohydrates, steroids, proteins, glycosides, tannins, flavonoids, terpenoids, and phenolic compounds of Ocimum basilicum var. thyrsiflora are well known (Lyczko et al 2020) Pharmacological studies have demonstrated the antibacterial, antioxidant, antiviral, anti-inflammatory, hypolipidemic, anti-platelet aggregation, anti-carcinogenic, antiulcerogenic, and antithrombotic properties of these substances (Bora et al., 2011; Chiang et al., 2005). The redox activities of phenolic compounds are primarily responsible for their antioxidant qualities (Beric et al., 2008), and most of these phytochemicals' antioxidant qualities have been associated with decreased cancer death rates across a range of human population (Oyas 2013). Phytochemical research was performed on plant samples to identify components with physiological and medicinal benefits. Following examination, the plant extracts contained the phytochemicals phenols, tannins, flavonoids, saponins, glycosides, steroids, terpenoids, and alkaloids. The phenolic compounds are among the biggest and most prevalent groups of plant metabolites[21].

ISSN PRINT 2319 1775 Online 2320 7876

Research paper UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

6. Conclusion

Hence, the phytochemical profile of the selected plant sample was examined. The study found that phytochemicals that occur in plants are an excellent source for treating a wide range of diseases. Plants were rich in phytoconstituents such as flavonoids, steroidoids, glycosides, vitamin A, and vitamin C. Phytochemical screening was required to identify the various phytoconstituents present in plant extracts. Natural products include antioxidants, which are essential for preventing the harmful impacts of free radicals. Furthermore, plant-based antioxidants are safer and less costly than synthetic alternatives. Our research led us to the conclusion that, given Ocimum basilicum var. thyrsiflora's natural ingredients would be beneficial to use natural ingredients in therapeutic medications for improved effects on human health.

Reference-

1. Fair RJ, Tor Y. Antibiotics and bacterial resistance in the 21st century. Perspect Medicine Chem. 2014; 6:25-64. doi: 10.4137/pmc. s14459.
2. Harvey A. Strategies for discovering drugs from previously unexplored natural products. Drug Discov Today. 2000;5(7):294-300. doi: 10.1016/s1359-6446(00)01511-7.
3. Yildirim, A., Mavi, A., Oktay, M., Kara, A.A., Algur, O.F., Bilaloglu, V., 2000. Comparison of antioxidant and antimicrobial activities of Tilia (Tilia argentea DesfEx DC), sage (Salvia triloba L.) and Black tea (Camellia sinensis) extracts. J. Agric. Food Chem. 48,5030– 5034.
4. Li, S., Li, S.K., Gan, R.Y., Song, F.L., Kuang, L., Li, H.B., 2013. Antioxidant capacities and total phenolic contents of infusions from 223 medicinal plants. Ind. Crops Prod. 51, 289–298.
5. Kaurinovic B, Popovic M, Vlaisavljevic S, Trivic S. Antioxidant capacity of Ocimum basilicum L. and Origanum vulgare L. extracts. Molecules. 2011;16(9):7401-14. doi: 10.3390/molecules16097401.
6. Gülçin I, Topal F, Çakmakçı R, Bilsel M, Gören AC, Erdogan U. Pomological features, nutritional quality, polyphenol content analysis, and antioxidant properties of domesticated and 3 wild ecotype forms of raspberries (Rubus idaeus L.). J Food Sci. 2011;76(4):C585-93. doi: 10.1111/j.1750-3841.2011.02142. x.

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

7. Akbar A, Kuanar A, Sandeep I, Kar B, Singh S, Mohanty S, et al. GC-MS analysis of essential oil of some high drug yielding genotypes of turmeric (Curcuma longa L.). Int J Pharm Pharm Sci. 2015;7(9):35-40.
8. 7. Pattnaik PK, Kar D, Kuanar A, Sahu A, Mishra B. Molecular & biochemical characterization of selected elite accessions of ginger. Biocatal Agric Biotechnol. 2016; 8:130-8. doi: 10.1016/j.bcab.2016.09.002.
9. 8. Kar D, kuanar A, Panda MK, Pattnaik PK. Analysis of antimicrobial activities of different parts of Symplocos racemosa: an endangered medicinal plant of Eastern Ghats of India. Iran J Sci Technol Trans A Sci. 2018;42(3):1077-85. doi: 10.1007/s40995-016-0118-4.
10. 9. Kar DA, Pattnaik PK, Pattnaik BI, Kuanar AN. Antimicrobial analysis of different parts extract in different solvent system of a waste weed-Calotropis procera. Asian J Pharm Clin Res. 2018;11(2):227-30.
11. 10. Kar D, Panda MK. In vitro antioxidant potential of methanolic extract of Symplocos racemosa Roxb. Asian J Chem. 2017;29(10):2271-4. doi: 10.14233/ ajchem.2017.20747.
12. Bora KS, Arora S, Shri R. Role of Ocimum basilicum L. in prevention of ischemia and reperfusion-induced cerebral damage, and motor dysfunctions in mice brain. J Ethnopharmacol. 2011;137(3):1360-5. doi: 10.1016/j. jep.2011.07.066.
13. Hmid, I., Elothmani, D., Hanine, H., Oukabli, A., Mehinagic, E., 2017. Comparative study of phenolic compounds and their antioxidant attributes of eighteen pomegranate (Punica granatum L.) cultivars grown in Morocco. Arab. J. Chem. 10 (Suppl. 2), S2675–S2684.
14. Suppakul P, Miltz J, Sonneveld K, Bigger SW. Antimicrobial properties of basil and its possible application in food packaging. J Agric Food Chem. 2003;51(11):3197-207. doi: 10.1021/jf021038t.
15. Adigüzel A, Güllüce M, Şengül M, Öğütcü H, Şahin F, Karaman İ. Antimicrobial effects of Ocimum basilicum (Labiatae) extract. Turk J Biol. 2005;29(3):155-60.
16. Manosroi J, Dhumtanom P, Manosroi A. Anti-proliferative activity of essential oil extracted from Thai medicinal plants on KB and P388 cell lines. Cancer Lett. 2006;235(1):114-20. doi: 10.1016/j.canlet.2005.04.021.
17. Jayasinghe C, Gotoh N, Aoki T, Wada S. Phenolics composition and antioxidant activity of sweet basil (Ocimum basilicum L.). J Agric Food Chem. 2003;51(15):4442-9. doi: 10.1021/jf034269o.

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 12 , special Iss 10, 2022

18. Kim HJ, Chen F, Wang X, Rajapakse NC. Effect of methyl jasmonate on secondary metabolites of sweet basil (Ocimum basilicum L.). J Agric Food Chem. 2006;54(6):2327-32. doi: 10.1021/jf051979g
19. Raina P, Deepak M, Chandrasekaran CV, Agarwal A, Wagh N, Kaul-Ghanekar R. Comparative analysis of anti-inflammatory activity of aqueous and methanolic extracts of Ocimum basilicum (basil) in RAW264.7, SW1353 and human primary chondrocytes in respect of the management of osteoarthritis. J Herb Med. 2016;6(1):28 36. doi: 10.1016/j.hermed.2016.01.002.
20. Chiang LC, Ng LT, Cheng PW, Chiang W, Lin CC. Antiviral activities of extracts and selected pure constituents of Ocimum basilicum. Clin Exp Pharmacol Physiol. 2005;32(10):811-6. doi: 10.1111/j.1440-1681.2005.04270. x.
21. Bibi, G., Haq, I., Ullah, N., Mannan, A., Mirza, B., 2011. Antitumor, cytotoxic and antioxidant potential of Aster thomsonii extracts. Afr. J. Pharm. Pharmacol. 5, 252–258.