ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUL1925

Qualitative Phytochemical Detection of Ethanolic Leaf Extract of Two Medicinal Plant Such as *Ocimum basilicum* and *Coleus amboinicus*

[1]Dr. D. P. Sivasakti Balan, Principal,
[2]V. Santhanalakshmi ; [3]R.Fiza, (Guide)
[4]R.N Spandana ; [5]D. Harini ; [6]P. Sthanshitha (KRM Public School)

Abstract:- Study on phytochemical detection of ethanoic leaf by qualitative analysis focuses on the presence of phytochemicals in two different plant leaves. *Ocimum basilicum* and *Coleus amoboinicus* the findings are expected to contribute to the development of natural products and enhance the utilization of plant as a medicine.The method of extraction using ethanol as a solvent is attributed to its efficacy in extracting broad spectrum of phytochemicals, ensuring the comprehensive analysis of the bioactive constituents present in these plants. Preliminary phytochemical tests are being carried out by following standard procedure. Qualitative analysis revealed that *Coleus amboinicus* contained alkaloids, betacyanin, carbohydrates, Flavonoids, Cardiac glycosides, Phenol,and Starch. In contrast *Ocimum basilicum* exhibited a broad spectrum including Alkaloids, Anthocyaninand betacyanin, carbohydrates, Coumarine, Flavanoids, Cardiac glycosides, phenols, Saponins, Starch, Tannins, Terpenoids. The findings highlight the diverse bioactive compounds present in the leaves consideredfir studyshows their potential in the development of medicinal agricultural and cosmetics products.Further research in these phytochemicals such as terpenoids, terpenes in herbal plants as insecticide is recommended for sustainable agricultural practices.

Keywords:- *Phytochemical, Ocimum basilicum and Coleus amboinicus*

I. INTRODUCTION

Medicinal plants have been playing a crucial role in traditional medicine for centuries, offering a plethora of therapeutic benefits due to their rich phytochemical compositions. Among these, *Ocimum basilicum* ,commonly known as Great Basil (Thiruneerpachillai) and *Coleus amboinicus* often referred to as Indian Borage (Karpuravalli) have garnered significant attention for their potential medicinal properties. These plants are renowned for their diverse bioactive compounds, which include essential oils, flavonoids, alkaloids, and terpenoids, all contributing to their therapeutic efficacy.

This study focuses on the qualitative phytochemical detection of ethanolic leaf extracts of *Ocimum basilicum* and *Coleus amboinicus.* The selection of ethanol as a solvent is attributed to its efficiency in extracting a broad spectrum of phytochemicals, ensuring a comprehensive analysis of the bioactive constituents present in these plants. This research paper focuses on the detailed analysis of these bioactive compounds, investigating their presence, concentration, and effects in different plant species. The findings are expected to contribute to the development of natural products and enhance the utilization of plants in medicine, agriculture, and food science. (Abrahim, N. N *et al.*, (2012).

The use of herbs as medicine is a practice that dates back thousands of years and spans various cultures around the world. This research paper examines the medicinal properties of herbs, exploring their efficacy in treating a wide range of ailments and promoting overall health. Through an analysis of traditional herbal remedies and modern scientific studies, the paper aims to bridge the gap between historical knowledge and contemporary applications. Emphasis is placed on understanding the active compounds within these herbs, their pharmacological effects, and the potential for integrating herbal Singh, R. (2015).

- *Distribution*

Herbal plant *Ocimum basilicum* is a tender plant reported to be world wide in distribution .Basil is native to the tropical region like Central Africa to Spotheast Asia. This plant is treated as annual plant and they also described as perennial in warmer horticultural zonewith tropical mediterrian climates Simon,James.E (23 February 1998)

Coleus amboinicus is native to Southern and Eastern Africa and Eswatini to Angola and Mozombique and Kenya(northern region),Arabian Peninsula and India.This plant was brought to Europe and then from Spain to America, so it is also known as Spanish thyme. George Staples; MichealS,Kristiasen (1999)

- *Physical Discription*

Ocimum basilicum Basil leaves smooth with toothed edges. arrangement of leaves is opposite. Colour of the flower is white to magenta and the are found at the tip of the plant. These plants are found in the tropical region as they are frost sensitive. (Britannica, The Editors Encyclopedia,Dec 2023)

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUL1925

Increase in interest is noticed at recent times to substitute the synthetic pharmaceutical chemical with the compounds with bioactive properties. Food industries also search for the naturally occurring bioactive compounds which could act against microbes and act against cancer and act as antioxidant . Such properties are found to be present in the ethanolic extract of *Ocimum basalicum* and in Thymus algeriensis (Bios and Reut)

Table 1Systematic Position

Kingdom	**Plantae**
Division	Magnoliophyta
Class	Magnoliopsita
Order	Laminales
Family	Laminaceae
Genus	*Ocimum*
Species	*basilicum*

Coleus amboinicus is a perennial plant and it is semi succulent plant with pungent with Oregano like flavor. Stem of this plant is found to be fleshy. small erect leaves are found to have small hair like projections. Leaves are broad oval shaped ,the hairs are glandular in nature.

Table 2 Systematic Position

Kingdom	**Plantae**
Clade	Tracheophyta
Clade	Angiosperm
Clade	Asterids
Order	Laminales
Family	Laminaceae
Genus	*Coleus*
Species	*amboinicus*

Fig 1 Leaves of *Ocimum bacilicum*

Fig 2 Leaves of *Coleus amboinicus*

➢ *Phytochemistry*

Phytochemicals are the chemical compounds reported to be present in the plants or the plant origin chemicals(Breslin Andrew (2017)Plants produce such chemicals as primary or secondary metabolite. Major role of these chemicals to defence against competitors, pathogens and predators

The various basils have such distinct scents because the volatile aromatic compounds vary with cultivars. *Simon, James E (23 February 1998* The essential oil from European basil contains high concentrations of linalool and methyl chavicol (estragole), in a ratio of about 3:1.Other constituents include 1,8-cineole eugenol and myrcene among others.The clove scent of sweet basil is derived from eugenol. The aroma profile of basil includes 1,8-cineole and methyl eugenol In this species eugenol is synthesized from coniferyl acetate and NADPH

- *Phytochemicals*

The main chemical compounds found in the essential oil of *Coleusamboinicus* are carvacrol (28.65%),thymol (21.66%), α-humulene (9.67%) undecanal (8.29%),

γ-terpinene (7.76%),*p*-cymene (6.46%), caryophyllene oxide (5.85%)α-terpineol (3.28%), andβ selinene(2.01%).Another analysis obtained thymol (41.3%), carvacrol (13.25%)1,8-cineole (5.45%),eugenol (4.40%),caryophyllene (4.20%) terpinolene (3.75%), α-pinene (3.20%),β-pinene (2.50%), methyl eugenol (2.10%), and β-phellandrene (1.90%). The variations can be attributed to the methodology used in the extraction process, seasonal variations, soil type, climate, genetic and geographical variations of the plant. *Lin, Jerry; Massonnet, Mélanie; Cantu, Dario (1 July 2019).*

Phytochemicals are generally regarded as research compounds rather the essential nutrients because proof of their possible health effects has not been established yet. Phytochemicals under research can be classified into major categories, such as carotenoids and polyphenols which include phenolic acids, flavonoids.

Flavonoids can be further divided into groups based on their similar chemical structure, such as anthocyanins,flavones ,flavanones ,isoflavones and flavanols Flavanols are further classified as catechins, epicatechins, and proanthocyanidins In total, between 50,000 and 130,000 phytochemicals have been discovered.

II. REVIEW OF LITERATURE

➢ *Ocimum basilicum*

Ocimum basilicum, commonly known as Great Basil, is renowned for its diverse phytochemical composition, which includes essential oils, flavonoids, alkaloids, and terpenoids. These compounds contribute to its broad spectrum of medicinal properties. Basil is widely used as medicine for its therapeutic benefits, including acting against microbes, inflammation, cancer and antioxidant. Essential oils of basil, particularly rich in compounds like linalool, eugenol, and methyl chavicol, have been extensively studied for their antimicrobial properties against a range of pathogenic bacteria and fungi (Simon, 1998).

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUL1925

➢ *Coleus amboinicus*

Coleus amboinicus, commonly known as Indian Borage, is another plant recognized for its rich phytochemical profile. It contains a variety of bioactive compounds, including essential oils, phenolic acids, flavonoids, and saponins. These compounds endow Indian Borage with various medicinal properties, which act against microbes, inflammation and tumour.

➢ *Phenolic Compounds*

Phenolic or phenolcarboxylic acids are the major plant phenolic compounds known for their significant presence in a plants focused nutrition foods such as endosperrms, fruit peels,and leaves of vegetable , where they are found in the highest concentrations. Vincenzo Lattanzio's comprehensive review on plant phenolics, published in 2006, highlights the importance of phenolic acids in plants. Phenolic compounds have potential in managing diseases associated with oxidative stress like diabetes, cancer, and cardiovascular diseases.Dietary polyphenols impact glucose absorption in tissues which are insulin sensitive and tissues which are non sensitive.

➢ *Alkaloids*

Alkaloids are crucial in both human medicine and plant defense. They comprise about 20% of known secondary metabolites in plants, providing protection from predators and regulating growth. Therapeutically, alkaloids are renowned for their roles as anesthetics, cardioprotective agents, and anti-inflammatory agents. Cushnie et al. (2014) provide an overview of its property against the bacteria and emphasizing their significant medicinal applications.

➢ *Anthocyanins*

In the system of traditional system , these are used in addressing health issues like Alzheimer's disease, infections due to virus, prostate enlargement, diseases associated with eyes like retinopathy and glaucoma, fatty liver, increased cholesterol level, hypertension, certain cancers, stroke, and UTI. Kong *et al.* (2003) explore the analysis and biological activities of anthocyanins, detailing their therapeutic potential and applications in treating various health issues.

➢ *Cardiac Glycosides*

It has historically been the primary treatment for congestive heart failure and cardiac arrhythmia because of its ability to increase muscle contraction force while decreasing heart rate. These compounds are crucial in managing heart failure by lowering blood pressure and increased heart's contractile force. They are also used to treat tachycardia and atrial fibrillation by slowing down heart rate, as described by Bullock and Manias (2013).

➢ *Coumarins*

Coumarin, found in artificial vanilla substitutes and various other products, has medicinal applications due to its biological activity. Borges et al. (2005) review the presence, formation and medicinal properties of coumarins highlighting their use in medicinal chemistry.

➢ *Flavonoids*

Phytochemical compounds such as flavonoids found in numerous fruits, vegetables, and leaves, known for their anticancer, antioxidant, anti-inflammatory, and antiviral properties. Their potential in medicinal chemistry is significant due to their wide range of health benefits. Flavonoids and phenolic compounds are particularly noted for their chemo preventive properties, which act against mutagens, carcinogens, inflammation and anti oxidants.

➢ *Saponins*

Saponins, a subclass of terpenoids, are known for their surfactant properties due to their amphipathic nature. They react with cholesterol and phospholipids in cell membrane, making them useful in cosmetics and drug development. They are also used as adjuvants in vaccine production as discussed by Skene and Sutton (2006).

➢ *Terpenoids*

Terpenoids are responsible for the diverse medicinal effects of pharmaceutical plants. They are divided into primary and secondary metabolites, with over 40,000 individual compounds. Terpenoids shows a range of biological activities such as anti-inflammatory, antitumor, anti-bacterial, anti-malarial, anti-viral, cardioprotective and hypoglycemic effects. Their significance in medicine is highlighted by their ability to promote transdermal absorption and inhibit cardiovascular diseases. The terpenoids and phenolic compounds are the sources for pharmaceutical and medicinal plants with anti-inflammatory effects. Anti-inflammatory properties in pharmaceutical and medicinal plants are largely due to their content of terpenoids and phenolic compounds.(Zhao & Chang, 2016).

➢ *Alkaloids*

Alkaloids in basil serve multiple purposes, both in plant defense and human medicine. They exhibit significant pharmacological activities, including anesthetic, cardioprotective, and anti-inflammatory effects (Cushnie et al., 2014).

➢ *Traditional and Modern Applications*

Basil has been traditionally used to cure ailments like respiratory disorders, digestive and skin problems . Modern research supports these uses, highlighting basil's potential in developing natural remedies and pharmaceuticals. The integration of traditional knowledge with contemporary scientific findings underscores the importance of basil in holistic health approaches (Singh, 2015).

➢ *Aim*

The main aim of the study is to determine and evaluate the phytochemical constituents of *Ocimum basilicum* and *Coleus amboinicus* using ethanol as solvent.

➢ *Objectives*

- To analyze the presence of phytochemicals in *Ocimum basilicum* and *Coleus amboinicus.*

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUL1925

- To compare the phytochemical compositions between the two plant species belonging to the family of *lamiaceae*
- To identify potential therapeutic applications based on the phytochemical profiles.

III. MATERIALS AND METHODS

Fig 3 Sample Leaves of *Coleus amboinicus* and *Ocimum basilicum*

➢ *Preparation of Extract*

Fig 4 Leaves Soaked in Ethanol

One of the safest forms of extraction is the method which extract the soluble compound using the solvent like Ehanol, It is cost effective and usually adopted to extract the essential oils .

Ethanol is used as a popular solvent as it is safe to infuse edibles and compatible in any type of container. Consistency is absorbed with results using ethanol as solvent.

Plant material is mixed with enough Ethanol such that the leaves completely submerge under the ethanol. Then mixture is to be left in the low temperature in the freezer for 24 hours. The ethanol will extract the soluble compounds during this period of 24 hours.

Filtration is the next step after the soaking process, Solid materials are removed with the help of funnel and the filter paper. This process removes the extract from the solid material.

Separated material is labeled separately as sample 1 *Coleus amboinicus* and 2 *Ocimum basilicum*

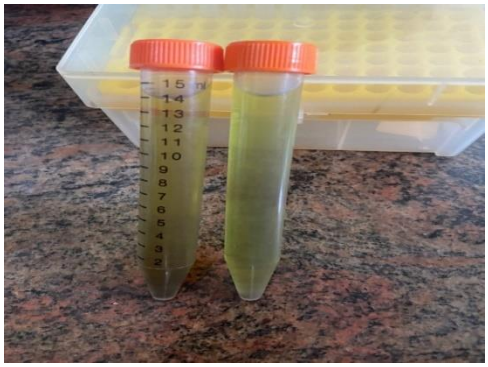

Fig 5 Extracted Sample 1 and 2

➢ *Phyto Chemical Analysis*

- *Qualitative Phytochemical Analysis:*

✓ *Test for Acids*

Million's Test: To the 1ml sample (extract), 5 drops of Millons reagent was added.Then the mixture was heated in the water bath for about 5 minutes then cooled , 1% sodium nitrate solution was added,appearance of red colour shows the presence of acids

✓ *Test for Alkaloid*

Mayer's Test :Take 2.0 ml of extract add concentrated hydrochloric acid and add few drops Mayer's reagent appearance of white or green precipitation indicate the presence of alkaloid.

✓ *Test for Anthocyanins and Betacyanins*

Sodium Hydroxide Test: Take 2ml of extract and 1ml of 2N sodium hydroxide and heated for 5 minutes for 100°C to observe the formation of bluish green colour which indicates the presence of Anthocyanin and yellow colour indicates the presence of betacyanins.

.

✓ *Test for Carbohydrates*

Molisch"s Test:Take 2ml extract and 1ml of Molisch's reagent and add few drops of concentrated sulphuric acid and presence of purple or reddish ring indicates the presence of carbohydrates.

✓ *Test for Cardiac Glycosides*

Ferric Chloride Test: Take 0.5 ml extract, 2.0 ml glacial acetic acid and few drops 5% ferric chloride were added. This was under layered with 1.0 ml of concentrated sodium hydroxide. Formation of the brown ring at the interface indicates presence of cardiac glycosides.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUL1925

✓ *Test for Coumarins*

Sodium hydroxide Test: Take 1.0 ml of extract, 1.0 ml 10% sodium hydroxide was added Formation of yellow colour indicates presence of coumarins

✓ *Test for Flavonoids*

Sulphuric acid test :Take 1ml of extract add few drops of concentrated sulphuric acid and observed for the formation of orange colour.

✓ *Test for Glycosides*

Sulphuric Acid Test: To 2.0 ml extract, 10 ml glacial acetic acid, 5% ferric chloride and few drops concentrated sulphuric acid were added and observed for the formation of greenish blue colour, which indicates the presence of glycosides.

✓ *Test for Phenols*

Ferric Chloride Test: To 1.0 ml extract, 2.0 ml distilled water, followed by few drops of 10% ferric chloride were added. Formation of blue or green colour was observed, which indicates presence of phenols.

✓ *Test for Proteins*

Ninhydrin Test: To 2.0 ml extract, few drops of 0.2% ninhydrin was added and heated for 5 min. and observed for the formation of blue colour. This indicates the presence of proteins.

✓ *Test for Quinones*

To 1.0 ml extract, 1.0 ml concentrated sodium hydroxide was added and observed for the formation of red colour, which indicates the presence of quinones.

✓ *Test for Saponins*

Foam Test: To 1.0 ml extract, 5.0 ml distilled water was added and shaken well in a graduated cylinder for 15 min. lengthwise. Formation of 1.0 cm layer of foam was observed, which indicates the presence of saponins.

✓ *Test for Starch*

Iodine test: 2 ml of extract, few drops of iodine solution was added and observed. There was no formation of blue purple colour, which indicates the absence of starch.

✓ *Test for Tannin*

1 ml of extract +2 ml 5% Feric chloride was added.Presence of dark blue or greenish black indicates the presence of tannin.

✓ *Test for Terpenoids*

0.5ml extract added with 2ml of chloroform and conc.sodium hydroxide formation of red brown colour shows the presence of Terpenoids

IV. RESULT

Fig 6 Test Result

Table 3 Result of Phytochemical Tests of Sample I (*Coleus amboinicus*) and Sample 2 (*Ocimum basilicum*)

S.NO.	TEST	SAMPLE I *Coleus amboinicus*	SAMPLE II *Ocimum basilicum*
1	Acids	Absent	Absent
2	Alkaloids	Present	Present
3	Anthocyanin and Betcyanin	Present	Present
4	Carbohydrate	Present	Present
5	Cardiac glycosides	Absent	Present
6	Coumarins	Absent	Present
7	Flavanoids	Present	Present
8	Glycosides	Present	Present
9	Phenols	Present	Present
10	Proteins	Absent	Absent
11	Quinones	Absent	Absent
12	Saponins	Absent	Present
13	Starch	Present	Present
14	Tannin	Absent	Present
15	Terpenoids	Absent	Present

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUL1925

V. DISCUSSION

The qualitative analysis of phytochemicals in the ethanolic leaf extracts of *Ocimum basilicum* (Sample I) and *Coleus amboinicus* (Sample II) reveals notable differences in their phytochemical profiles. The presence or absence of specific phytochemicals in these samples underscores the unique chemical composition of each plant, reflecting their distinct medicinal properties and potential applications.

➢ *Comparative Phytochemical Analysis*

- *Sample I: Ocimum basilicum*

Sample I demonstrated the presence of several key phytochemicals, including:

✓ *Alkaloids:*
Known for their therapeutic properties, such as anesthetic, cardioprotective, and anti-inflammatory effects.

✓ *Anthocyanins and Betacyanins:*
Pigments with antioxidant properties that contribute to the plant's anti-inflammatory and anticancer activities.

✓ *Carbohydrates:*
Essential for energy storage and structural components in plants.

✓ *Flavonoids:*
Recognized for their anticancer, antioxidant, anti-inflammatory, and antiviral properties.

✓ *Glycosides:*
Compounds that can exert a variety of biological effects, including anti-inflammatory and antimicrobial actions.

✓ *Phenols*:
Known for their strong antioxidant properties, protecting against oxidative stress-related diseases.

✓ *Starch:*
A polysaccharide that serves as an energy reserve.

- *Sample II: Coleus amboinicus*

Sample II exhibited a broader spectrum of phytochemicals, including all those found in Sample I, with additional compounds:

✓ *Cardiac Glycosides:*
Therapeutically significant for treating heart conditions like congestive heart failure and arrhythmias due to their ability to increase the force of cardiac muscle contractions.

✓ *Coumarins:*
Compounds with anticoagulant, antimicrobial, and anti-inflammatory properties.

✓ *Saponins:*
Known for their surfactant properties and potential applications in cosmetics and pharmaceuticals, as well as their role as immune system boosters.

✓ *Tannins:*
Possessing astringent properties, useful in treating diarrhea and skin conditions, and also known for their antioxidant activity.

✓ *Terpenoids:*
A diverse group of compounds with anti-inflammatory, antitumor, antibacterial, and antiviral properties.

➢ *Implications of Phytochemical Presence*

The presence of a wider range of phytochemicals in Sample II *(Coleus amboinicus)* compared to Sample I (*Ocimum basilicum*) suggests that *Coleus amboinicus* may have a broader spectrum of medicinal applications. The additional presence of cardiac glycosides, coumarins, saponins, tannins, and terpenoids in Sample II enhances its potential use in cardiovascular health, antimicrobial treatments, immune system enhancement, and anti-inflammatory therapies.

Cardiac Glycosides in *Coleus amboinicus* are particularly note worthy for their established use in treating heart conditions, offering a therapeutic advantage over *Ocimum basilicum*, which lacks these compounds. Similarly, the presence of coumarins and saponins in *Coleus amboinicus* extends its application to include anticoagulant and immune-boosting properties, respectively.

Tannins and terpenoid**s** add to the medicinal value of *Coleus amboinicus* by providing additional antioxidant and anti-inflammatory benefits, which are absent in *Ocimum basilicum.* These differences highlight the unique therapeutic potentials of each plant, making them suitable for different medicinal applications.

VI. SUMMARY AND CONCLUSION

➢ *Summary*

The qualitative analysis of the ethanolic leaf extracts of *Ocimum basilicum* (Sample I) and *Coleus amboinicus* (Sample II) has revealed significant differences in the phytochemical composition of the two samples. The cold ethanol extraction method proved to be both efficient and safe, effectively isolating a broad spectrum of bioactive compounds from the plant samples.

Sample I (*Ocimum basilicum*) was found to contain alkaloids, anthocyanins and betacyanins, carbohydrates, flavonoids, glycosides, phenols, and starch. On the other hand, Sample II (Coleus amboinicus) exhibited a wider range of phytochemicals, including alkaloids, anthocyanins and betacyanins, carbohydrates, cardiac glycosides, coumarins, flavonoids, glycosides, phenols, saponins, starch, tannins, and terpenoids. The presence of cardiac glycosides, coumarins, saponins, tannins, and terpenoids in Sample II,

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUL1925

which were absent in Sample I, highlights the broader medicinal potential of *Coleus amboinicus*.

These phytochemicals have various therapeutic applications:

- *Cardiac Glycosides:*
  Used to treat congestive heart failure and cardiac arrhythmia.

- *Coumarins:*
  Employed as flavoring agents in the soap industry and as anticoagulants.

- *Saponins:*
  Serve as adjuvants in vaccine development and have potential in cosmetic formulations.

- *Tannins:*
  Used for their styptic and astringent properties to treat conditions such as tonsillitis, pharyngitis, hemorrhoids, and skin eruptions.

- *Terpenoids:*
  Exhibit a wide range of medicinal properties, including antitumor, anti-inflammatory, antibacterial, antiviral, antimalarial, transdermal absorption enhancement, cardiovascular disease prevention and treatment, and hypoglycemic activities.

➢ *Conclusion*

The findings of this study underscore the significant differences in the phytochemical profiles of *Ocimum basilicum* and *Coleus amboinicus*, reflecting their unique medicinal properties and potential applications. The cold ethanol extraction method has proven to be effective in isolating these bioactive compounds, facilitating a comprehensive qualitative analysis.

Coleus amboinicus (Sample II), with its broader spectrum of phytochemicals, demonstrates a greater potential for diverse medicinal applications, particularly in cardiovascular health, the cosmetic industry, and medical treatments. The presence of cardiac glycosides, coumarins, saponins, tannins, and terpenoids in *Coleus amboinicus* enhances its value as a multifunctional medicinal plant.

Further research, including quantitative analysis and in vivo studies, is recommended to better understand the therapeutic potentials and mechanisms of action of these phytochemicals. Such studies would provide deeper insights into the applications of these plants in developing natural products for medicine, agriculture, and food science. This research contributes to the growing body of knowledge on the medicinal properties of *Ocimum basilicum* and *Coleus amboinicus*, supporting their continued use and exploration in traditional and modern medicine.

RECOMMENDATIONS

Phytochemicals that contribute to a plant's insecticidal properties include a variety of compounds such as alkaloids, terpenoids, phenolics, and glycosides. Alkaloids, such as nicotine found in tobacco, can be toxic to insects. Terpenoids, including pyrethrins from chrysanthemum flowers, disrupt the nervous systems of insects. Phenolic compounds like tannins can deter insect feeding and reproduction. Glycosides, such as cyanogenic glycosides, release toxic hydrogen cyanide when the plant tissue is damaged. These phytochemicals work through different mechanisms to protect plants from insect herbivores, either by directly killing the insects or by deterring them from feeding and reproducing on the plants.

Based on the findings from the qualitative phytochemical detection of ethanolic leaf extracts of *Ocimum basilicum* and *Coleus amboinicus*, it is recommended to further investigate these extracts for their potential insecticidal properties. This can be particularly beneficial for protecting grains and other agricultural products from insect pests, ensuring long-term storage and usage. The presence of various phytochemicals, such as terpenoids and tannins, indicates that these plants could offer natural and effective solutions for pest control in agricultural practices.

REFERENCES

[1]. Abrahim, N. N., Kanthimathi, M. S., Abdul-Aziz, A., & Tayyab, S. (2012). Phytochemicals: Extraction, isolation, and identification of bioactive compounds from plant extracts. *Journal of Applied Pharmaceutical Science*, *2*(12), 1-8.

[2]. Borges, F., Roleira, F., Milhazes, N., Santana, L., & Uriarte, E. (2005). Simple coumarins and analogues in medicinal chemistry: Occurrence, synthesis and biological activity. *Current Medicinal Chemistry*, *12*(8), 887-916.

[3]. Breslin, A. (2017). The chemical composition of green plants. Sciencing. Leaf Group Ltd.

[4]. Bullock, S., & Manias, E. (2013). *Fundamentals of Pharmacology*. Pearson Higher Education AU.

[5]. Codd, L. E. W. et al. (1981). Flora of Southern Africa: The Republic of South Africa, Basutoland, Swaziland and South West Africa. Vol. 28, Part 4, 148. Available at: Biodiversity Heritage Library.

[6]. Encyclopaedia Britannica, The Editors of. (2023). Basil (herb). Retrieved December 21, 2023, from Encyclopedia Britannica.

[7]. Jassbi, A. R., Zamanizadehnajari, S., & Baldwin, I. T. (2010). Terpenoids in plant defense and how they are affected by biotic and abiotic stresses. *Phytochemistry*, *71*(9-10), 1075-1083.

[8]. Kandil, M. A. M., Khatab, M. E., Ahmed, S. S., & Schnug, E. (2009). Herbal and essential oil yield of Genovese basil (Ocimum basilicum L.) grown with mineral and organic fertilizer sources in Egypt. *Journal für Kulturpflanzen*, *61*(12), 443-449.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUL1925

[9]. Kong, J. M., Chia, L. S., Goh, N. K., Chia, T. F., & Brouillard, R. (2003). Analysis and biological activities of anthocyanins. *Phytochemistry, 64*(5), 923-933.
[10]. Lin, J., Massonnet, M., & Cantu, D. (2019). The genetic basis of grape and wine aroma. *Horticulture Research, 6*(1), 1-24. doi:10.1038/s41438-019-0163-1.
[11]. Simon, J. E. (1998). Basil. *Center for New Crops & Plant Products, Department of Horticulture, Purdue University*. Archived from the original on May 2, 2017. Retrieved January 22, 2018.
[12]. Singh, R. (2015). Medicinal plants: A review. *Journal of Plant Sciences, 3*(1-1), 50-55.
[13]. Skene, C. D., & Sutton, P. (2006). Saponin-adjuvanted particulate vaccines for clinical use. *Methods, 40*(1), 53-59. doi:10.1016/j.ymeth.2006.05.019.
[14]. Staples, G., & Kristiansen, M. S. (1999). *Ethnic Culinary Herbs: A Guide to Identification and Cultivation in Hawaii*. University of Hawaii Press.
[15]. Venugopala, K. N., Rashmi, V., & Odhav, B. (Year). Title of article/book. *Journal/Publisher details*. (Note: This reference seems incomplete; please provide full details for accurate formatting).
[16]. Zhao, L., & Chang, W. C. (2016). Terpenoid biosynthesis in plants: New insights and future perspectives. *Molecular Plant, 9*(4), 361-379.