International Journal of Innovative Research in Engineering
Volume 4, Issue 6 (November-December 2023), PP: 10-13.
www.theijire.com ***ISSN No: 2582-8746***

Qualitative Phytochemical Analysis in the Leaves of Piper nigrum

Ramesh Babu P.B[1], Sharon N.S[2], Viswagithe S.L[3]
[1]*Center for Materials Engineering and Regenerative Medicine, BIST. BIHER. Selaiyur, Tamilnau, India.*
[2,3]*Department of Genetic Engineering, Bharath Institute of Higher Education and Research. Selaiyur, Tamilnadu, India,*

How to cite this paper: Ramesh Babu P.B[1], Sharon N.S[2], Viswagithe S.L[3], "Qualitative Phytochemical Analysis in the Leaves of Piper nigrum", IJIRE-V4I06-10-13.

Abstract: *Restorative plants address a rich wellspring of antimicrobial compoenents and will be useful therapeutically in various countries as therapeutic medicine. Phytochemicals are non-nutritive plant synthetic substances that have defensive or infection preventive properties. The principle objective of this paper is to evaluate for phytochemical content in Piper nigrum as these medications are regularly considered as more encouraging as they will quite often show less or no secondary effects. Qualitative phytochemical tests were utilized to identify the presence of alkaloids, tannins, flavonoids, cardiovascular and heart glycosides. Flute player nigrum (Uziza or dark pepper) is an extravagant plant in the family Piper aceae, developed for its organic products, which is typically dried and use as a flavor and seasoning. Piper nigrum or dark pepper oil can be utilized to help in the treatment of relief from discomfort, ailment, Chills, influenza, colds, increment dissemination, weariness, solid hurts, physical and enthusiastic briskness nerve tonic and fevers. It besides expands the progression of salivation, animates craving, empowers peristalsis, conditions the colon muscles and is an overall stomach related tonic. Remotely it is utilized for its rube facient properties and as a neighborhood application for loosened up sensitive danger and some skin sicknesses. Leaves of the pepper plant are viewed as noxious by most Americans and Europeans, while they are broadly eaten across the asian mainland. Pepper leaves are not zesty, and have a charming spinach like flavor. They can be cooked in a way like spinach too.*

Keywords: *Phytochemicals; Piperaceae; Piper nigrum; Pepper leaves.*

I. INTRODUCTION

Plant materials are rich wellsprings of organically dynamic metabolites. Phytochemicals are normally happening in therapeutic plants that are liable for guard against microbes, hunters and contenders. Plant-inferred substances have as of late happen to extraordinary interest because of their applications as medications, as model builds for drug amalgamation or as intermediates for manufactured medications. Since old occasions, plants have been model wellspring of meds as they are a supply of compound specialists with remedial properties. Everyone is progressively utilizing plant-inferred meds as dietary enhancements to soothe and treat various human issues. Natural medications are generally utilized by provincial individuals in India particularly in distant regions. Customary recuperating spices assume a significant part in administration of wellbeing related issues of the neighborhood populace. Plant removes have been accounted for logically for their natural exercises. Numerous phytochemicals could secure people against specific sicknesses. There are numerous phytochemicals present in products of the soil and each work in an unexpected way.

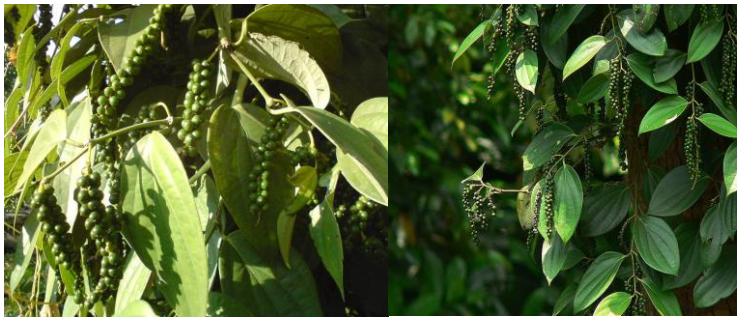

Figure 1: The plant Piper Nigrum

Flautist nigrum (Black pepper) plant is a blooming woody lasting climbing plant that has a place with Piperaceae family. Pepper plants effectively fill in the shade on supporting trees, lattices or shafts up to greatest stature of 13 feets or 4 meters and roots might come out from leaf hubs assuming that plant contact to the ground (Fig 1). The plants have heart shape substitute leaves with commonly huge size of 5-10 cm long and 3-6 cm across, with 5 to 7 unmistakable palmate veins. The blossoms are little, monoecious with independent male and female blossoms yet might be polygamous which contain both male and female blossoms. The little blossoms are borne on pendulous spikes at the leaf hubs that are close to as long as the leaves. The length of spikes goes up to 7-15 cm. The dark pepper's natural products are little (3 to 4 mm in measurement) called a drupe and the dried unripe products of Piper nigrum are known as a peppercorn (1-4). The completely full grown natural products are dull red in shading and around 5 mm in width. An organic product contains a solitary seed. The plants bear natural products from fourth or fifth year, and keep on bearing natural products as long as seven years. A solitary stem contains 20-30 spikes of natural products. The gathered spikes are sun dried to isolate the peppercorns from the spikes. The new gathered unripe green natural products might freeze-dry to make green pepper. The new reaped unripe green organic products might sun-dried to make dark pepper. The red skin of the age natural products is eliminated and the stony seeds are sun-dried to make white pepper (4-8).

Hindrance of medication biotransformation and mitochondrial energetics. Piperine hinders numerous enzymatic medication biotransforming responses, and this has significant ramifications for the metabolic actuation of cancer-causing agents and mitrochondrial energy creation. Selvendiran et al. (2005) found that piperine hindered mitochondrial Krebs cycle, stage I, and glutathione utilizing proteins in benzo(a)pyrene-instigated test lung carcinogenesis in Swiss pale skinned person mice. The impact of piperine on calcium transport is probably going to be noteworthy with the impacts of this compound on the mitochondrial respiratory chain and ATPase movement. The impact of piperine on the metabolic enactment and dispersion of aflatoxin B1 in rodents has been examined, and it was observed that piperine uniquely restrained liver microsome catalyzed aflatoxin B1 restricting to calf thymus DNA in vitro, in a portion dependent manner.

II. MATERIALS AND METHODS

The leaves of Piper nigrum were gathered from Keraladithyapuram, Trivandrum,Kerala , India in August,2018. The plant material was washed completely with refined water to eliminate surface foreign substances and was conceal dried for 30 days (9-13). Each example of the material was ground independently into fine powder and put away in impermeable holders at surrounding temperature.

Readiness of Crude Extracts:

The plant powder was taken in a test tube and refined water was added to it with the end goal that plant powder absorbed it and shaken well. The arrangement then, at that point, separated with the assistance of channel paper and sifted concentrate of the chose plant tests were taken and utilized for additional phytochemical examination. 100 ml of ethanol, hexane, and water (fluid) were taken into cleaned cone shaped jars of 100 ml limit then, at that point, added 5 gm of each dried powdered example. It was hatched for 10 days. Later the concentrates were separated through Whatman No.1 channel paper. The supernatants were gathered independently, named and utilized for the screening of different phytochemicals (14-18).

Phytochemical Analysis:

The standard subjective methodology are utilized for the distinguishing proof of following bioactive mixtures present in the leaves of Piper nigrum. Tests performed for the presence of phytoconstituents (19-26)

Meyer's test: To 1ml of every one of the example arrangement few drops of Meyer's reagent (potassium mercuric chloride arrangement) was added. A creamish white accelerate was shaped demonstrating the presence of alkaloids.

Wagner's test: To few ml of every one of the example arrangement in 10ml methanol add 1% HCl and Wagner's reagent (Iodine in potassium iodide) was added, which brought about the development of tanish red hasten

FeCl3 test: One drop of FeCl3 arrangement was added to every one of the test, development of yellow hasten was come about responding emphatically for alkaloids.

Basic reagent test: To 5ml of concentrate was blended in 2ml of chloroform and add 3ml of concentrated sulphuric corrosive.

Lead acetic acid derivation test: When watery fundamental lead acetic acid derivation was added to test produces ruddy earthy colored accelerate.

Ferric chloride test: To few ml of test tests taken independently, hardly any drops of ferric chloride were added which brought about the development of blackish red hasten

Brayer's test: To 1ml of cool filtrate was refined to 5ml of Distilled water and a couple of drops (2-3)of 10% ferric chloride was added. A somewhat blue dark encourage noticed the presence of tannin. 2. A amount of 0.5 g of the dried powdered example was bubbled in 20 ml of water and separated. A couple of drops of 0.1%.Ferric chloride was added and noticed for caramel or somewhat blue dark tone

Ferric chloride test: To test arrangement add a drop of ferric chloride,the improvement of extreme tone portray the presence of phenol.

Foam test: Crude dry powder of concentrate is overwhelmingly shaken with 2mL of refined water and is permitted to represent 10 min. On the off chance that steady foam shows up, it demonstrates the presence of saponins

EST FOR CARDIAC GLYCOSIDES:

The concentrate is blended in with 2ml of chloroform and 2ml of acidic corrosive. It is then cooled in ice. Cautiously add concentrated sulphuric acid. The shading change from violet to blue to green show presence of glycosides.

Test for steroids

Salkowski Test: To 2ml of the leaf separate, 2ml of chloroform was added trailed by concentrated sulphuric corrosive. Arrangement of ruddy earthy colored ring at the intersection showed the presence of steroids.

Libermann Burchard Test - 0.5 g of concentrate with not many drops of acidic anhydride, bubbled and cooled. Concentrated sulphuric corrosive was then added from sides of test tube (test tube is named a bit) and noticed for the arrangement of earthy colored ring at the intersection of the two layers. Green tone at upper side of ring and dark red tone beneath demonstrates a positive test for steroid

Test for terpenoids

Salkowski Test: To 2ml of the leaf separate, 2ml of chloroform was added trailed by concentrated sulphuric corrosive. Arrangement of rosy earthy colored ring at the intersection showed the presence of steroids.

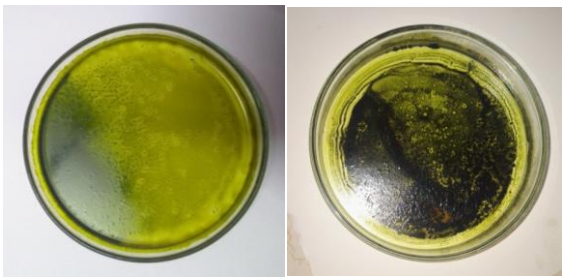

Fig 2 – Extricate prepared-extract and Preparation of crude extract

S. No	Phytochemical test	Aqueous extract	Ethanol extract	Hexane extract
1	Alkaloid	+	+	+
2	Flavonoid	+	-	-
3	Tannin	-	-	-
4	Phenolic compound	-	-	+
5	Saponin	+	-	-
6	Cardiac glycosidase	+	+	+
7	Steroid	-	-	-
8	Terpenoid	-	+	+

Table 1: *Detection of medicinally active alkaloids in Piper Nigrum*

III. RESULTS AND DISCUSSION

Plants comprise a significant and lasting wellspring of numerous auxiliary metabolites. Pepper leaves were extricated with different solvents and the concentrated concentrates was acquired and broken up in Dimethyl sulphoxide and saved it for my future use (Fig 2). All the pepper leaves removes were tried fundamental for the presence of constituents like alkaloids, flavonoids, saponins, tannins and phenols. The current review displayed the presence and nonattendance of phytochemical compounds in every dissolvable concentrate of water, ethanol and hexane. The consequences of the subjective phytochemical examination in the leaves of Piper nigrum. For extraction of phytochemicals, refined water, ethanol and hexane solvents were utilized. Primer phytochemical examination of Piper nigrum intensifies show different kinds of synthetic mixtures which give the gauge to the event of the restoratively dynamic constituents like terpenoids, alkaloids, flavonoids, glycosides, tannins. From tests it is uncovered that the ethanolic concentrate of leaf of P.nigrum shows least phytoconstituents. In light of the extremity of the substance compounds, they get isolated in particular solvents. Both ethanol and hexane separates showed the presence of terpenoids, alkaloids, and glycosidase while neither of the concentrates contain saponins (Table 1). Both fluid and ethanolic separates showed positive for alkaloids glycosidase. alkaloids, flavonoids and tannins are generally seen in watery and hexane extracts. Steroids and tannins were missing in all the three extracts. Glycosides were identified in all concentrates individually. Test for phenolic compounds showed positive in hexane remove.

Numerous unique exploration articles on the pharmacological capability of Piper nigrum (Black Pepper) or "Piperine" had been distributed up until this point. It was uncovered from these articles that Black Pepper has huge in vitro and in vivo pharmacological potential for the treatment of various afflictions and sicknesses and viewed as protected. Piperine has additionally been found to expand the retention of many medications and shown bioavailability upgrading movement of many medications and supplements. This significant property of piperine might be exceptionally useful to improve the helpful viability of numerous remedially significant medications. It is in this way presumed that Black pepper and its bioactive compound Piperine showed wide range restorative potential and furthermore arose as a fantastic adjuvant to improve the helpful viability of the simultaneously regulated medications and supplements. Further point by point research studies are expected to get more logical information on this extraordinary King of flavors. Flautist nigrum had been accounted for to restrain growths development in various exploratory models. Many contemplated uncovered the antitumor movement of P. nigrum or Piperine by the oral organization. The alcoholic concentrate of peppercorn and piperine displayed viable immunomodulatory and antitumor exercises. Piperine is additionally answered to decrease the cellular breakdown in the lungs by modifying lipid peroxidation and by antioxidative insurance compounds actuation. The piperine was assessed for the calming, pain relieving,

and against joint exercises. The in vitroanti-incendiary exercises were assessed on interleukin 1β invigorated fibroblast like synoviocytes got from rheumatoid joint inflammation, while hostile to ligament including pain relieving exercises were assessed on carrageen a prompted intense paw model of torment and joint inflammation in rodents. In vivo pain relieving movement of piperine in mice was assessed. The acidic corrosive incited squirming and tail flick examine models in mice were utilized to assess the pain relieving action of piperine

In this way this multitude of phytochemicals act synergistically and show useful impacts in therapy of wide assortment of sickness conditions going from pyrexia to disease. In view of this subjective examination, pepper leaves showed great wellspring of phytochemicals.

Acknowledgements:

Authors thank the management Bharath Institute of Higher Education and Research, Chennai, India for their encouragement and support in carrying out above research work.

References

[1]. *Ahmad N, Fazal H, Abbasi BH, Farooq S, Ali M, et al. Biological role of Piper nigrum L. (Black pepper): A review. Asian Pacific J Trop Biomed. 2012; S1945-S1953*

[2]. *Acharya SG, Momin AH and Gajjar AV. Review of Piperine as A Bio-Enhancer. Am J Pharm Tech Res. 2012; 2:32-44*

[3]. *Taqvi SI, Shah AJ, Gilani AH. Blood pressure lowering and vasomodulator effects of piperine. See comment in PubMed Commons below J CardiovascPharmacol. 2012; 52: 452-458.*

[4]. *Manoharan S, Balakrishnan S, Menon V, Alias L, Reena A. Chemopreventive efficacy of curcumin and piperine during 7,12-dimethylbenz[a] anthracene-induced hamster buccal pouch carcinogenesis. Singapore Med J. 2009; 50:139-46.*

[5]. *Parganiha R, Verma S, Chandrakar S, Pal S, Sawarkar HA, Kashyap P. In vitro anti- asthmatic activity of fruit extract of Piper nigrum (Piperaceae). Inter J Herbal Drug Res. 2011; 1:15-18.*

[6]. *Li S, Wang C, Wang M, Li W, Matsumoto K, et al. Antidepressant like effects of piperine in chronic mild stress treated mice and its possible mechanisms. See comment in PubMed Commons below Life Sci. 2007; 80: 1373-1381.*

[7]. *Matsuda H, Ninomiya K, Morikawa T, Yasuda D, Yamaguchi I, et al. Protective effects of amide constituents from the fruit of Piper chaba on D-galactosamine/TNF-alpha-induced cell death in mouse hepatocytes. See comment in PubMed Commons below Bioorg Med. 2007; 18: 2038-2042.*

[8]. *Johnson JJ, Nihal M, Siddiqui IA, Scarlett CO, Bailey HH, et al. Enhancing the bioavailability of resveratrol by combining it with piperine. See comment in PubMed Commons below MolNutr Food Res. 2011; 55: 1169-1176.*

[9]. *Farnsworth NR, Bunapraphatsara N. Thai medicinal plants recommended for primary health care system. Medicinal Plant Information Center. 1992.*

[10]. *Bauer AW, Kirby WM, Sherris JC, Turck M. Antibiotic susceptibility testing by a standardized Single disk method. American Journal of Clinical Pathology. 1966; 493.*

[11]. *Brain KR, Turner TD. The practical evaluation of phytopharmaceuticals. Bristol: Wright- Scientechnica; 1975.*

[12]. *Telrandhe UB, Hemalatha S, Modi A. Pharmacognostic and phytochemical investigation on root of Cadaba farinosa Forsk. Internation. Journal of Pharma and Biological Sciences. 2010; (2):1-13.*

[13]. *Culki I. Methodology of Analysis of Vegetable drug. Chemical Industries branch, UNIDO, 1994; 24: 26 -27.*

[14]. *Evans WC. Trease and Evans' pharmacognosy. Elsevier Health Sciences; 2009 ;May 27.*

[15]. *Perez C, Pauli M, Bazerque P. An antibiotic assay by the agar well diffusion method. Acta Biologie Et Medicine Experimental.1990; 15(1):113-5.*

[16]. *Javid T, Adnan M, Tariq A, Akhtar B, Ullah R, AbdElsalam NM. Antimicrobial activity of three medicinal plants (Artemisia indica, Medicago, falcata and Tecoma stans). African Journal of Traditional, Complementary and Alternative Medicines. 2015; 12(3):91-6.*

[17]. *Sandhya S, Sharmili SA, Anbumalarmathi J, Umamaheswari K. Phytochemical Analysis, GCMS. Composition, Antibacterial, Antioxidant Activity of Nyctanthes arbortristis and Nerium oleander. Journal of Chemical, Biological and Physical Sciences (JCBPS). 2016; 6(2):415.*

[18]. *Daniyan SY, Abalaka ME. Prevalence and Susceptibility Pattern of Bacterial Isolates.*

[19]. *Dental Caries in a Secondary Health Care Institution, Nigeria. Shiraz E-Medical Journal. 2011; 12(3):135-39*

[20]. *Harnessing the medicinal properties of Andrographis paniculata for diseases and beyond: a review of its phytochemistry and pharmacology - Agbonlahor Okhuarobo, Joyce Ehizogie Falodun, Osayemwenre Erharuyi, Vincent Imieje, Abiodun Falodun, Peter Langer. Asian Pacific Journal of Tropical Disease. 2014;*

[21]. *Biological activities of Kalmegh (Andrographis paniculata Nees) and its active principles - A review -Abhishek Niranjan, SK Tewari and Alok Lehri (Indian journal of natural products and resources. 2010; (2).*

[22]. *Phytochemical analysis and Antifungal Activity of Andrographis paniculata - Jaideep Singh Yadav IJPRBS. 2012; 1(4): 240-263.*

[23]. *Phytochemical Extraction and Characterization of the Leaves of Andrographis paniculata for its Anti-Bacterial, Anti-Oxidant, Anti-Pyretic and Anti-Diabetic Activity - Priyanka Das, Alok Kumar Srivastav (International Journal of Innovative Research in Science, Engineering and Technology. 2014; 3(8).*

[24]. *Qualitative Analysis of Andrographis paniculata Nees - Sanjay R. Biradar, Biradar D.S. and Bhagyashri D. Rachetti. International science journal. 2014; 1(4)*

[25]. *Phytochemical analysis of Andrographis Paniculata using different solvents-Sithara NV, Komathi S, Rajalakshmi G, Queen J, Bharathi D (European Journal of Biotechnology and Bioscience. 2016; 4(8), 28.*