

Phytochemical Study of Methanolic Extracts of Piper Nigrum Linn.



Botany

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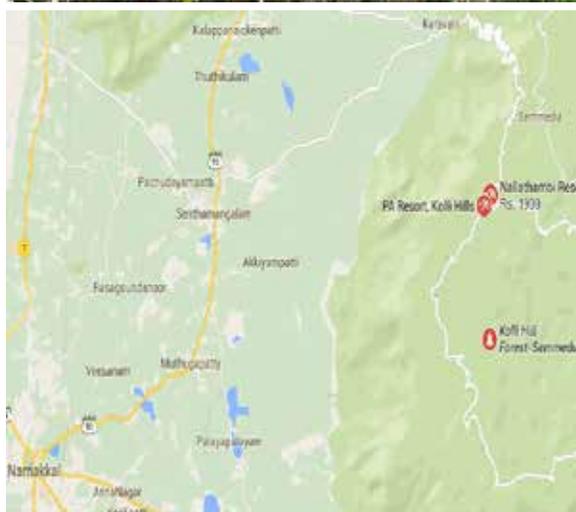
ABSTRACT

Piper nigrum L. is an important medicinal plant used in traditional and folk medicine. Ayurvedic and Unani system of medicine. The present study deals with the analysis of phytochemical constituents by qualitative method of Piper nigrum leaves and seeds were done using methanol extract. Alkaloids, flavonoids, terpenoids, steroids, anthraquinone, phenol, saponins, tannin, carbohydrates, oils and resins were analyzed. Alkaloids, flavonoids, phenol, carbohydrates were present in methanol extracts of leaves and seeds. Terpenoids, anthraquinones, oils and resins were absent in the extract.

1.Introduction

According to The World Health Organization (WHO) variety of drugs are obtained from medicinal plants. In developed countries about 80% of individuals depends on compounds derived from medicinal plants. The use of herbal medicine for the treatment of diseases and infections is old as mankind. Many references of medicinal plants the sacred Vedas dating back between 3500 BC and 800 BC. Before the history of plant have been used to treat or prevent illness. "Virikshayurveda" is the one of the remotest works in traditional herbal medicine compiled even before the beginning of Christian era. In the recent years increasing awareness of the important of medicinal plant. Ganesh *et al.* (2014) and Prasad *et al.* (2012) reported that, the occurrence of natural products with medicinal properties traced in Vedas and Bible. Plants have been model source of medicines as they are a reservoir of chemical agents with therapeutic properties from ancient time. Spices are used for flavoring, coloring or preserving the food. They are either used in the form of dried seed, fruit, root, bark and vegetable substances. Important part of human diet in herbs and spices. Spices are renewable raw materials, Spices have many uses like medicinal religious ritual, cosmetics or perfume production. Deepali *et al.* (2013) mentioned that, variety of spices produces in India, because different climates in different part of country. Spices are natural items so easily adapt by our human bodies, no side effects from its.

The organic compounds such as carbohydrates, proteins, fats, membrane lipids, nucleic acids, chlorophylls and hemes are found throughout the plant kingdom and are central to the metabolism of plant. Monika Gupta *et al.* (2013) reported that, small percentage of spices are Phytochemical studies in India are used in traditional folk and herbal medicine 6000 medicinal plants generally estimated in India. The medicinal plants are useful of healing as well as for curing of human diseases because of the presence of the phytochemical constituents. Phytochemicals are naturally occurring in the medicinal plants leaves, vegetables and root have defense mechanism and protect from various diseases. Phytochemicals are primary and secondary compounds. Chlorophyll, proteins and common sugars are included in primary constituents and secondary compounds have terpenoid, alkaloids and phenolic compounds. Terpenoids exhibit various important pharmacological activities, that is anti-inflammatory, anti-cancer, anti-malarial, inhibition of cholesterol synthesis, anti-viral and anti-bacterial activities. Terpenoids are very important in attracting useful mites and consume the herbivorous insects, alkaloids are used as anesthetic agents and are found in medicinal plant.



Piper nigrum is commonly known as Black Pepper. In Tamil "Milagu". *Piper nigrum* is called Indian long Pepper, evergreen plant, indigenous to Asia. Black Pepper is a flowering vine in the family Piperaceae contain more than 700 species for cultivated for its fruit. Black Pepper is native to South India, perennial herb. Vietnam is the world's largest producer and exporter of pepper, 34% producing. The plant is the world's most traded spices. Black Pepper, "The King of Spices" contributes its major share in Indian Spice. Pepper plant is used Ayurvedic and Unani system of medicine used as the plant fruit, root and seed thicker part

of stem are cut and used as important drug. Nisar Ahmad *et al.* (2012) reported that, Piperaceae family has been investigated for phytochemicals analysis only in 12% plant species and isolated in 592 compounds. (Sharma *et al.* 2014) reported that, the main therapeutical active constituents of *Piper nigrum* in alkaloid piperine, nerolidol is very famous secondary metabolite of *Piper nigrum* used to control mites. Another important compound volatile oil. Medicinally black pepper can be used for digestive disorders, different gastric problems, diarrhea, indigestion, respiratory disorders including cold, fever, asthma. Some skin disorder, isolated valuable compound from this specie including phenolics, lignans terpenes, chalcones, flavonoid, alkaloid and steroid. Biological activities of *Piper nigrum* antioxidant, radical scavenging, anti-insecticidals, antibacterial allelopathy, anti-convulsant, anti-tubercular, anti-pyretic, anti-inflammatory. The present investigation to find out the qualitative phytochemical analysis from the leaves and seeds.

2. Materials and Methods

Selection of Plant Species

The plant materials (leaves and seeds) of *Piper nigrum* were collected from the Semmedu of Kolli Hills in Namakkal District, Tamil Nadu, India. The plant materials were washed thoroughly 2-3 times with running tap water and once sterile with distilled water. Then the plant parts were shade dried and coarsely powdered separately and stored in well closed bottles for further analysis in laboratory.

Authentication of Plant materials:

Botanical Survey of India [BSI], Southern circle, Coimbatore, India. The specimen was labeled, numbered and annotated with the date of collection and locality.

Preparation of Extract

Crude sample was prepared by Soxhlet extraction method. About 20 gm of powdered material was uniformly packed into a thimble and extracted with 250 ml of methanol extract. The process of extraction has to be continued for 24 hours or till the solvent in siphon tube of extractor become colourless. After that the extract was taken in a beaker and kept on hot plate and heated at 30-40°C till all the solvent got evaporated. Dried extract was kept in refrigerator at 4°C till future use.

Phytochemical Screening

Preliminary phytochemical analysis was carried out for all the extracts as per standard method described by Brain and Turner (1975) and Evans (1996).

Detection of Alkaloids

Extracts were dissolved individually in dilute hydrochloric acid and filtered. The filtrates were used to test the presence of alkaloids.

Mayer's Test: Filtrates were treated with Mayer's reagent. Formation of a yellow cream precipitate indicates the presence of alkaloids.

Wagner's Test: Filtrates were treated with Wagner's reagent. Formation of brown / reddish brown precipitate indicates the presence of alkaloids.

Detection of Flavonoids

Lead Acetate Test: Extracts were treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of flavonoids.

H₂SO₄ Test: Extracts were treated with few drops of H₂SO₄. Formation of orange colour indicates the presence of flavonoids.

Detection of Steroids

Two ml of acetic anhydride was added to 0.5 g of the extracts, each with two ml of H₂SO₄. The colour changed from violet to blue or green in some samples indicates the presence of steroids.

Detection of Terpenoids

Salkowski's Test

0.2 g of the extract of the whole plant sample was mixed with two ml of chloroform and concentrated H₂SO₄ (3 ml) was carefully added form a layer. A reddish brown coloration of the inner face was indicates the presence of terpenoids.

Detection of Anthraquinones

Borntrager's Test

About 0.2 g of the extract was boiled with 10% HCl for few minutes in a water bath. It was filtered and allowed to cool. Equal volume of CHCl₃ was added to the filtrate. Few drops of 10% NH₃ were added to the mixture and heated. Formation of pink colour indicates the presence Anthraquinones.

Detection of Phenols

Ferric Chloride Test: Extracts were treated with few drops of ferric chloride solution. Formation of bluish black colour indicates the presence of phenol.

Lead Acetate Test: Extract was treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of phenol.

Detection of Saponins

About 0.2 g of the extract was shaken with five ml of distilled water. Formation of frothing (appearance of creamy miss of small bubbles) shows the presence of saponins.

Detection of Tannins

A small quantity of extract was mixed with water and heated on water bath. The mixture was filtered and ferric chloride was added to the filtrate. A dark green colour formation indicates the presence of tannins.

Detection of Carbohydrates

Extracts were dissolved individually in five ml distilled water and filtered. The filtrate was used to test the presence of carbohydrates.

Detection of Oils and Resins

Test solution was applied on filter paper. It develops a transparent appearance on the filter paper. It indicates the presence oils and resins.

3. Results and Discussion

The present study of phytochemical analysis the species of *Piper nigrum* the results presented in the table 1. The Phytochemical bioactive compounds of methanolic extracts *Piper nigrum* were qualitative analyzed for leaves and seeds. The presence of different types of secondary metabolites such as alkaloids, flavonoids, steroids, terpenoids, phenols, tannin and carbohydrates compounds and absent of this phytochemical study anthraquinones, oils and resins .

Table 1: Qualitative Phytochemical analysis of *Piper nigrum* leaves and seeds extracts with methanol solvent

Phytochemicals	Extracts	
	Leaves-Methanol	Seed-Methanol
Alkaloids		
Mayer's Test	+	+
Wagner's Test	+	+

Flavonoids		
Lead Acetate Test	+	+
H ₂ SO ₄	+	+
Steroids		
Liebermann-Burchard Test	+	-
Terpenoids		
Salkowski Test	+	-
Arthroquinone		
Borntrager's Test	-	-
Phenols		
Ferric Chloride Test	+	+
Lead Acetate Test	+	+
Saponin	+	-
Tannin	-	+
Carbohydrates	+	+
Oils & Resins		

(+) Detected, (-) Not Detected

Shilika Shetty and Vijaylaxmi (2012) reported in the earlier study different medicinal compounds such as glycosides, carbohydrates, amino acids, Saponins, flavones, tannins, phenols, oils and fat were present and alkaloids, steroids, glycosides were absent. Prasad *et al.* (2012) reported that, the presence of phenols, anthraquinones, terpenoids, flavonoids and lignin and glycosides, tannins, saponin were absent. Gayatri Nahak and Sahu (2011) reported the presence of alkaloid, glycosides, terpenoids, steroids, flavonoids, tannins, reducing sugar, anthraquinones. Jyothiprapha and Venkatachalam (2016) reported that, the presences of alkaloids, glycosides, phenol, terpanoids, carbohydrates and saponnin, steroids, flavanoids, protein, tannins were absent. Esha *et al.* (2013) and Praveen *et al.* (2011) reported the alkaloids, tannins, phenols, saponins, glycosides, sterol, lignin and reducing sugar were present and anthraquinones were absent in extract of *Piper longum*.

4. Conclusion

The present study conclude that the *Piper nigrum* leaves and seeds have the potential to act as a source of useful drugs. The various phytochemical constituents presences of alkaloids, flavonoids, steroids, phenols, Saponins, tannins and carbohydrates. The phytochemical constituents seemed to have the potential to act as a source of useful drugs and also improve the health status of the consumers as a result of the various compounds that are vital role for good health.

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