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Research Article

PHYSICOCHEMICAL AND PHYTOCHEMICAL ANALYSIS OF *ELA (ELETTARIA CARDAMOMUM) AND PIPPALI (PIPER LONGUM)*

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ABSTRACT

Aim: To evaluate physicochemical and phytochemical Analysis of Ela & Pippali. Objectives: To Analyse the Physicochemical and Phytochemical properties of Ela and Pippali, as physicochemical and phytochemical aspects is an important parameter in detecting adulteration or improper handling of drugs. Materials and Method: Raw drugs were procured from local market in Hassan. The Drugs are identified, and Physicochemical and Phytochemical analysis was done at Dravya Guna department of Sri Dharmasthala Manjunateshwara College of Ayurveda and Hospital Hassan. Results and Discussion: Physico chemical analysis of Ela and Pippali was carried out and found similar to reported API standard limits. Qualitative tests of the Ela showed presence of Glycosides, Flavonoids, steroids, carbohydrates and Proteins. Qualitative tests of the Pippali showed presence of Alkaloids, Glycosides, Flavonoids, steroids, tannins, carbohydrates and Proteins. These secondary metabolites are the essential part of the drug which makes the plant useful for treating different ailments and having the potential of providing useful drugs for the management of various conditions. Conclusion: The present study will provide sufficient information about the identification, standardization, Therapeutic efficacy and quality control of Ela and Pippali.

KEYWORDS: *Elettaria cardamomum, Pipper longum,* physicochemical analysis, phytochemical analysis

INTRODUCTION

Ela is pungent, aromatic, herbaceous and perennial plant of *zingiberaceae* family. This plant grows in height about 2 – 4m. Leaves of this plant are 20 – 40 cm long, linear – lanceolate, alternate in two ranks and have long pointed tip. Flowers are produced in loose spikes about 30 – 60cm long and white or pale violet in color. Fruits are 1 – 2cm long three sided, three chambered, yellow green pods surrounding several black, brown seeds. The green seed pods of this plant are dried, and seeds are used as spice.

Cardamomum is called 'Queen of spices. It has strong, unique taste, resinous fragrance and extensively soothing aroma. This herb is used as spice and medicine from 4th century. Seeds of this plant are used in wide range of preparations. Seeds are commonly used as breathe fresheners.[1]

Pippali is a cylinder Aromatic climber and creeping jointed stems and freshly fruits are embedded into the spikes. The leaves are of dark green colour. Flowers of this plant are monecious. Male and female flowers are borne on different plants. Leaves are ovate or heart shaped. They are about 2 – 3 inches long. This plant bear flowers during rainy season. Fruits of this plant are oval shaped consisting of orange and yellowish colour and they grow in early winters, drupes are about 1 inch in diameter. Spike when once get ripened, turns red in colour. Roots are greyish brown coloured and longitudinally wrinkled. They are perennial woody roots.

Long pepper has its reference from the ancient textbooks of Ayurveda. Ayurveda has explained various uses of long pepper for dietary purpose as well as for various health purposes. It is basically used for healthy respiratory system. Long pepper is also beneficial for healthy digestion and healthy metabolism as well.[2] Analytical procedure helps in determination of the presence of the materials in terms of Phytochemicals or compounds in the test drug. It is commonly used in chemical, clinical and pharmaceutical research laboratories as a part of quality control measures It is used for the standardizations of various Ayurvedic formulations i.e., Vasa Avaleha,[3] Vyaghri haritaki[4] Avaleha, Kanakabindvarishta,[5] Mahasudarshan churna, Balachaturbhadra churna etc. Keeping this in view, attempt has been made to evaluate the physicochemical, phytochemical analysis of root of *Piper longum* Linn and *Elettaria cardamomum*. The drug subjected to physicochemical and phytochemical analysis by following the standard procedures mentioned in Ayurvedic Pharmacopeia of India.[6]

MATERIAL AND METHODS

Procurement of raw materials

Raw drugs were procured from local market in Hassan. The Drugs are identified and authenticated in Dravya Guna department of Sri Dharmasthala Manjunateshwara College of Ayurveda and Hospital Hassan.

PHYSICOCHEMICAL EVALUATION

Physical Evaluation

Foreign Matter: Weigh 100 g of drug sample and spread it out. By inspection with the unaided eye or by the use of lens foreign matters are separated and weighed.

Total Ash: Two grams of sample was incinerated in a tared platinum crucible at temperature not exceeding 450 degree C until carbon free ash is obtained. Percentage of ash was calculated with reference to weight of the sample.

% of Total Ash = Wt of Residue / Wt of sample × 100

Acid insoluble ash: To the crucible containing total ash, 25ml of dilute HCl was added and boiled. The insoluble matter on ash less filter paper (Whatman No 41) was collected and washed with hot water until the filtrate is neutral. The filter paper containing the insoluble matter was transferred to the original crucible. It was dried on hot plate and ignited to constant weight. The residue was allowed to cool in insoluble ash with reference to the air – dried drug was calculated.

% of Acid insoluble Ash = Difference in weights / Wt of the sample × 100

Alcohol soluble extractive: 4 grams of the sample was weighed accurately in a glass stoppered flask. To this 100ml of distilled alcohol (approx. 95%) was added. The mixture was shaken occasionally for 6 hours. It was allowed to stand for 18 hours. Then it was filtered rapidly taking care not to lose any solvent. 25ml of the filtrate was pippeted out in a pre – weighed 100ml beaker. It was evaporated to dryness on a water bath. It was kept in hot air oven at 105 degree C for 6 hours cooled in desiccators for 30 min and weighed. The percentage of alcohol extractable matter of the sample was calculated. Repeat the experiment twice and take the average value.

% of Alcohol soluble extractive= Difference in wt / Wt of sample × 100

Water soluble extractive: Grams of the sample was weighed in a glass stoppered flask. To this 100ml of distilled water was added, shaken occasionally for 6 hours. It was allowed to stand for 18 hours. It was filtered rapidly taking care not to lose any solvent. 25ml of the filtrate was pipetted out in a pre – weighed 100ml beaker. It was evaporated to dryness on a water bath. It was kept in an air oven at 1050 C for 6 hours. It was cooled in desiccators and weighed. Repeat the experiment twice. Take the average value.

% of Water-soluble extractive= Difference in wt / Wt of sample × 100

PHYTOCHEMICAL EVALUATION

Preliminary phytochemical tests

Test for Alkaloids
Dragendorff's test: To 2 – 3 ml filtrate, add few drops Dragendorff's reagent. Orange, brown precipitate, is formed.

Test for Glycosides
Borntrager's test for Anthraquinone glycoside: To 3 ml of extract, add dilute Sulphuric acid. Boil and filter. To cold filtrate, add equal volume benzene/chloroform. Shake well. Separate the organic solvent. Add ammonia. Ammonical layer turns pink or red.

Test for Saponin
Foam test: Shake the drug extract or dry powder vigorously with water. Persistent stable foam observed.

Test for flavonoids
Shinoda test: To extract, add 5 ml 95% ethanol/t-butyl alcohol, few drops conc. HCL and 0.5g magnesium turnings. Orange, pink, red to purple colour appears.

Sulphuric acid: On addition of sulphuric acid (66% or 80%) flavones and flavanols dissolve into it and give a deep yellow solution. Chalcones and aurones give red or red-bluish solutions. Flavones give orange to red colours.

Tests for carbohydrates
Benedict's test: Mix equal volume of benedict's reagent and test solution in test tube. Heat in boiling water bath for 5 min. Solution appears green, yellow, or red depending on amount of reducing sugar present in test solution.

Fehling's test: Mix 1 ml Fehling's A and 1 ml Fehling's B solutions, Boil for 1 min. Add equal volume of test solution. Heat in boiling water bath for 5 to 10 min. First yellow, then brick red precipitate. is observed.

Test for Tannins and Phenolic compounds
Ferric chloride test: To 2 ml of the test solution, add few drops of 5% ferric chloride solution, deep blue-black colour is formed.

Lead acetate test: To 2 ml of the test solution, add few drops Lead acetate solution, white precipitate. is formed.

Test for protein
Biuret test: To 3 ml T.S. add 4% NaOH and few drops of 1% CuSO4 solution. Violet or pink colour appears.

Precipitation test: The test solution gives white colloidal precipitate. With following reagents: (a) Absolute alcohol (b) 5% Mercuric chloride solution (c) 5% Copper sulphate solution (d) 5% lead acetate (e) 5% Ammonium sulphate

Test for steroids
Salkowski reaction: To 2 ml of test solution, add 2 ml chloroform and 2 ml conc. Sulphuric acid. Shake well. Chloroform layer appears red and acid layer shows greenish yellow fluorescence.

RESULTS

ELA

Botanical Source: *Elettaria cardamomum* Maton
Used Part: Seed

Organoleptic Examination
Size: 1 to 2 mm pieces
Texture: Hard
Surface: Rough
Colour: Brownish Black outer surface inner surface
Fracture: No
Odour: Characteristic
Taste: Pungent

Table 1: Physicochemical Analysis

Particulars	Values obtained
Foreign Matter	0%
Total Ash	3.66%
Acid – insoluble ash	3.2%
Alcohol soluble extractive	5.8%
Water soluble extractive	8.6%

Table 2: Physicochemical Analysis API Standards[7]

Particulars	Values obtained
Foreign Matter	Nil
Total Ash	Not more than 6%
Acid – insoluble ash	Not more than 4%
Alcohol soluble extractive	Not less than 2%
Water soluble extractive	Not less than 10%

Table 3: Phytochemical Analysis

Particulars	Result
Alkaloids	Negative
Glycosides	Positive
Saponins	Negative
Flavonoids	Positive
Carbohydrates	Positive
Tannins	Negative
Proteins	Positive
Steroids	Positive

PIPPALI

Botanical Source: *Piper longum* Linn
Used Part: Fruit

Organoleptic Examination
Size: 1.5 to 2.5 cm pieces
Texture: Hard
Surface: Rough
Colour: Brownish Black outer surface inner surface
Fracture: Brittle
Odour: Characteristic
Taste: Pungent

Table 4: Physicochemical Analysis

Particulars	Values obtained
Foreign Matter	0.32%
Total Ash	5%
Acid – insoluble ash	1.6%
Alcohol soluble extractive	13.4%
Water soluble extractive	11.6%

Table 5: Physicochemical Analysis API Standards[8]

Particulars	Values obtained
Foreign Matter	Not more than 2%
Total Ash	Not more than 7%
Acid – insoluble ash	Not more than 0.5%
Alcohol soluble extractive	Not less than 5%
Water soluble extractive	Not less than 7%

Table 6: Phytochemical Analysis

Particulars	Result
Alkaloids	Positive
Glycosides	Positive
Saponins	Negative
Flavonoids	Positive
Carbohydrates	Positive
Tannins	Positive
Proteins	Positive
Steroids	Positive

DISCUSSION

The physical constant evaluation of drugs is an important parameter in detecting adulteration or improper handling of drugs. Physicochemical analysis of Ela and Pippali was carried out and found similar to reported API standard limits. Qualitative tests of the Ela showed presence of Glycosides, Flavonoids, steroids, carbohydrates and Proteins. Qualitative tests of the Pippali showed presence of Alkaloids, Glycosides, Flavonoids, steroids, tannins, carbohydrates and Proteins. Polyphenols such as tannins and flavonoids are reported numerous health protective benefits like lowering of blood lipids.[9] Tannins are known to possess general antimicrobial and antioxidant activities.[10] Glycoside is a molecule in which a sugar is bound to another functional group via a glycosidic bond. Glycosides play numerous important roles in living organisms.[11] In animals and humans, poisons are often bound to sugar molecules as part of their elimination from the body. Steroids are mainly useful in reduction of inflammation and it has anti cancerous effect and helps in building body mass. Carbohydrates help to provide energy to the body and Proteins helps in growth and maintenance of the body. These secondary metabolites are the essential part of the drug which makes the plant useful for treating different ailments and having the potential of providing useful drugs for the management of various conditions.

CONCLUSION

The results obtained from Physicochemical and Phytochemical evaluation would be helpful in the identification and quality control of the drug and ensure therapeutic efficacy. Thus, the present study will provide sufficient information about the identification, standardization and quality control of Ela and Pippali.

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