Research Article

Phytochemical Screening and Total Phenolic Content of Aqueous and Acetone Extracts of Seed, Butter, Mace of Nutmeg (*MyristicaFragrans* Houtt)

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ABSTRACT

The present study of Phytochemical screening of aqueous and acetone extracts of seed, butter and mace of Nutmeg (*Myristica fragrance* houtt) was done using standard methods of phytochemical analysis. Total Phenolic content was estimated by folin-ciocalteu method. The acetone mace extract showed a significant total phenolic content as compared to the other extracts.

Keywords: Phytochemical screening, *Myristica fragrance* houtt, Total Phenolic, folin-ciocalteu method, Nutmeg.

INTRODUCTION

Since ancient times people have been exploring the nature particularly medicinal plants in search of new drugs. Medicinal plants are used by 80% of world population for their basic health needs.[1]

Myristica fragrance is a perennial edible plant of the Annanceae family. The seed are economically and medicinally important. The kernel obtained from the seed is a popular condiment used as a spicing agent. The seeds are embedded in a white sweet smelling pulp and are most economically important part of the tree.[5]

Nutmeg is the seed kernel inside the fruit and the mace is the lacy covering aril on the kernel. Nutmeg has aromatic, stimulant, narcotic, carminative, astringent, aphrodisiac, hypolipidemic, antithrombotic, antiplatelet aggregation, antifungal, anti-dysenteric, anti-inflammatory activities.[6]

Plant synthesize a wide range of chemical compounds which are classified based on their chemical class, bio-synthetic origin and functional groups in to primary and secondary metabolite.

Primary metabolites are directly involved in growth and development while secondary metabolite are not involved directly and they have been worked as biocatalyst. Secondary metabolites are synthesized during secondary metabolism of plants, they are basic source of several pharmaceutical industries since they have medicinal properties and all secondary metabolite have specific function.[1]

In the present study aqueous and acetone extract of seed and butter of *Myristica fragrance (hautt)* were subjected to preliminary phytochemical screening for the presence of different secondary metabolites such as flavonoids, alkaloids, tannins, saponins, glycosides, terpenoides, steroids, resin, phenolics, phalobatannins, diterpenes, quinones. Total Phenolic content of the above extract also estimated.

MATERIALS AND METHODS

Preparation of Extract

Nutmeg obtained from estate of kodaikanal, flesh was separated, oven dried at a temp of 45°C and mashed. Nutmeg Kernel and mace are obtained from market commercially and ground. Each powder macerated and mixed with water and acetone in the ration of 1:4. Acetone and Aqueous extract of butter, seed and mace was obtained using soxhlet apparatus.

Phytochemical Screening

Phytochemical test in aqueous and acetone extract of butter, seed and mace were done using modified procedure by Harbarne[12]. Types of qualitatively analysed phytochemicals are Tannins, Flavonoids, Alkaloids, Terponoides, Steroids, Saponins, Diterpines, Resins, Phenol Quinones, phalobatannins, Glycosides.

Test for Flavonoids

A few drops of 1% liquid ammonia was taken in test tubes, to which the sample was added. Yellow coloration of the solution confirmed the presence of Flavonoids.

Test for Tannins

To 5ml of the sample, a few drops of 0.1% Ferric chloride was added. The presence of a brownish green or blue black color indicated that the material possessed Tannins.

Test for Phalobatannins

Ten ml of the sample was boiled with 1% HCl in a test tube. The presence of Phalobatannins was confirmed by the deposition of red precipitate in the tube.

Test for Terpenoids

Around 2 ml of chloroform and 3 ml of concentrated sulphuric acid were added consecutively to 5 ml of the sample. A reddish brown interface in the solution denoted the presence of Terpenoids.

Test for Alkaloids

2 ml filtrate was mixed with 2 ml of Hcl and about 6 drops of mayers reagent. A creamish or pale yellow precipitate indicated the presence of alkaloids.

Test for Saponins

Froth test for saponins was used. 2 ml of distilled water was added to 2 ml of the test solution and shaken well and observed for frothing.

Test for Steroids

1 ml of solvent extract was dissolved in 2 ml of acetic anhydride, was added to 2 ml of sulphuric acid. The colour changed from violet to blue or green in some samples indicating presence of steroids.

Test for Glycosides

Mix 2 ml of solvent extract with 2 ml of chloroform. Add 2 ml of acetic anhydride and 2 drops of concentrated sulphuric acid from the side of test tube.

First Red then blue and finally green colour appears indicating Glycosides.

Test for Phenols

2ml of ethanol was added to the test solution and few drops of ferric chloride solution was added. Blue coloration indicates the presence of Phenols.

Test for Diterpenes

To the extract, 3-4 drops of copper acetate solution was added.

Formation of emerald green color shows the presence of diterpenes.

Test for Quinones

A small amount of extract was treated with concentrated Hydrochloric acid and observed for the formation of yellow precipitate.

Determination of Total Phenolic Content

The total phenolic content was determined by using the folin-ciocalteu assay[16].

An aliquot (1 ml) of extracts and standard solution of Gallic acid was added to 25 ml of volumetric flask, containing 9 ml of distilled water.

A reagent blank using distilled water was prepared. 1 ml of folin-ciocalteu phenol reagent was added to the mixture and shaken.

After 5 Minutes 10 ml of 7% sodium carbonate solution was added to the mixture. The volume was then made up to the mark.

After incubation for 90 Minutes at room temperature, the absorbance against the reagent blank was determined at 550 nm with an UV-visible spectrophotometer.

Total phenolic content was expressed as mg Gallic acid Equivalents (GAE).

RESULTS AND DISCUSSION

Phytochemical Screening

Phytochemical analysis help in identifying new source of therapeutically and industrially valuable compounds. In the present study, secondary metabolites were qualitatively analysed in various Nutmeg extracts.

Acetone seed extract and acetone mace extract showed the presence of maximum number of plant constituents (Table 1).

Different phytochemicals have been found to possess a wide range of medicinal properties, which may help in protection against various diseases.

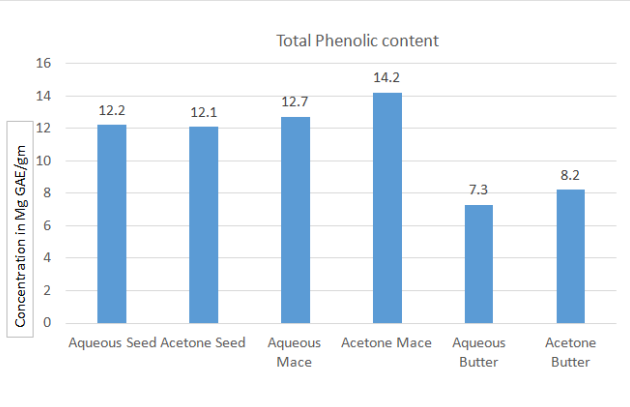
For example, Flavonoids acts as antioxidant, Alkaloids protect against chronic diseases, saponins protect against hypercholesterolemia and steroids, triterpenoids show analgesic properties.

Table 1: Preliminary Phytochemical screening of *Myristica fragrance Hautt.*

S. No.	Plant Constituents	Acetone Seed	Aqueous Seed	Acetone Butter	Aqueous Butter	Acetone mace	Aqueous mace
1	Alkanoids	+	-	-	-	++	+
2	Flavonoids	++	+	-	-	++	+
3	Tannins	+	-	+	-	+	-
4	Saponins	-	+	-	-	-	-
5	Glycosids	+	-	+	-	+	++
6	Terponoids	++	-	+	+	+	-
7	Steroids	++	+	+	-	+	-
8	Resin	+	+	-	-	-	+
9	Phenolics	+	+	+	+	++	+
10	Phaloba Tannins	-	-	-	-	+	-
11	Diterpenes	+	+	+	-	-	+
12	Quinones	+	-	+	+	+	-

Table 2

S. No	Sample Extract	Concentration of total phenolics (mg GAE/gm)
1	Aqueous Seed	12.2
2	Acetone Seed	12.1
3	Aqueous Mace	12.7
4	Acetone Mace	14.2
5	Aqueous Butter	7.3
6	Acetone Butter	8.2



Graph 1

Total Phenolic Content

The quantity of total phenol was found to be high in Acetone mace extract (14.2 mg GAE/gm) when compared with other plant extracts. The total phenol content in aqueous seed extract, acetone seed extract and aqueous mace extract was found to be almost equal. Whereas aqueous butter extract showed a very low total phenol concentration of about 7.3 mg GAE / gm. (Table-2)(Graph–1).

CONCLUSION

The present study revealed the secondary metabolites and total phenolic content of aqueous and acetone extract of butter, seed and mace of Nutmeg (myristica *fragrance* houtt).

The high content of phenolic compounds indicates that these compounds contribute to the antioxidant activity.

The high concentration of phenolic compounds in acetone mace extract is promising that in future antioxidant analysis can be done and has high potential value for drug preparation.

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