



ISSN 2320-3862

JMPS 2017; 5(1): 323-325

© 2017 JMPS

Received: 05-11-2016

Accepted: 07-12-2016

Varsha D Hutke

P.G. Dept. of Botany, Govt.
Vidarbha Institute of Science and
Humanities, Amravati, India

Mayuri Naswale

P.G. Dept. of Botany, Govt.
Vidarbha Institute of Science
and Humanities, Amravati,
India.

Screening of various extracts of *Grewia Hirsuta* leaves and fruits for secondary metabolites

Varsha D Hutke and Mayuri Naswale

Abstract

Secondary metabolites present in plants are responsible for medicinal activity of plants. The present investigation is designed in screening of secondary metabolites present in the leaves and fruits of *Grewia hirsuta* an ethnomedicinally important plant. *Grewia* belonging to the family Tiliaceae is reported to have high medicinal value. The qualitative analysis for secondary metabolites was performed with different solvents such as ethanol, ethyl acetate, acetone, chloroform and distilled water. Phytochemical analysis revealed the presence of various chemical compounds like alkaloids, flavonoids, terpenoids, glycosides, steroids and phenols in various extracts.

Keywords: *Grewia hirsuta*, Secondary metabolites, Medicinal plants, Phytochemical screening

Introduction

Medicinal plant is any plant which, in one or more of its organs, contains substances that can be used for therapeutic purposes, or which are precursors for chemo pharmaceutical semi-synthesis. When a plant is designated as a “medicinal” it is implied that the said plant is useful as an active ingredient of medicinal preparations [12].

Since time immemorial, man has used various parts of plants in the treatment and prevention of various ailments [13]. Diversity of medicinal plants and herbs containing various phytochemicals with biological activity can be of valuable therapeutic importance. Different phytochemicals have been found to have broad range of activities which may help protection against chronic diseases [8]. In India 95% of prescriptions were plant based in the traditional system of Unani, Ayurveda, Homeopathy and Siddha [11].

Grewia hirsuta belong to family Tiliaceae also known as kukuebicha, Govli. It is shrub with 30-90 cm high branches slender, leaves 5-11, oblong linear- lanceolate, stellate, small hairy above, flowers white turning yellow, fruit 2-4 lobed, shining brown, hairy. *G. hirsuta* has high medicinal value; leaves are useful in nose and eye diseases, anthelmintic [3]. The root is astringent to the bowel; useful in cholera, hydrophobia, kidney pain, piles, anthelmintic [2]. Leaves and fruits are purgative, expectorants, carminative, abortifaciant, galactagogue; useful in splenic enlargement, eye troubles, piles, rheumatism pain in joints and in breasts [6]. Considering all these facts, the present study was designed to investigate the presence of various phytochemicals in the five different extracts of the leaves and fruits of *G. hirsuta*.

Material method

Collection of plant material

The fresh sample of leaves and fruits of *G. hirsuta* were collected from Brahminvada region, Undri, Dist-Buldana, Maharashtra and identified with the help of floras. Collected materials were washed under running tap water to remove the surface pollutants and air dried under shade. After drying, the plant materials were ground well using mechanical blender into fine powder and transferred into airtight containers with proper labeling for future use.

Preparation of the plant extracts

Crude plant extracts were prepared by Soxhlet extraction method. About 50 gm of powdered plant material was uniformly packed into a thimble and extracted with 500 ml of different solvents separately. Solvents used were ethanol, ethyl acetate, acetone, chloroform and distilled water. The process of extraction continues for 24 hours or till the solvent in siphon tube of an extractor become colorless.

Correspondence

Varsha D Hutke

P.G. Dept. of Botany, Govt.
Vidarbha Institute of Science and
Humanities, Amravati, India

After that the extracts were taken in a beakers and kept on hot plate and heated at 30–40°C till all the solvent got evaporated. Dried extracts were kept in refrigerator at 4°C for their future use in phytochemical analysis.

Qualitative Phytochemical test

The solvent free extract obtain as above was then subjected to qualitative preliminary phytochemical screening for identification of various plants constituents following the standard methods [5, 7].

Test for Alkaloids

Solvent free extracts, 50 mg was stirred with few ml of dilute HCL and filtered. The filtrate was tested with various alkaloidal reagents as follows:

Mayer's test

Few ml of filtrate and a drop or two of Mayers reagent were added by the side of the test tube. A white or creamy ppt indicates the presence of alkaloids.

Wagner's test

To a few ml of filtrate, few drops of Wagner's reagent were added by the side of the test tube. A reddish- brown ppt confirms the presence of alkaloids.

Hager's test

To a few ml of filtrate, 1 or 2 ml of Hager's reagent (saturated aqueous solution of picric acid) were added. A prominent yellow ppt indicates the presence of alkaloids.

Test for phenolic compound

Lead acetate test

The extract (50mg) was dissolved in distilled water and to this; 3ml of 10% lead acetate solution was added. A bulky white ppt indicates the presence of phenolic compounds.

Test for Tannins

About (0.5g) of the plant extract was added in 10 ml of water in test tube and filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or blue- black coloration.

Test for proteins

To 2 ml of protein solution 1ml of 40% NaOH solution and 1 to 2 drops of 1% CuSO₄ solution was added. A violet color indicated the presence of peptide linkage of the molecule.

Test for amino acids

To 2 ml of sample was added to 2 ml of Ninhydrin reagent and kept in water bath for 20 minutes. Appearance of purple color indicated the presence of amino acid in the sample.

Test for reducing sugars

To 2 ml of extract 2 drops of Molisch's reagent was added

and shaken well. 2ml of conc. H₂SO₄ was added on the sides of the test tube. A reddish violet ring appeared at the junction of two layers immediately indicated the presence of carbohydrates.

Test for glycoside

Each extract was hydrolyzed with HCL and neutralized with NaOH solution. A few drops of Fehling's solution A and B were added to each mixture. Formation of red ppt indicates the presence of glycosides.

Test for Flavonoids

- (a) 0.2 g of each extract was dissolved in diluted NaOH and few drops of HCL were added. A yellow solution that turn colorless indicates the presence of flavonoids
- (b) To 2 ml of test solution, 0.5ml alcohol was mixed. Then a bit of magnesium and 1 or 2 drops of con. HCL were added and heated. The mixture was analyzed for reaction.

Test for Phenols

To 2 ml of test solution, alcohol and then few drops of neutral ferric chloride solution was added. A dark green clour indicated the presence of phenolic compound.

Test for Coumarins

3 ml of 10% NaOH was added to 2 ml of aqueous extract, formation of yellow color indicates the presence of coumarins.

Test for Resins

To the 0.2 g of each extract, 10 ml of glacial acetic acid was added then heated and cooled. A drop of conc. H₂SO₄ was added. Purplish red color shows the presence of resins.

Test for Steroids/ Terpenoids

1 ml of the extract was dissolved in 10 ml of chloroform and equal volume of con. H₂SO₄ was added by the side of the test tube. The upper layer turns red and H₂SO₄ layer showed yellow with green fluorescence indicated the presence of steroids.

Observations and Results

Table 1: Nature and color of various extracts of *Grewia hirsuta* (Leaf & Fruit)

| Extracts | Texture | | Color | |
|-----------------|---------|--------|------------|-------------|
| | Leaf | Fruit | Leaf | Fruit |
| Ethyl alcohol | Sticky | Sticky | Dark green | Light brown |
| Ethyl acetate | Sticky | Sticky | Dark green | Light brown |
| Acetone | Sticky | Sticky | Dark green | Light brown |
| Chloroform | Sticky | Sticky | Dark green | Light brown |
| Distilled water | Sticky | Sticky | Brown | Light brown |

Table 2: Phytochemical analysis of various extracts from leaves and fruits of *Grewia hirsuta*

| Phytochemical components | Leaf Extract | | | | | Fruit Extract | | | | |
|-----------------------------|---------------|---------------|---------|------------|---------|---------------|---------------|---------|------------|---------|
| | Ethyl alcohol | Ethyl acetate | Acetone | Chloroform | Aqueous | Ethyl alcohol | Ethyl acetate | Acetone | Chloroform | Aqueous |
| Alkaloids | - | - | - | - | + | - | + | - | - | - |
| Mayer's | + | + | + | + | + | + | + | + | + | + |
| Hager's | + | + | + | + | + | - | + | + | + | + |
| Wagner's | | | | | | | | | | |
| Phenolic compounds | | | | | | | | | | |
| Lead acetate | + | + | + | + | + | + | + | + | + | + |
| Tannin | | | | | | | | | | |
| Ferric chloride | + | - | - | - | + | - | - | - | - | - |
| Protein | - | - | + | + | - | + | + | + | + | - |
| Amino acids | - | - | - | - | - | | | | | |
| Reducing sugar | - | - | - | - | - | - | - | - | - | - |
| Glycosides | - | - | - | - | + | - | - | - | - | - |
| Flavonoides | - | - | + | + | - | + | + | + | + | + |
| Phenols | + | + | + | + | + | + | + | + | + | + |
| coumarins | + | + | + | + | + | + | + | + | + | + |
| Reasins | - | - | - | - | - | - | - | - | - | - |
| Steroids/ Terpenoids | - | - | - | - | + | + | + | + | + | + |

Key: (+) = indicate present, (-) = indicate absent

Table 1 indicated nature and color of leaf and fruit extracts of *G. hirsuta*. In all five solvents both leaf and fruit extracts showed sticky nature of extract. All extracts of fruits exhibited dark brown color and dark green color for leaf extract except distilled water (Brown).

The phytochemical characteristics of leaves and fruits of *G. hirsuta* were summarized in the table-2. The results revealed the presence of medically active compounds in *G. hirsuta*. From the table it could be seen that alkaloids, phenolic compounds, phenols, coumarins were present in leaf extract of the solvents such as ethanol, ethyl acetate, acetone, chloroform and distilled water. However proteins, flavonoids, tannins were found in some extracts like acetone, chloroform, distilled water. Reducing sugar, glycosides and resins were completely absent in leaf of *G. hirsuta*. In all the extracts fruit alkaloids, phenolic compounds, flavonoides, proteins, coumarin, steroids/terpenoids were present while tannin, reducing sugar, glycosides and resin were absent.

According to previous study secondary metabolites saponin, tannin, flavonoids and phenols [9]; alkaloids, flavonoids, phenol and terpenoids [11]; terpenoid, fatty compound, flavonoids, steroids, saponins and tannins [4]; tannins, saponins, steroids, terpenoids, phenols [10] were present *G. hirsuta*. Present results also in support of them.

References

1. Abiram N, Natarajan B, Sagadevan E. Phytochemical investigation and invitro evaluation of hypoglycemic potential of *Grewia hirsuta*. International journal of pharma and bio sciences. 2014; 5(1):76-83.
2. Bhakuni DS, Dhar ML, Dhar MM, Dhawan BN, Gupta B, Shrimal RC. Screening of Indian plants for biological activity: Part-III. Indian J Exp Biol. 1971; 9:91-102
3. Dhavan BN, Patnaik GK, Singh KK, Tandon JS. Screening of Indian plants for biological activity: Part-IV. Indian J Exp Biol. 1977; 15:208-219.
4. Goyal PK. Phytochemical and pharmacological properties of genus *Grewia*: A Review. Int J Pharm Pharm Sci. 2012; 4(4):72-78.
5. Harbone JB. Phytochemicals methods. Chapman and Hill. London, 1973.

6. Kirtikar KR, Basu BD. Indian medicinal plants, International book distributors, Dehradun, India, 1995, 1.
7. Kokate CK. *Practical Pharmacognosy*, 4th ed., Vallabh Prakasan, Delhi, 1994, 107-111.
8. Liu RH. Health benefits fruits and vegetables are from additive and cynergic combination of phytochemicals. Am. J. Clin. Nuter. 2003, 517S-520S.
9. Shagal MH, Kubararawa D, Ldi Z. Phytochemical screening and antimicrobial activity of root, stem bark and leaves extracts of *Grewia mollis*. African Journal of Biotechnology. 2012; 2(5):11350-11353.
10. Sharma N, Patni V. *In vivo* an *in vitro* qualitative phytochemical screening of *Grewia* species. International Journal of Biological and Phaemaceutical Research. 2013; 4(9):634-649.
11. Satyavati GV, Gupta AK, Tondon N. Medicinal plants of India. Indian council of medicinal Research, New Delhi, India, 1987.
12. Savitram N, Rao LM, Suhrulatha. Screening of medicinal plants for secondary metabolites. Middle- East J. of Sci. Res. 2011; 8(3):579-584.
13. Tanaka H, Sod M, Fuijiwara S, Antibacterial activity of isoflavonoids isolated from *Erythrina variegata* against mehticillin resistant *Staphylococcus aureas*. Lett. Appl Microbiol. 2002; 35:495-498.