



The Phytochemical Study of Leaf Samples of Three *Grewia* Species from Western Maharashtra.

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Abstract

Grewia species are well known their nutritional and therapeutic attributes. The plants which exhibit medicinal properties are subjected to detailed pharmacognostic analysis whereby their proper identification can be done. *Grewia flavescens* A. Juss. popularly known as “donkeys berry”, is a shrub or small tree distributed in southern India and this plant is known for its nutritional value. In spite of having many ethno medicinal reports available on these plants, there is no sufficient scientific work on pharmacognosy pharmacological effects of these plants, hence in this present investigation, study was done for preliminary screening of phytoconstituents. The objective of present investigation was to carry out the determination of phytochemical study from leaf samples of *Grewia flavescens* A. Juss, *Grewia damine* gaertn and *Grewia nervosa* (Lour.) panigr. The phytochemical screening of different solvent extracts of the leaves revealed the presence of alkaloids, flavonoids, saponins and tannins and irodoids along with minerals like calcium and potassium. This study will be helpful in determining the various other phytochemical and physiochemical parameters of these plants in future.

Keywords: Pharmacological effects, phytochemical screening, alkaloids, flavonoids, saponins, tannins, irodoids, minerals

Introduction

The medicinal plants presently carry considerable important aspect due to their especial attributes as a source of therapeutic phytochemicals that may lead to the development of novel drugs. Traditional knowledge of herbal medicine might serve as a powerful tool for drug discovery.

The drug discovery from plants is more holistic and can provide maximum benefits to the community. Plants become medicinally more significant when their therapeutic uses are known, characterization has been done and screening of phytochemicals has been accomplished (Singh *et*

al., 2014). *Grewia flavescens* is a plant from the semi-arid and sub-humid tropical zones of Africa, Saudi Arabia, Yemen and India used to treat organic and infectious diseases (ELhassan *et al.*, 2021). *Grewia*, the versatile genus of medicinal plant is the unique source of various types of compounds having diverse chemical structure. It is very useful traditional plant genus, crude extract from various part of various species have a therapeutic uses from time immemorial. Phytochemically, the genus *Grewia* has been found to possess mainly triterpenoids, fatty component, flavonoids, steroids, saponins and tannins (Goyalet *al.*, 2012). The *Grewia* species are rich in phytochemicals and are regarded as a promising niche in averting or ameliorating the chronic ailments (Ullah *et al.*, 2012). During the last few decades, medicinal properties of many species have been identified (Asolkar *et al.*, 1992). Traditional medical practitioners residing in the vicinity of the forests of the Thirtharameshwara range and Ubbrani range of Western Ghats of Karnataka, India, were using the stem bark extracts and pastes for curing jaundice, hepatic disorders, and bronchial and urinary infections (Kirthikar and Basu, 1975). Leaves of *Grewia flavescens* A.Juss. have also been used in the stomach and intestine disorders such as diarrhoea and dysentery and to be useful in ulcerated tongue, colic pain, wounds, cholera and dysentery. (Ribeiro *et al.*, 2010). Medicinal plants may be the ones frequently used in treating and preventing specific ailments and diseases and that are usually well thought-out to be detrimental to humans (Nwachukwu *et al.*, 2010).

Materials and Methods

The plant specimens were collected from different localities of Maharashtra viz., Kolhapur, Pune, Sangli, Satara and Sholapur. The material was collected in polythene bags and brought to the laboratory for phyto-chemical analysis.

Determination of alkaloids: This was done by preparing Meyers reagents, Wangers reagent and Dragendroff's reagent.

Procedure: 5 gm of powdered material was extracted with 50 ml 5 % ammoniac ethanol for 48 hrs, the extract was concentrated by distillation and the residue was treated with 10 ml of 0.1 N H₂SO₄. The acid soluble fraction was tested with Meyers, Wagner's and Dragendroff's reagent. A white coloured ppt. denoted the presence of alkaloids.

Estimation of Iridoids: This was estimated by using reagents viz., Aqueous HCl, 0.20 % CuSO₄ 5H₂O and Conc. HCl

Procedure: 1 gm leaf powder was placed in test tube with 5 ml of 1% aqueous HCl. After 3-6 hrs 0.1 ml of 0.20 % CuSO₄ 5H₂O in water and 0.5 ml conc. HCl was added and when the tube was heated for a short time on a flame a colour was developed. Presence of blue color indicates that iridoids are presents.

Estimation of Saponins: Procedure: 4gm powder boiled with 50 ml Distilled Water, for half an hour. This extract is filtered. The filtrate is taken in test tube after cooling and shaken vigorously for a 1 or 2min. The formation of persistent froth of 1 cm length showed the presence of saponins.

Estimation of Steroids: This was estimated by using Chloroform and Conc. H₂SO₄.

Procedure: 5gm of powder in 50 ml water boiled for half an hr and filtered. The extract tested by following test for presence of steroids presence.

Salkowski reaction: To the 2 ml water extract 2 ml chloroform and 2 ml conc. H₂SO₄ was added in a test tube, the mixture was shaken well. The formations of Red colour in chloroform layer and greenish yellow fluorescence in acid layer showed the presence of steroids.

Estimation of Calcium: Calcium was determine by using Methyl Red indicator, Ammonium oxalate solution – 6gm per 100 ml Distilled water, 2N sulphuric acid and 0.01N pot permanganate soln.

Calculation: -

1 ml 0.01 N KMnO₄ = 0.2004 mg Calcium.

Results and Discussion

The comparative profile of different phytochemical tests carried out from leaf powder samples of selected *Grewia damine* Gaertn, *Grewia flavescens* A.Juss and *Grewia nervosa* (Lour.) panigr. Plant specimens. The phytochemical test carried out for colour showed the presence of green colour in both species viz., *Grewia flavescens* A.Juss and *Grewia nervosa* (Lour.) panigr. whereas faint green colour in *Grewia damine* Gaertn. While the tests carried out for odour and bitterness showed the disagreeable odour and bitter test respectively in selected three *Grewia* species. Similarly, when the phytochemical tests carried out for presence of phytochemical compounds, the three plant specimen showed the presence of Tannins, Phenols, Alkaloids and Saponins except Irodoids that was absent from *Grewia damine*, *Grewia*

flavescens and *Grewia nervosa*. The test carried out for minerals viz., Calcium and potassium showed the concentration 9.00% and 1.11% in *Grewia damine* whereas 10.85% and 0.70% in *Grewia flavescens* and 8.90% and 1.28 in *Grewia nervosa* respectively. When compared the amount of concentration of calcium, it was found to be high in *Grewia flavescens* A.Juss over *Grewia nervosa* (Lour.) panigr. And *Grewia damine* Gaertn. Similarly, the concentration of another mineral viz., potassium was found to be highest in specimen *Grewia nervosa* (Lour.) panigr in comparison with *Grewia flavescens* A.Juss and *Grewia damine* Gaertn. Phytochemical screening of *Grewia flavescens* A.Juss leaves extracts revealed presence of carbohydrates, protein, phytosterols, flavonoids, triterpenoids, steroids, saponins and glycosides (Devikapatel, 2015).

Table: 1. Phytochemicals in *Grewia damine* Gaertn.

Plant specimen	Colour	Odour	Taste	Tannins	Phenols	Alkaloids	Saponins	Irodoids	Ca (%)	K (%)
<i>Grewia Damine Gaertn</i>	Faint Green	Disagreeable	Bitter	+	+	+	+	-	9.00%	1.11%

Table: 2. Phytochemicals in *Grewia flavescence* A.Juss.

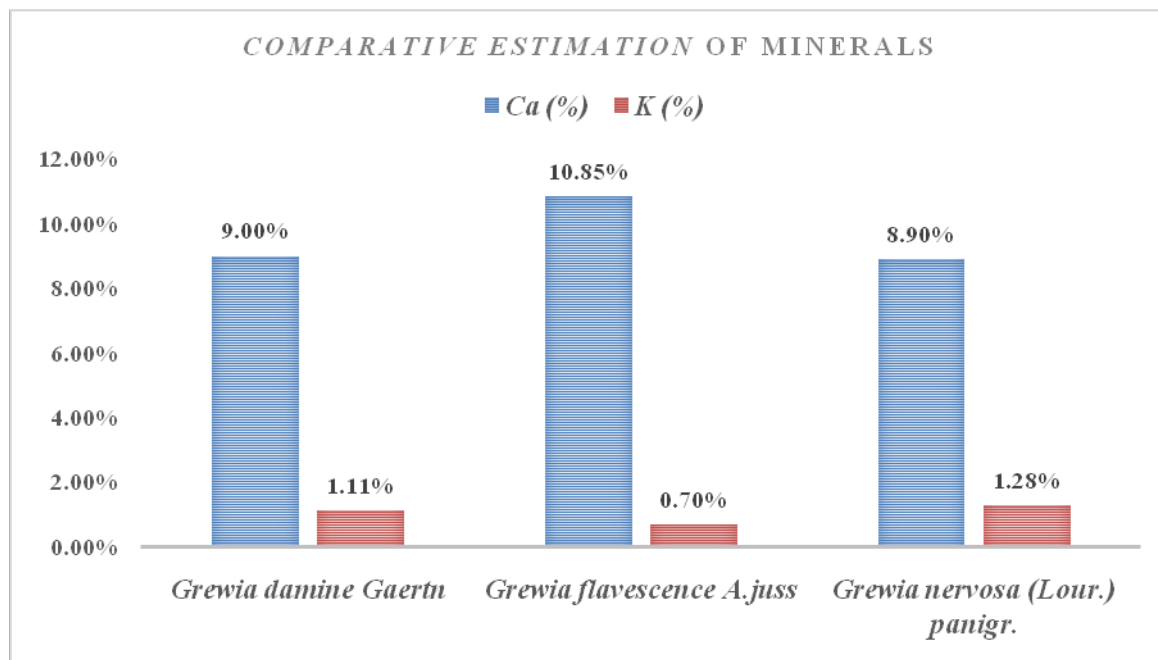
Plant specimen	Colour	Odour	Taste	Tannins	Phenols	Alkaloids	Saponins	Irodoids	Ca (%)	K (%)
<i>Grewia flavescens</i> A. Juss	Green	Disagreeable	Bitter	+	+	+	+	-	10.85%	0.7%

Table: 3. Phytochemicals in *Grewia nervosa* (Lour) panigr.

Plant specimen	Colour	Odour	Taste	Tannins	Phenols	Alkaloids	Saponins	Irodoids	Ca (%)	K (%)
<i>Grewia nervosa</i> (Lour.) panigr	Green	Disagreeable	Bitter	+	+	+	+	-	8.90%	1.28 %

(Key: + indicates Present and – indicates absent)

Graph 1: Comparative estimation of minerals from *Grewia damine* Gaertn, *Grewia flavescence* A.Juss and *Grewia nervosa* (Lour) panigr.



Conclusion

Since many species of this genus *Grewia* have been used as medicines for a long time in many countries, pharmacological studies have revealed that the extracts of *Grewia* are quite bioactive. The genus *Grewia* exhibits very good pharmacological activities. The present study will be useful in the utilization of medicinal properties of these plants and will enhance the further development of new herbal products and drug investigations. Further investigation into pharmacological properties and separation of phytoconstituents from these plants is still required before recommendations are made.

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