



PHYTOCHEMICAL ANALYSIS OF LEAVES OF JUSTICIA AND WITHANIA

Kedar G. K.*¹, Darade A. M.² and Darade M. S.^{1*}

¹Department of Botany, Government Vidarbha Institute of Science and Humanities, Amravati-444604.

²Department of Biotechnology, Shri Shivaji College of Agricultural Biotechnology Amravati – 444603.



*Corresponding Author: Kedar G. K.

Department of Botany, Government Vidarbha Institute of Science and Humanities, Amravati-444604.

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ABSTRACT

The phytochemical analysis of members of the plant family Acanthaceae and Solanaceae were carried out in present investigation. These two plants are *Justicia adhatoda* and *Withania somnifera*. The chemical constituents were isolated from the dried powder of leaves. In the leaves there found some important active chemical compounds like Alkaloids, flavonoids resins, fatty acids, glycosides etc. These compounds are used in the preparation of crude drugs. The medicinal value of plants lies in chemical active substance that promotes definite physiological action. The extract of leaves were analyzed in terms of colour, taste and odour. The presence of chemical compounds were detected with the help two solvents such as Petroleum ether and Diethyl ether. The presence of coumarin is not observed in the leaves of both the sample plants.

KEYWORDS: *Justicia adhatoda*, *Withania somnifera*, Leaves, Metabolites, Solvent, Colour, Odour, Taste.

INTRODUCTION

There are about 80% people in the world they uses herbal medicines for health care. The chemical compounds found in plant parts have medicinal properties and are useful in Pharma industries. The medicinal properties are useful in the preparation of various drugs which are used in the treatment of man and animal diseases. The phytochemical constituents possess antimicrobial properties. The traditional medicinal plants are important in primary health care. Different types of phytochemicals are found more or less in different plant parts. The chemical compounds found varies plant to plant species. The chemical constituents are the primary and secondary metabolites of plants. They may be flavonoids, Alkaloids, proteins, lycopene tannins, lignins, terpenoids steroids, amino acid, nucleotide, sugar, lipids etc. The plants are major source of medicines since ancient time. The bioactive compounds can be extracted from different parts of the plant like stem, leaves flower, fruits, fruit coat, seed and seed coat. The alkaloids such as Vasicine and Vasicinone are present in the leaves of many plants. These alkaloids possess respiratory stimulant activity.^[2] The chemical constituents in the plant parts promote broncho dilation and relaxation of the tracheal muscles. The decoction of the flower can be used to treat tuberculosis. The decoction of fruits, leaves and roots are also extensively used in the treatment of cold cough, bronchitis and asthma.^[1,3]

The present investigation is aimed to determine chemical constituents present in the leaves of *Justicia* and *Withania*.

MATERIALS AND METHODS

Study site and sample collection

The healthy and fresh leaves of *Justicia adhatoda* and *Withania somnifera* were collected from the campus of educational institute G.V.I.S.H. Amravati. The campus is located at Amravati city which is situated in eastern part of Maharashtra state of India. The study site is located at Latitude 76° 37', 27 E and 20° 32' to 21° 46' N Longitude.

Morphology of sample plants

The sample plant *Justicia adhatoda* is one of the member of the family Acanthaceae. It is identified with vernacular name as Adulsa. It is a shrub producing lance shaped leaves in the form of a cluster upto 20 simple leaves. The leaves are up to 9 cm. long and 4 cm wide. The phyllotaxy of leaves is opposite. The leaves are showing smooth margin. The colour of leaves may be pale brownish to greenish depending upon the species and environmental conditions occurring in that area.

The sample plant *Withania somnifera* is one of the member of the family Solanaceae. The plant is identified with vernacular name Ashwagandha. The plant is branched, erect, hairy under shrub. It grows upto a height

1.5 meter The plant body is covered by stellate hairs or trichomes The leaves are simple, entire, ovate and alternate. The phyllotaxy is sub opposite type. The leaves may be up to 10 cm long.

Preparation of extract

The healthy and fresh leaves of both the sample plants were brought in the laboratory and thoroughly washed with distilled water. The leaves were blot dried in the shade and used for analysis. The leaves were grinded in a grinder and powder is prepared from the dried leaves. It was stored in a glass bottle. 05 gm of dried powder was weighed and extract was prepared with addition of 10 ml of methanol in a beaker. The extract was centrifuged at 3000 rpm for 05 minutes. The supernatant was taken for further analysis.

Phytochemical Analysis

The phenolic contents were determined with the help of by Folin-Ciocalteu reagents.^[4] The Thimble Soxhlet

apparatus were used along with two solvents like Petroleum ether and Diethyl ether. The supernatant was vacuum dried and stored in air tight container for further analysis. The chemical analysis were subjected to presence or absence of various chemical compounds in two different solvents.

RESULTS AND DISCUSSION

The chemical test for colour taste and odour of the sample leaves were carried out with solvent Petroleum ether and Diethyl ether .The extract of leaves of *Justicia adhatoda* were appearing green in both the solvents. The taste of leaf was bitter. In terms of *Withania somnifera* the colour of extract appeared green in both the solvents. The taste of sample was not characteristic (Table 1). The strong odour of the sample were reported in the leaves of both plants.

Table 1: Determination of colour, taste and odour of the sample of Leaves.

S.N.	Plant Name	Solvent	Color	Taste	Odour
1	<i>Justicia adhatoda</i>	Petroleum ether	Green	bitter	Strong
		Diethyl ether	Green	bitter	Strong
2	<i>Withania somnifera</i>	Petroleum ether	Green	No characteristic taste	Strong
		Diethyl ether	Green	No characteristic taste	Strong

The presence of chemical compounds present in sample were noted in solvents like Petroleum ether and Diethyl ether. The presence of chemical compounds such as alkaloids, proteins, carbohydrates, flavonoids, tannins, fatty acids, phenolic compounds were tested These compounds provide immunity to the body to fight against diseases. The presence of alkaloids was detected

with Mayer's test, Wagner's test and Hager's test. The Alkaloid was noted in petroleum ether and in Diethyl ether with Mayer's test The presence of resin was noted in petroleum ether. The presence of flavonoids, fatty acids and Tannins noted in Diethyl ether (Table 2). The presence of coumarin is not observed in both the solvents.

Table 2: Determination of phytochemicals in the leaves of *Justicia adhatoda*.

S.N.	Name of the components	Name of the solvent	
		Petroleum ether	Diethyl ether
1	Alkaloids		
	a) Mayer's Test	+	+
	b) Wagner's Test	+	-
	c) Hager's Test	+	-
2	Flavonoids	-	+
3	Carbohydrates	-	-
4	Glycosides	-	-
5	Terpenoids	-	-
6	Resins	+	-
7	Protein	-	-
8	Fatty acids	-	+
9	Amino acid	-	-
10	Tannins	-	+
11	Coumarins	-	-

The phytochemicals found in *Justicia* can be used to cure cough and used as drug in Ayurvedic and Unani medicines.^[4] The phytochemicals are used in the treatment of respiratory tract ailments like bronchitis,

asthma, tuberculosis, cold and cough.^[6] Its main action is expectorant, antispasmodic or bronchodilator.^[5]

Table 3: Determination of phytochemicals in the leaves of *Withania somnifera*.

S.N.	Name of components	Name of the solvent	
		Petroleum ether	Diethyl ether
1	Alkaloids		
	a) Mayer's Test	+	-
	b) Wagner's Test	+	+
	c) Hager's Test	-	+
2	Flavonoids	-	-
3	Carbohydrates	+	+
4	Glycosides	-	+
5	Terpenoids	-	-
6	Protein	+	+
7	Resins	-	-
8	Fatty acids	-	-
9	Amino acid	+	+
10	Tannins	-	-
11	Coumarins	-	-

In the sample of leaves of *Withania somnifera* different phytochemicals are observed in both the solvents like Petroleum ether and Diethyl ether. In petroleum ether presence of Alkaloids was noted with Mayer's test and Wagner's test. There found presence of carbohydrates, protein and amino acids. In Diethyl ether there found presence of alkaloids by Wagner's test and Hager's test. The presence of carbohydrates glycosides protein amino acid are observed in Diethyl ether. (Table 3). These metabolites play an important role as an antioxidant and used to treat infertility. The chemical constituents may help to reduce swelling and lowers blood pressure. The compounds like flavonoids, terpenoids resins, fatty acids, tannins and coumarin were absent in the sample.

CONCLUSION

The leaves of *Justicia adhatoda* and *Withania somnifera* are the important source of different phytochemicals and secondary metabolites. The sample plants contain medicinally important chemical constituents such as Alkaloids, flavonoids, glycosides, protein, resins and fatty acids. The secondary metabolites play a vital role in the treatment of various diseases. The phytochemicals help for proper growth and development of plants. They help an important role in defense mechanism of plants from insects and pathogens diseases. The presence of chemical constituents can be determined with the help of different solvents.

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