

Phytochemical analysis of some selected species of the family Convolvulaceae occurring in Central Rajasthan

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Abstract

Family Convolvulaceae occupies a significant position among first ten dominant families of Rajasthan State. The family is important as a source of food, for drugs, for several ornamentals etc. Plant used for edible purposes include *Ipomoea batatas* and *Ipomoea aquatica*. Plants of medicinal value include *Evolvulus alsinoides*, and *Ipomoea violacea*. Plants of ornamental value include *Argyreia speciosa* (Elephant Creeper), and *Ipomoea cairica* (Railway Creeper). Phytochemical investigations is taken up for the present studies of some selected species of Convolvulaceae occurring in Central Rajasthan, include the quantitative estimation of total soluble sugars, soluble proteins, starch, free amino acids, and phenols.

Keywords: *Phytochemical, Convolvulaceae.*

INTRODUCTION

Family Convolvulaceae (Morning Glory Family) is consisting of 1650 species under 52 genera (Mabberley, 2008) distributed in all parts of the world, except the coldest regions, but mainly in warmer regions of Asia and America. The family is represented in India by 158 species of 20 genera (Santapau and Henry, 1973) Plants belonging to this family exhibit a variety of habits. Most of them are twining herbs (*Ipomoea hederifolia*). Some are shrubby climbers *Argyreia*, *Lettsomia aggregata* is a large woody climber. *Ipomoea carnea* and *Blinkworthia* are shrubs, *Humbertia* is a tree. Some are grown along sea beaches and act as sand binders (*Ipomoea pes-caprae*). *Ipomoea aquatica* is a water plant, *Humbertia* is a xerophyte and *Cuscuta* is a total stem parasite. They grow in various habitats, like *Cressa cretica* is found in saline soils.

Bentham and Hooker, (1876) placed the Convolvulaceae in the cohort Polemoniales under series Bicarpellatae of subclass Gamopetalae. They divided the family into five tribes namely, Convolvulaceae, Dichondreae, Nolanae, Cresseae and Cuscutae. (Otaghavari et al., 2015), (Sharma & Katewa, 2007); (Sharma et al., 2005); (Purohit, 2019); (Sharma & Khandal, 2019), highlighted the importance family Convolvulaceae.

Members of Convolvulaceae possess a number of distinguishing characters. Leaves are simple, alternate and exstipulate, may be entire or palmately lobed. Flowers are large, sweetly scented and beautifully coloured in many genera. Gamopetalous corolla may be campanulate or funnel shaped or tubular or salver form. Corolla limb entire or shortly

lobed, often plicate in bud. Stamens-5, which are deeply inserted into the corolla tube. A nectar secreting disc is present below the ovary superior biloculate ovary with 2 erect ovules in each locule. Fruit is a berry or capsule.

Phytochemicals are the chemicals that present naturally in plants preliminary phytochemical tests are helpful in finding chemical constituents in the plant material that may well lead to their quantitative estimation. Phytochemical investigations are taken up for the present studies of some selected species of Convolvulaceae occurring in Central Rajasthan, including the quantitative estimation of total soluble sugars, soluble proteins, starch, free amino acids, phenols and lipids. These phytochemical investigations have been carried out on the three species of *Ipomoea* from Rajasthan viz., *I. c. ssp. fistulosa*, *I. nil* and *I. pes-tigridis*. Material for this purpose was obtained from plants growing at various localities of Central Rajasthan.

The data recorded for the above-mentioned parameters are being given below: -

1) Total soluble sugars

After centrifugation the residue was again extracted with 10 ml of 80 per cent alcohol and the two supernatants were combined and made up to particular volume. An appropriate amount of aliquot and 4 ml of Anthrone reagent were mixed well and placed in boiling water for 8 min. in blank supernatant was omitted. Optical density was recorded at 800 nm. Standard curve was prepared using glucose.

2) Soluble proteins

A suitable quantity of dried material (200 mg) was homogenised in 10 ml of phosphate buffer (0.2 Molar, pH = 6.1). After centrifugation, supernatant was used as a source of soluble proteins.

A suitable amount of supernatant was mixed with 0.5 ml of 10 per cent Trichloro-acetic acid (TCA) and left at 4°C for 6 h. After centrifugation 3 ml. of mixed reagent (1) and (2) and 0.1 ml of phenol (Folin's reagent) reagent were added. In blank, aliquot was replaced by distilled water. After 10 minutes, optical density was recorded at 800 nm. Standard curve was prepared by using bovine serum albumin.

3) Total Starch

After centrifugation the residue was boiled in 10 ml of 1 per cent KOH for 30 min. supernatant was used for the estimation of starch. Optical density was recorded after 10 minutes at 600 nm. Standard curve was prepared using starch.

4) Total free amino acids

After centrifugation residue was extracted with 10 ml. of 80 per cent alcohol. The two supernatants were combined. The upper aqueous phase was used for the estimation of total free amino acids. To suitable amount of aliquot was added 1 ml. of Ninhydrin reagent. The test tubes were placed in boiling water for 20 minutes immediately after this, 5 ml. of diluent was added and optical density was recorded at 570 nm. Standard curve was prepared using alanine.

5) Total Phenols

After centrifugation residue was again extracted with 10 ml of 80 percent. The supernatants were combined and made up to specific volume and used as the source of total phenols.

To suitable amount of aliquot was added 3 ml of Na₂CO₃ solution and 0.5 ml Folin's reagent. In blank aliquot was replaced by an equal volume of distilled water. Test tubes were

placed in boiling water for 1 minute and centrifuged to clear the turbidity. Optical density was recorded at 800 nm.

Table 1: Table summarizing the results for phytochemicals (mg/gdw) in the studied plant parts

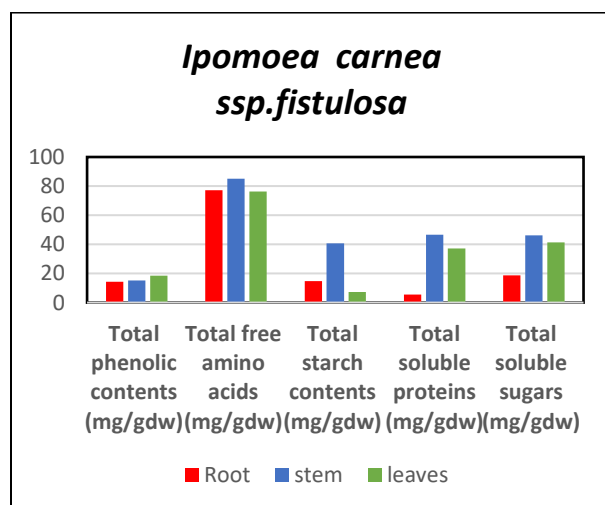
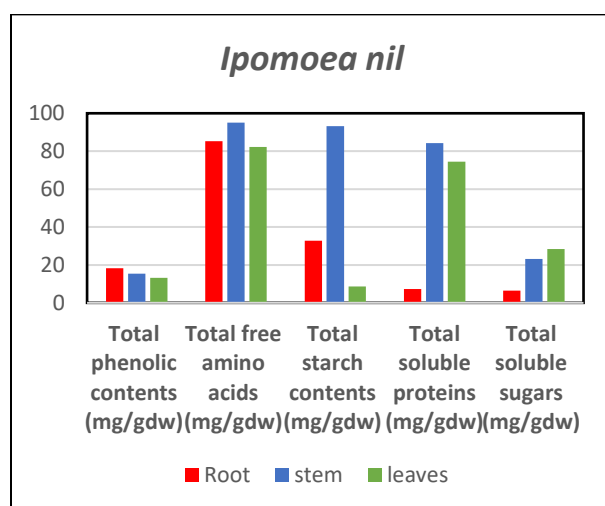
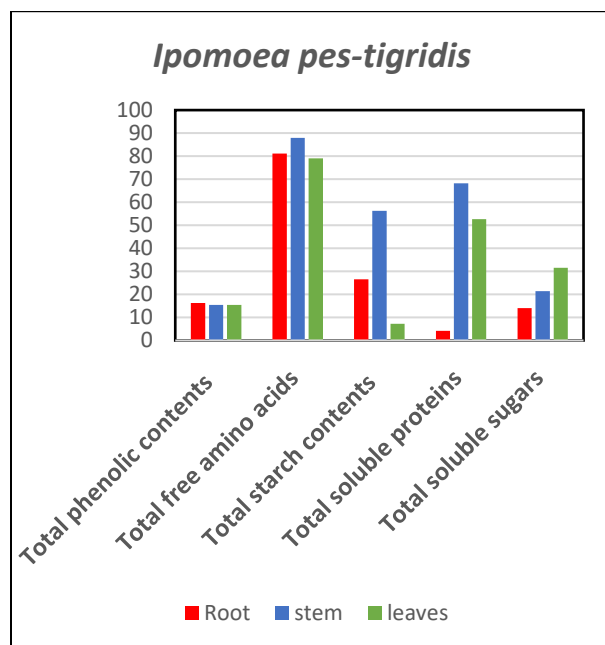
S.No	PHYTOCHEMICALS	<i>I.c. ssp.fistulosa</i>			<i>I. nil</i>			<i>I. pes-tigridis</i>		
		Root	stem	leaves	Root	stem	leaves	Root	stem	leaves
1	TOTAL SOLUBLE SUGARS	18.7	46.2	41.3	6.4	23.2	28.3	11.4	21.4	31.5
2	TOTAL SOLUBLE PROTEINS	5.6	46.7	37.2	7.3	84.2	74.4	4.2	68.2	52.7
3	TOTAL STARCH	14.8	40.6	07.2	32.7	93.2	08.6	26.5	56.3	07.3
4	TOTAL FREE AMINO ACIDS	77.1	85.2	76.2	85.2	95.1	82.3	81.1	88.0	79.1
5	TOTAL PHENOLS	14.3	15.3	18.4	18.3	15.4	13.2	16.3	15.5	15.5

Conclusion

Family Convolvulaceae is one of the most common families of dicots in the flora of Central Rajasthan. Phytochemical analysis of the extracts revealed a range of compounds that have been known to be medicinally useful and physiologically active. (Sofowra, A.1993)

Due to their versatile applications, phytochemicals are the substances derived from plants that have recently gained much attention. A wide range of medicinal properties are found in plants, both preventive and curative. Medicinal properties of plants are a result of chemically active substances that produce a definite physiological response (Karunyadevi et al., 2009) There are several diseases that are combated by plants in traditional medicine. A phytochemical analysis of the plants seemed to indicate that they could serve as a source of useful drugs and improve the health of consumers.

In the present study, the phytochemical screening for leaves, stem and roots of selected species of Convolvulaceae occurring in Central Rajasthan, include the quantitative estimation of total soluble sugars, soluble proteins, starch, free amino acids, and phenols. According to this study, there are a number of bioactive compounds or phytochemicals that have biological importance. This justifies their use in traditional medicine for treating various diseases. As a result of their countless medicinal benefits, these phytochemicals are becoming more popular today There is no side effect associated with phytochemicals, although they are extremely effective against diseases like asthma, arthritis, and cancer. The study will also be useful to foresters, physiochemists and to those interested in conservational aspects of plants.



Graphical Representation Total phytochemicals (mg/gdw) in different organs of the selected species of Convolvulaceae.

REFERENCES

- Mabberley, D.J. 2008. Mabberley's Plant-Book: A portable dictionary of plants, their classification and uses. Third Edition, Cambridge University Press: [i]-xviii, 1-1021
- Santapau, H. & A.N. Henry 1973. A dictionary of the flowering plants in India. CSIR, New Delhi. p. 83.
- Bentham, G. and J. D. Hooker. 1876. Convolvulaceae. In: Genera Plantarum. II. London. Pp.865-881
- Otaghvari, A.M., Yadav S.R., Raina S.N. and Uniyal P.L. 2015. Vegetational wealth of Aravalli Rajasthan. Scientific Publishers, Jodhpur.
- Sharma S.K. and Katewa S.S. 2007. Addition to the Flora of Rajasthan from Southern Aravallis. ZOO'S PRINT Journal 22(10): 2867 – 2868.
- Sharma S.K., Katewa S.S. and Bhatnagar C. 2005. New Records of plants from Rajasthan. ZOO's PRINT journal 20(9): 1984 – 1985.
- Purohit C.S. 2019. A note on some rare plants of Rajasthan reported from Todgarh-Raoli wildlife sanctuary. Int. J. Usuf. Mngt. 20: 36 – 45.
- Sharma S.K. and Khandal D. 2019. Reporting of New plant species to the flora of Rajasthan. Indian J. Environ. Sci. 23(2): 51 – 52.
- Yem, E. & Willis, A.J. 1964. The estimation of carbohydrates in plant

extracts by anthrone reagent. *Bioche. J.* 57 : 508-517.

- 10) Lowry, O.H., Rosenbrough, N.J., Farr, A.L. & Randall, R.J. 1951. Protein measurement with the folin reagent. *J. Bio. Chem.* 193 : 265-275.
- 11) Chinoy, J.J. 1939. A new calorimetric method for the determination of starch, natural starches and flour. Part I, calorimetric determination of soluble starch. *Microchemic.* 26 : 32.
- 12) Moore, S. & Stein, W.H. 1948. Photometric ninhydrin method for use in the chromatography of amino acids. *J. Biol. Chem.* 176 : 367-388.
- 13) Farkas, G.L. & Kirlyay, Z. 1962. Role of phenolic compounds in the physiology of plant diseases and disease resistance. *Phytopath.* 44 : 105-150.
- 14) Karunyadevi S, Arun N, Surekha V. Screening of phytochemical compounds, antioxidant and antimicrobial activity of Aloe vera And Arkaa. *Advanced Biotech.* 2009; 9: 38-43.
- 15) Sofowra, A. 1993. *Medicinal Plants And traditional Medicine In Africa.* Spectrum Books Ltd., Ibadan, Nigeria, pp. 191-289.