

**PHARMACOGNOSTIC STUDIES ON *INDIGOFERA CORDIFOLIA*
HEYNE EX ROTH ON ROOT****Chavhan V. N.* and P. Y. Bhogaonkar**¹Department of Botany, Arts, Commerce and Science College, Maregaon, Dist. Yavatmal
445303 (M.S.) India.²Department of Botany, Govt. Vidarbha Institute of Science and Humanities, Amravati. 444
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Corresponding Author*Chavhan V. N.**Department of Botany, Arts,
Commerce and Science
College, Maregaon, Dist.
Yavatmal 445303 (M.S.)
India.**ABSTRACT**

Indigofera cordifolia Heyne ex Roth, is annual prostrate herb found frequently on wasteland. *Indigofera cordifolia* Heyne ex Roth, root is used medicinally in traditional systems of health care. The plant root is commonly used on burning micturation in Vidarbha region by Banjara tribe. The anatomical and phytochemical study was carried out for plant root. Anatomically root of *I. cordifolia* is characterized by large amount of secondary xylem parenchyma and absence of root nodule. Phytochemical analysis was done to test 16 types of bioactive molecules. Present investigation showed the presence of alkaloids, catechol, flavanol, flavones, flavonol, saponins, steroids, unsaturated steroids and digitoxose. Different ash values were estimated and ash

analysis was done to study the mineral profile qualitatively as well as quantitatively by using Atomic Absorption Spectrophotometer.

KEYWORDS: Pharmacognosy, *Indigofera cordifolia*, Phytochemical Analysis, Mineral Profile.

INTRODUCTION

Indigofera cordifolia Heyne ex Roth is annual prostrate herb found frequently on wasteland. It is locally known as Godhadi. *Indigofera cordifolia* Heyne ex Roth, root is used medicinally in traditional systems of health care. Plant root is used by Banjara of Vidarbha on burning micturation (Bhogaonkar and Chavhan, 2013). Dhansekaran Thangavel et al., 2014 has reported that the whole plant is used as a very good source of antioxidant, anticancer with

therapeutic potential and as gastro protective, tumor specific cytotoxic, MDR-reversing and radical intensity (Bhattiprolu Kesava Rao et al., 2004). It has treated rheumatism, arthritis, inflammation, tumor and liver diseases (Anonymous, 2004). The seed extract is used as therapeutic agent and shows antioxidant and free radical scavenging activity (Khatri D. K. et al., 2013). The seeds and leaves extract showed anti-diabetic effect (Khatri and Juvekar, 2014). The study showed maximum amount of total soluble sugar and starch in roots and protein in the stem, lipids in leaf explants of *I. cordifolia* (Shipka Upman, 2014). Muhammad Qasim et. al., 2014 has reported that the whole plant decoction was used in dysentery, diarrhea and vomiting.

MATERIAL AND METHOD

The plants were brought to laboratory for identification and were processed for herbarium specimens. For identifications standard floras were referred. For nomenclature <http://www.theplantlist.org> is followed. Anatomy of the plant parts used was studied. For the anatomical studies fresh hand cut sections were observed under microscope. Microphotographs were taken with the help of CCD camera for detailed tissue studies. Detection of bioactive compounds was done by standard prescribed methods. (Anonymous, 1966, Evans 1997, Gibbs 1974, Gupta & Varshney 1997, Harborne 1973, Johanson 1940, Peach and Tracey 1979, Sadasivam and Manickam 2005, Thimmaiah 1999). Responses to various tests were denoted by +, ++ and +++; indicating weak, moderate and strong reactions respectively. Plant ash was prepared and different ash values were calculated following (Kulkarni and Apte, 2000). Qualitative analysis was done to detect various minerals (Johanson, 1940) and quantitative estimation was done by Atomic absorption spectrophotometer.

RESULT AND DISCUSSION

Herbs, prostrate, annual, branching from base, branches 20-30 cm long, clothed with white hairs. Leaves alternate, simple, cordate, 1.0-1.2 x 0.6-0.8 cm, subsessile, pubescent on both surfaces; stipules minute. Flowers in dense axillary clusters. Calyx divided to the base, 3.0-4.0 mm long, teeth linear, ciliate along margins. Corolla bright red, as long as calyx, staminal tube 2 mm long; stamens 10, diadelphous, included. Pods globose, apiculate, 3.0-4.0 mm long, densely white pubescent. Seeds small, globose. Fls. and Frts.– July to August.

ANATOMY**Root**

Stele diarch, secondary growth normal. Vessels large as well as very narrow scattered. In old root vessels are either clustered or in series. Rays mainly biseriate some uniseriate. Xylem parenchyma present in large amounts, becoming thick-walled with age. Fibrous tissue scanty. Zone of secondary phloem thick; several stone cells scattered in the secondary phloem as well as secondary cortex. Cork superficial, thin, 2-3 layered. Fls. and Frts.– July to August.

Phytochemistry

Plant tissue was screen for 16 bioactive compounds. Plants were found to contain alkaloids (++) , simple phenolics- β -naphthol (++) , flavonoids – flavanol (+), flavone (++) and flavonol (++) , saponins (++) , steroids (+), unsaturated steroids (+) and cardenolides- digitoxose (++) . Anthraquinones, anthracene glycosides, iridoids, flavanones, flavanone, leucoanthocynin, tannin, fatty acids, triterpenoids, cardiac glycosides, emodins, polyoses and polyurenoids were found to be absent.

Phytochemical Profile**Ash Analysis****Table 1: Ash values per gm dry tissue.**

| | | |
|----|---------------------|-------------|
| a. | Ash yield | 103.8 mg/gm |
| b. | Water soluble ash | 14% |
| c. | Water insoluble ash | 86% |
| d. | Acid soluble ash | 70.9% |
| e. | Acid insoluble ash | 29.1% |
| f. | Sulphated ash | 59% |

Table2: Mineral Profile.

| S. N. | Mineral | Qualitative Estimation | Quantitative Estimation |
|-------|-----------------------------|------------------------|-------------------------|
| | | | Dry Weight per 100 gm |
| a. | Sodium | ++ | 88.400 mg/100gm |
| b. | Potassium | +++ | 212.648mg/100gm |
| c. | Calcium | + | 47.375 mg/100gm |
| d. | Phosphorus | + | 66.144 mg/100gm |
| e. | Iron - Test a – Test b – | +++ +++ | 192.934 mg/100gm |
| f. | Sulphur | + | ----- |
| g. | Magnesium | + | 69.205 mg/100gm |
| h. | Chlorine | +++ | ----- |
| i. | Aluminum | +++ | 364.962 mg/100gm |
| j. | Manganese | + | 0.399 mg/100gm |

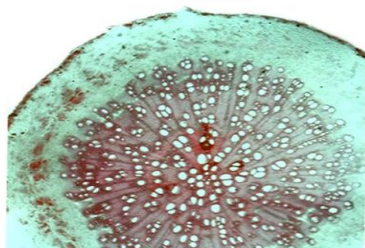
| | | | |
|----|----------|---|----------------|
| k. | Copper | + | 1.281 mg/100gm |
| l. | Nickel | - | Absent |
| m. | Chromium | - | Absent |
| n. | Zinc | + | 1.577 mg/100gm |



Habit



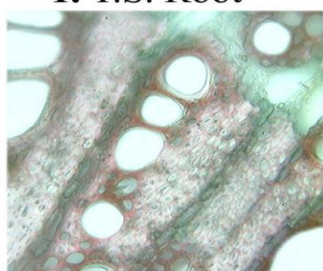
Root



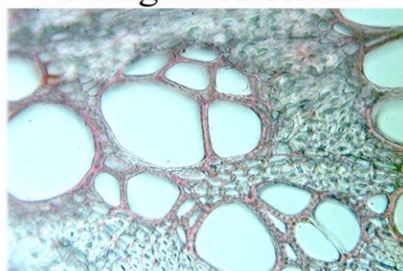
1. T.S. Root



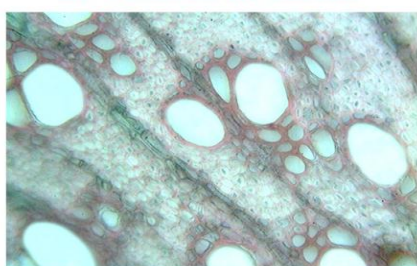
2. Magnified centre



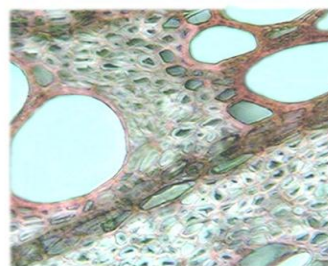
3. Vessels in series



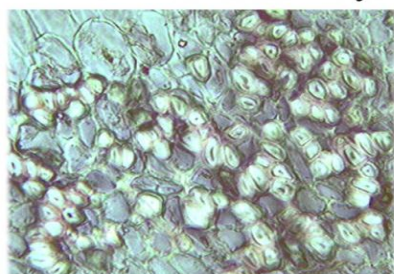
4. Vessels in clusters



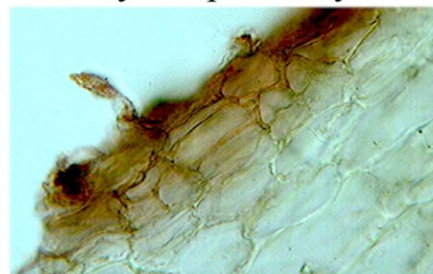
5. Uni & biseriate rays



6. Xylem parenchyma



7. Iiry Phloem with stone cells



8. Superficial thin cork

Indigofera cordifolia Roth

Root

CONCLUSION

Indigofera cordifolia is characterized by absence of root nodules. Anatomically root of *I. cordifolia* is characterized by large amount of secondary xylem parenchyma.

Fabaceae are reported to possess solitary calcium oxalate crystals (but no sphaeraphides), proanthocynins, tannins, alkaloids and gums. Roots of *I. cordifolia* were found to contain alkaloids, catechol, flavonoids, saponins, steroids and cardenolides with digitoxose sugar. Locally roots are used as antiinflammatory to treat the micturation; flavonoids and steroids might be imparting this property to the plant.

Tambe et al., (2010) have shown the wound healing activity of methanol and ethyl acetate extract of aerial parts of the plant. They reported alkaloids, steroids, flavonoids and tannins from aerial parts. The phytochemical study shown flavonoids, alkaloids are found in maximum amount. The trace amount steroids, cardiac glycosides and triterpenes are also found. The tannins, phlobatanins, saponins and anthocyanins are absent (Pande J. et. al., 2017).

Ash values provide important pharmacognostic character. Different ash values for *I. cordifolia* roots are shown in (table 1). Minerals play several vital roles in maintaining body health. During present work 13 minerals were studied out of which 11 were quantitatively estimated (table 2). As far as mineral profile is concerned out of eleven minerals estimated quantitatively, eight are present in maximum concentration in *Indigofera*. Aluminum content was found to be highest (364.962 mg/100gm). The species also shows highest concentration of Potassium (212.648 mg/100 gm), Iron (192.934 mg/100gm), Sodium (88.400 mg/100gm) and Magnesium (69.205 mg/100gm). Indirectly it helps the patient.

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