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Available online at: www.jpardonline.com***Heliotropium indicum*: Pharmacognostical, Physico-chemical and Phytochemical approaches**Abinash Kumar Sahu¹ *, Chaitanya Prasad Meher¹, Ashutosh Meher¹,
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ABSTRACT: Background: Medicinal plants have much creative property due to the presence of many secondary metabolites. **Aim:** The study was aimed to investigate pharmacognostical, Physico-chemical and Phytochemical screening of the different extracts of *Heliotropium indicum* powder. **Method:** The Phytochemical studies of stem was performed on its 70 % alcoholic extracts to identify its Alkaloids, Carbohydrates and Glycosides, Saponins, Proteins and Amino acids, Phenol compounds & Flavonoids and Phytosterols by using suitable chemicals and reagents. The fluorescence characteristics of the stem powder of *H. indicum* was observed under Day and UV light at 254 and 366 nm, by using powder of the drug. **Result:** Macroscopical results showed *H. indicum* is a shrub, tubular and having tap root. Powder microscopy of stem showed, xylem vessels with numerous bordered pitted thickening, spiral vessels, Calcium oxalate and covering trichomes. The physicochemical studies reveals that the total, water insoluble, acid insoluble ash and water soluble extractive values were 13.9, 4.5, 0.5 and 5.6 % respectively. The moisture content showed flowers have 8.3 % of moisture. The pH of the stem powder showed 6.6. T.S. of the stem showed middle of the stem is hollow and outer side having numerous hairs. The phytochemical screening showed that the stems are a rich source of Alkaloids, Phenols, Saponins and Flavonoids. However, the presence of proteins and Glycosides is limited in stem. Fluorescence characteristics of the stem powder showed different fluorescence colour in different reagents. This gives idea about presence of different chemical constituents in stem. **Conclusion:** The *H. indicum* plant possessed good physico-chemical property and distinct phytoconstituents.

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INTRODUCTIONS:

Natural products have always helped in the maintenance of life and good health and becoming increasingly important as alternative medicines and as a source of pharmaco-therapeutics for the treatment of many diseases. India is one of the twelve-mega diversity countries in the world and has 17,000 flowering plants^[1]. Many scientific themes are found to be concealed with in folklore and local literature as well in religious practice

which are regarded as indigenous knowledge and study of the biological aspect of such knowledge is a new dimension in ethanobiological research in this contest the studies relevant to ethno botany in Indian scenario demands a separate status ^[2,3].

This *Heliotropium indicum* (*Boraginaceae*) is a small evergreen annual herb fragrant plant, indigenous to Cochin, China, but found in ditches in many parts of India ^[4,5]. Its vernacular names are Hatisuara (Oriya), Hindi (Haathisoundha, Hattajuri), Sanskrit (Bhurundi, Duralabha, srihatini), Bengali (Hatishunda, Hatisura), Telgu (Kodikki, Nagadanti) and English (India Trunsole, heliotrope). The plant synonyms are *H. anisophyllum* and *Tiaridium anilophyllum* ^[6,7].

The leaf are aerial part of the plant having flat, opposite and consists of nodes, internodes, buds and gives rise to branches, leaves, and flowers. The colour of the flower is white, bisexual, actinomorphic, hypogynous and pentamerous. A flower is build of on stem or pedicel with the enlarged end known as thalamus or receptacle. The colour of the root is dark or dusty brown, shape is cylindrical, irregular bent, 1 to 3 cm in diameter tap root it's root is meant for supply of water and minerals ^[8,9].

Plant found to contains Pyrrolizidine alkaloids, tannins, indicine, AC- indicine, indicinine, indicinine-N-oxide, lupeol, rapnone. The root contains estoadiol and seeds contain Heliotrin as an important chemical constituent of this plant ^[10-12].

The whole plant is used to treat in high fever and the flowers are used as aborifaciant in large doses, emmnagogue is small doses. Leave are beneficial in gonorrhoea and localised inflammation, pharygodynia, rheumatism, ring worm, ulcers, wounds. Leaves juices are used as an application to wounds sores, boils and to repel pimples on the face. It is also employed locally in the kind of ophthalmia in which the tarsus is inflamed or excoriated.

The leaf extract is used as antineoplastic, against worms, skin diseases and wounds. The roots are aphrodisiac, astringent, bitter, expectorant, febrifuge, ophthalmic, cough, fever, rheumatism, ring worm. The whole plant is used as antitoxin, useful in eye infection and tendency, invigorating, antifatulence, appetizing removes wind and bile, useful in urticaria eye complaints, removes cough, breathing troubles and body ache ^[13-16].

MATERIALS AND METHODS:

The different Mayer's, Hager's, Barfoed's, Benedict's and millon's reagent, 70 % alcohol, extracts. α -naphthol, Sulphuric acid, 10 % Ammonia, Pyridine, Sodium nitropruside, Acetic anhydride, Ferric chloride, 10 % Lead acetate, 10 % Ammonium hydroxide solution were purchased from S.D. Fine Chemical, Mumbai. The solvents petroleum ether, chloroform and ethanol were purchased from Hi Media Laboratories Pvt. Ltd., Mumbai. All others chemicals, solvents and reagents were of analytical grade and procured from authorized dealer.



Fig 1. Plant *Heliotropium indicum*.

Collection and authentication:

The stems of *H indicum* were collected from adjoining area of Barpali (Dist-Bargarh, Orissa) in the month of May 2018. The plant was identified by Prof. (Dr.) Santosh Kumar Dash, Retired Professor and H.O.D., P.G. Dept. of Biosciences, C.P.S, Mohuda, Berhampur, Ganjam, Odisha Vide letter no BRPL/03/2018 on dated 28-05-2018. The plant was washed properly with water to remove the mud or dust, and then it was dried in sun light for 1 h and kept in shade dried and powdered by the help of mechanical process. The coarse powder have stored in air tight container for further studies.

Macro and microscopical Studies:

The plants parts were subjected for macroscopic study. The leaves, stem, flower, root T.S. were processed with glycerine and saffranine for better visualisation and it was observed under compound microscope (OLYMPUS 100MB, Universal Pvt. Ltd., Mumbai) at magnification of 100 X under day light ^[17,18].

Physical evaluations:

This includes the study of different physical parameters

which are rarely constant for crude drugs. The crude powder drug was evaluated for foreign organic matters, extractive values like alcohol and water soluble, ash values like total, water soluble and acid insoluble ash values, determination of swelling index, foaming index and moisture content [19,20].

Extraction study:

Extraction involves the separation of bioactive portion of the plant tissues from inactive components by using selective solvents with different extraction technique. The shade dried coarse powders stems of *H. indicum* were macerated with 70 % ethanol and extract was kept at room temperature for seven days. After seven days, solution was filtered and solvent was evaporated under reduce pressure by using vacuum dryer (Rotary Vacuum Dryer, Promas Eng. Pvt. Ltd., India). The crude extract was stored in refrigerator for further studies.

Table 1. Fluorescence analysis of powder drug.

Reagents	CO (NE)	CO (UV SWL)	CO (UV LWL)
P	YB	GB	--
P+1N NaOH in methanol	BY	YB	--
P+NaOH in water	DB	DBI	DBI
P+HCl	B	GBI	--
P+H ₂ SO ₄	BBI	GBI	--
P+HNO ₃	B	--	--
P+PE	B	B	B
P+CHCl ₃	B	B	--
P+PA	B	YB	--
P+ 5% FeCl ₃	BI	--	--
P+ 5% I ₂	BuBI	BI	--
P+ methanol	LB	B	--
P+HNO ₃ +NH	B	DB	B

P – Powder. **Acids concentration was 50 %**. **PE** - petroleum ether, **PA** - picric acid, **Y** – Yellow, **B** – Brown, **D** – Deep, **BI** – Black, **Bu** – Blue, **G** - Greenish and **L** – Light. **CO (NE)** - Colour observed (naked eye), **SWL** - short wave length and **LWL** – Long wave length.

Phytochemical screening:

The plant crude extract (stem) was screened for identification of phyto-constituents that are Carbohydrates, Proteins and Amino acids, Glycosides, Alkaloids, Volatile oils, Tannins, Mucilages, Flavonoids, Tannins, Sterols and Saponins as per the standard procedure of Pharmacopeia [21,22].

Fluorescence analysis:

Fluorescence characteristics of the powder (stem) of *H. indicum* were observed with different chemical reagents under Day light and UV light at 254 and 366 nm using powder of the drug [22,23].

RESULTS AND DISCUSSION:

The macroscopic study revealed that the leaves were flat, thin green appendages, containing supporting and conducting strands in their structure. The macroscopically studies shows, colour was green, simple shape, ovate size is 4.5 to 9.6 cm × 2 to 3.9 cm. The apex was acute, with entire margin, veins are of 5 to 7 pairs, veinlets were prominent and base was rounded. The stem consists of nodes and internodes; buds and gives rise to branches, leaves, and flowers (Fig 1). The colour of the stem is green and shape is cylindrical. Fracture was soft but fibrous. Branching of root arises from the pericyclic tissues. Root tips were covered by root caps (Fig 1). The colour of the root is dark or dusty brown, with cylindrical shape, irregular bent, and size is 1 to 3 cm in diameter. The microscopic study data is presented in Fig 2. The T.S. of the stem showed middle of the stem was hollow and outer side has numerous hairs. Stem powder microscopy observation showed xylem vessels with numerous bordered pitted thickening, spiral vessels, Calcium oxalate (Cluster crystal) and covering trichomes (Fig 3). The physical evaluation of powder crude drug showed the total ash value of 13.9 %. The water soluble ash (4.5 %) was higher than acid insoluble ash (0.5 %) that may be presence of organic matter. Water soluble extractive (5.6 %) was higher as compare to alcohol soluble extractive. The result of moisture content was 8.3 % of moisture. The pH of the stem powder was 6.6 at 1 % w/v solution.

The yield of stem extract in 70 % ethanol by maceration was found to be 7.9 %. The phytochemical screening showed that the stems are rich sources of Alkaloids, Phenols, Saponin and Flavonoids. However, presence of protein and Glycoside is limited in stem. Fluorescence study showed that different fluorescence colour was seen by different reagents. That gives idea about presence of different chemical constituents in stem (Table 1 and 2).

CONCLUSION:

The *H. indicum* plant possessed good physico-chemical property and distinct phytoconstituents like Alkaloids, Phenols, Saponin and Flavonoids. These phytoconstituents might be responsible for exhibiting

therapeutic values such are antineoplastic, against worms, skin diseases, aphrodisiac, astringent, bitter, expectorant, febrifuge, ophthalmic, cough, fever, rheumatism, ring worm and wounds. Extensive analytical study should be done to find out the chemical entity responsible for therapeutic values.

Table 2. Powder analysis with chemical reagents.

Reagents	CO (NE)
P	brown
P+HCl	Orange
P+HNO ₃	Brown
P+H ₂ SO ₄	Brownish Black
P+GAA	Light brown
P+5%KOH	reddish brown
P+5%NaOH	Reddish black
P+FeCl ₃	Deep black
P+PA	Yellowish brown
P+NH ₃	Brownish black

P – Powder, GAA – Glacial acetic acid, PA – Picric acid and CO (NE) - Colour observed (naked eye). All acids were concentrating.

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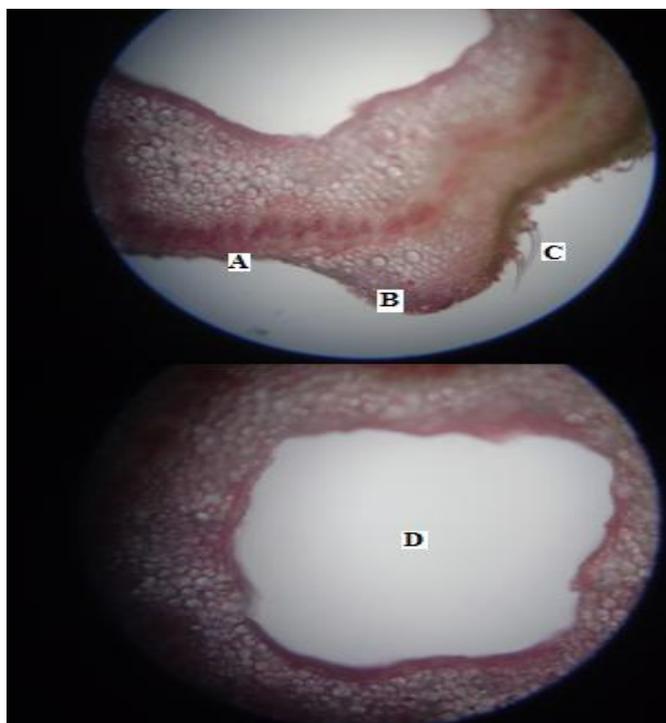


Fig 2. T.S. of Stem *H. indicum* (A – Epidermis, B – Cuticle, C – Trichome and D – Hollow).

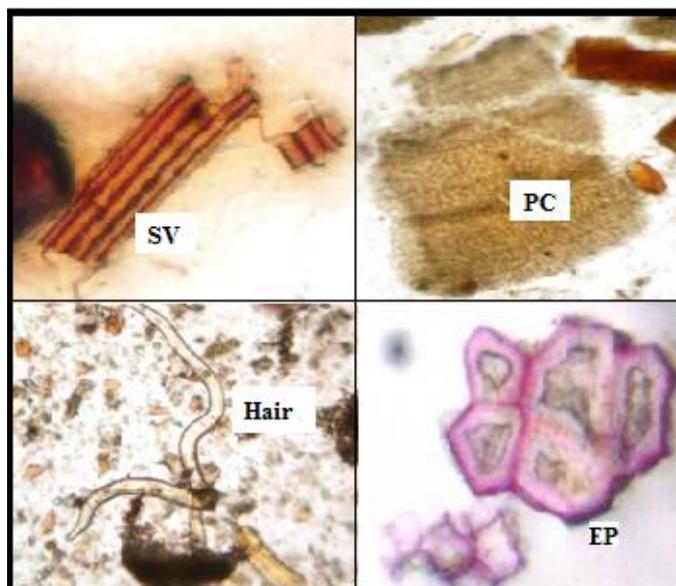


Fig 2. Powder characteristic (Powder microscopy) of stem.

SV- Spiral vessels, EP - Inner Epidermis and PC - Parenchymatous tissues.

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