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Pharmacognostical and Phytochemical Studies of Kukutnakhi- *Aspidium Cicutarium* - A Folklore Plant

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ABSTRACT : *Aspidium cicutarium L. from Dryopteridaceae family is a folk medicinal plant used in the treatment of shotha (inflammation). The rhizomes of this herb are said to be successful in managing Inflammation. This study is aimed at assessing the scientific evaluation of Aspidium cicutarium in the course of pharmacognostical and phytochemical analysis, which mainly covered the macroscopic and microscopic features of the rhizomes including powder microscopy and Phytochemical parameters such as pH, total ash value, water-soluble extract values were assessed in the preliminary physicochemical screening. Qualitative analysis revealed the existence of certain chemical constituents such as flavonoids, tannins, organic acids and saponin glycosides. The ethanol extract of rhizomes was subjected to TLC for the separation of components.*

KEYWORDS: *Aspidium cicutarium, pharmacognosy, phytochemistry, TLC*

I. INTRODUCTION

Ayurveda and folk lore system of medicine are an untapped source of knowledge ever fertile, and efforts may bring out a number of excellent unfailing remedies for a number of diseases / clinical conditions. Interdisciplinary study on the folk drugs providing scientific basis is need of the hour. Folk medicine is still practiced by some vendors, hakims and vaids in remote areas and some folk preparations are of surprisingly high curative value. Vincristine and vinblastine, the potent anti cancer drugs were derived from folk plant, Vincarosea (periwinkle) used traditionally for the treatment of diabetes mellitus. Today herbal medicine is making dramatic comeback and scientists are turning to natural products for answer to ailments like cancer, Aids, hepatitis and rheumatoid arthritis.

Aspidium cicutarium L. (Family: *Dryopteridaceae*), known as *"Kombadnakhii"* in Marathi is a folklore medicine widely used by the tribes of Western Ghats for the management of Inflammation.[1] Kukkutnakhi- this term is containing two words; *kukkut* means cock and *nakhi* meaning nail i.e. its rhizomes looks like nails of cock. The drug which is in wide use in the area of Western Ghats of Maharashtra and surrounding of Maharashtra state is not mentioned in classical Ayurvedic treatises and lexicons. The available textual information regarding the herb is very minimum and inadequate. This paper reviews research on the identification, authentication and qualitative analysis. The plant is extensively distributed in the Western Ghats of Maharashtra. It is available throughout the year, but more abundantly seen after rainy season up to end of February. In summer its availability is only in shady region and near water resources.
This study definitely will help to validate possible role of folklore drug named Kukktnakhi in modern drug industry.

II. MATERIALS AND METHODS

Collection of plant material : The fresh rhizomatous roots of the plant were collected in rainy season from the Amboli situated in Sindhudurga district of Maharashtra state [western region]. Rhizomes were identified with the help of different floras. [2], [3], [4] and authenticated at the department of Botany, Pune University, Pune. Matured rhizomes were cleaned properly, cut in to pieces, shade dried and coarsely powdered (10 mesh). The sample was analyzed by using different organoleptic, qualitative and quantitative analyse. A chromatography study analysis was also carried out.

Organoleptic evaluation : In the organoleptic evaluation various sensory parameters such as color, odor, taste and texture were investigated.

2. 3 Physico-chemical studies : The physico-chemical parameters such as loss on drying, total ash content, pH, and extractive values, (water-soluble and alcohol soluble) were determined. These parameters were analyzed in accordance with the Ayurvedic Pharmacopeia of India. [5]

2. 4 Preliminary qualitative tests : The extracts were analyzed for the presence sugars, carbohydrates, tannins, steroids, flavonoids and saponins using standard protocol. [6]

2. 5 Chromatographic study : Thin layer chromatography [TLC] of ethanol extract was carried out for the normal phase separation of components.

III. OBSERVATION, RESULTS AND DISCUSSION

Macroscopic study : *Kukutnakhi* [*Aspidium cicutarium L.*] is a plant belonging to the family Dryopteridaceae and grows in small rocky and watery area (Flowing water). It is slender 1.5 m in height, procumbent or staggering hairy herb. The creeping roots rhizomes are about 10- 20 cm in length and in wet condition colour is greenish. After drying externally it becomes blackish in colour and internally blackish yellow, Stem Slender branches obtusely, weak, spreading on the ground, Leaves Compound, opposite, petiolate, estipulate, 2.3 - 1.3 x 1.8 - 0.85 cm in length. [Figure no. 1] It has creeping underground stem, rhizomes. The Part which used was actually an underground stem though it is called as *muli*[root] in local language. [Figure no. 2]

3.2 Organoleptic characters

Table 1: Organoleptic characters of rhizomes of A. cicutarium

Sr. No	Particulars	Observation
1.	Color	Externally root are brownish black internally yellowish green
2.	Taste	Astringent, Bitter
3.	Odor	Odorless
4.	Touch	Rough
5.	Sound	Cracking sound
6.	Shape	Roots are like nail of cock

3.3Microscopic study : Microscopic study of T.S. of root of *Aspidium cicutarium L* showed presences of abundant thick walled parenchyma cell and with less xylem and phloem. [Figure no. 3] The nature of powder was coarse, yellow in color, astringent in taste, and characteristic in odor. The diagnostic character of powder shows fragments of epidermal cells, vascular elements, xylem vessels, polygonal, thin walled parenchymatous cells with dark colored substances along with Crystals of Ca-Oxalate and starch grains are present.

3.4 Phyto chemical analysis : Physical analysis of root powder showed particle Size moderately Coarse 80% passes through 710 micrometer and 20% passes through 250 micrometer. The value of total ash (8.4% w/w) shows the presence of residue after ignition, representing the plant residue, and external materials. pH the quantitative measure of alkalinity or acidity was studied with the help of digital pH-indicator. The pH of the water-soluble extract was observed as 5.92, suggesting that the sample is near to neutral or slightly acidic in nature.

Table 2: Physico-chemical parameters of Aspidium cicutarium

Parameters	Results
pH Value(10 % solution)	5.92
Loss on drying at 105 degree c	8.34%
Acid soluble Ash	0.36%
Water extractives	22.86%
Alcohol Extractives	20.98%
Total Viable Count	1*10 5 cfu/gm

3.5 Preliminary qualitative analysis : The qualitative analysis revealed the occurrence of flavonoids, alkaloids, tannins, organic acids, and saponin glycosides that will be the land marks in authentication of this plant. The presence of steroids and flavonoids is mostly responsible for the anti-inflammatory activity proven in Ayurveda. Alkaloids are present in Ethanol extract but not present in aqueous extract.

Table 3: Phytochemical screening of Ethanol and Aqueous extract of Aspidium cicutarium

Chemical constituents	Ethanol Extract	Aqueous Extract
Alkaloids	+	-
Phenolic compounds	+	+
Carbohydrates	+	+
Flavonoids	+	+
Steroids	+	-
Saponins	+	+
Tannins	+	+
Glycosides	+	-
+ Present, - Absent		

3.6 Chromatographic study and Uv visible spectrophotometric analysis of ethanol extract : Thin-layer chromatography [7] was executed for the normal phase separation of components of ethanol extracts of rhizomes of *Aspidium cicutarium. L.* For TLC screening, solvent system was prepared by taking N-Butenol:Acetic acid:Water in a proportion of 4:1:5. Stationary phase for the TLC profile was silica gel G60F254. The spots obtained from the extract were examined under ultra violet light of wavelength 254 and 366 nm. The resolution factor was calculated by using the formula R_f = distance travelled by solute/distance travelled by solvent. The result is depicted in table no. 4

Table 4: TLC profile

Spots	Under visible light N0. Of spots- 4	UV 254 NM N0. Of spots- 5	UV 366 NM N0. Of spots- 4	Reagent 5% Fecl3 N0. Of spots- 4
1	-	-	-	0.55
2	0.63	0.63	0.63	0.63
3	0.72	0.72	0.72	0.72
4	0.81(Brown)	0.81	0.81 (dark blue)	0.81 [blue]
5	-	0.91	-	-
6	0.97(Green)	0.97(All blue)	0.97(Red)	-

IV. CONCLUSION

The available textual information regarding the plant *Kukutnakhi* is very inadequate. As the drug is widely used in conditions like inflammation, snake bite by folklore practitioners, and to adopt it in current herbal medicinal practice, it is essential to conduct the pharmacognostical and physiochemical analysis that covers the preliminary steps of standardization. Therefore, this study was carried out with to investigate the physico-chemical and qualitative analysis. This study may act as a stepping stone for further research work.

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FIGURES

Figure no. 1- Kukutnakhi Aspidium cicutarium L. – whole plant

Figure no.2 freshly collected Kukkutnakhi *Aspidium cicutarium L.* root rhizomes

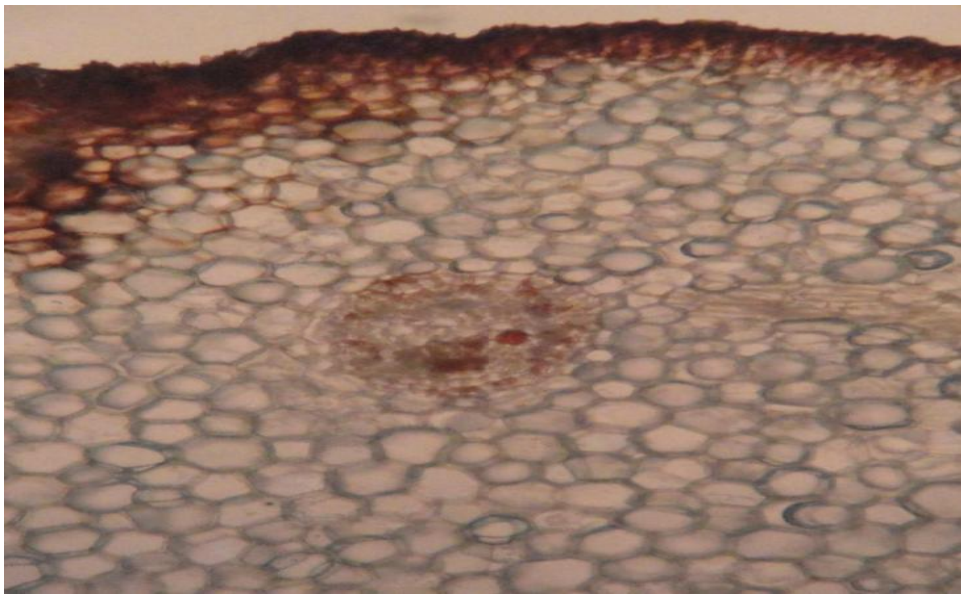

Figure no. 3 T.S. of root rhizome of *Aspidium cicutarium L*
Epidermal cell, parenchyma cell, phloem, xylem