Research Article

Pharmacognostic Screening of *Hedychium spicatum* Rhizomes

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ABSTRACT
The rhizomes of *Hedychium spicatum* belonging to family zingiberaceae are reported to have great medicinal value such as carminative, spasmolytic, hepatoprotective, anti-inflammatory, antiemetic, antidiarrhoeal, analgesic, expectorant, antiasthmatic, emmenagogue, hypoglycaemic, hypotensive, antimicrobial, anthelmintic, insectrepellent etc. By looking the high traditional use of *Hedychium spicatum* the present investigation was undertaken for research with the purpose of drawing the pharmacopoeial standards for this species. The present study deals with pharmacognostical parameters for the rhizomes of *Hedychium spicatum* which mainly consists of macroscopic and microscopic characters, physio-chemical constants and phytochemical screening. This information will be possibly used to differentiate the drug from its other species and will assist in standardization for quality, purity and sample identification.

Keywords: *Hedychium spicatum,* Standardization, Zingiberaceae, Phytochemicals, HPTLC.

INTRODUCTION

Hedychium spicatum Ham. ex Smith. (Zingiberaceae) is an Ayurvedic traditional medicinal plant known as Spiked Ginger Lily (**English),** Kapuurkachari (**Unani),** Poolankizangu, Kichilikizangu (**Siddha/Tamil), and** Ban-haldi (Kumaon). In Ayurveda, it is also denoted with various names such as Shathi, Shati, Gandhashathi, Gandhapalaashi, Kapuurkachari, Suvrataa, Gandhaarikaa, Gandhavadhuu, Gandhamuulikaa. The plant is found in Central Himalaya at 1100 –2500 m, East India and hills of South India. The Rhizomes of the plant is carminative, spasmolytic, hepatoprotective, anti-inflammatory, antiemetic, antidiarrhoeal, analgesic, expectorant, antiasthmatic, emmenagogue, hypoglycaemic, hypotensive, antimicrobial, anthelmintic, insectrepellent. The rhizomes shows hypotensive effect in dogs at low doses, lowers blood pressure in high doses. The ethanol (50%) extract is also found to be anti-inflammatory and hypoglycaemic; gave encouraging results in tropical pulmonary eosinophilia in clinical studies. Alcoholic extract of the plant demonstrated vasodilator, mild hypotensive and antiseptic in animals. Essential oil from rhizome is mild tranquilizer in male albino rats. Rhizome gave sitosterol and its glucoside, a furanoid diterpene - hedychenone and 7-hydroxyhedychenone. The essential oil contains cineole, gamma-terpinene, limonene, betaphellandrene, *p*-cymene, linalool and beta-terpineol as major constituents. The oil inhibits the growth of several fungi. The ethanol (95%) extract showed antibacterial activity. The 50% extract showed antimalarial activity *in vitro* against *Plasmodium berghei* strain[1-18].

In spite of the numerous medicinal uses attributed to this point, pharmacognostic information about this plant will play important role in pharmaceutical industry. Hence, the current investigation describe various pharmacognostic parameters like macroscopy, microscopy of rhizomes, moisture content, foreign organic matter, ash value, extractive value, microscopical characterstics of powdered drug, fluorescence analysis and phytochemical screening of rhizomes.

MATERIAL AND METHODS

Collection of Plant material

The rhizomes of *Hedychium Spicatum* (Specimen voucher no. GUH3908) were collected from Dhankurali village, Jakholi block, Rudraprayag district, the sample was

authenticated by Dr. R.L.Painuli, Department of Botany, HNB Garhwal University, Srinagar Garhwal, Uttarakhand.

Macroscopic and Microscopic analysis

The macroscopy and microscopy of the rhizomes of *Hedychium spicatum* was studied according to the method of Brain and turner (1975a). For the microscopic studies, microscopic sections were cut by free hand sectioning. The micro powder analysis was done according to the method of Brain and Turner (1975b) and Kokate(1986a)[19-21].

Preliminary Phytochemical screening

Extracts prepared by successive solvent extraction using soxhlet extractor were subjected to qualitative chemical tests by using standard procedures described by Kokate (1986b) in order to find out the chemical constituents present[22].

Physicochemical analysis

Various physicochemical parameters like Loss on drying, foreign organic matters, Ash values and Extractive values, fluorescence's analysis were performed as per WHO guidelines. These tests will be useful for standardization and obtaining the quality standards[23].

RESULT AND DISCUSSION

Macroscopic characters

Proper examination of the untreated sample of rhizomes of the *Hedychium spicatum* was carried out under diffused sunlight and artificial source similar to day light. The rhizomes are cylindrical, externally light yelloish brown layer covered the edges with scars and rings, rudiments of rootlet are also visible, 10-30cm long and 2-2.5 cm in diameter. Odour is camphoraceous and taste is bitter.

Microscopic Characters

Microscopic characters showed the presence of cork consisting of a outer zone of irregularly arranged cells and inner zone of radially arranged cells followed by a wide zone of cortex 20-30 cells thick, some cortical cells filled with flattened and oval oblong starch grains. Numerous oleoresins cells also found in the zone. Closed collateral fibrovascular bundles are also found in the cortex. Ground tissue composed of large parenchymatous cells with abundant starch grains and oils.

Powder characters

The rhizome powder is light yellow in colour with bitter taste and camphoraceous odour. On microscopic examination of the powder showed presence of oval shape starch grains, fibrovascular bundle. Numerous cortical cells filled with yellowish green oil and spiral vessels.

Physicochemical analysis

Ash value of a drug give an idea of the earthy matter or the inorganic composition and other impurities present along with the drug. The percentage of total ash, sulphated ash, acid insoluble ash and water soluble ash were carried out (Table1). The foreign matter and loss on drying of sample was also carried out (Table1).Extractive values are primarily useful for the determination of exhausted or adulterated drugs. The petroleum ether, chloroform, ethyl acetate, methanol and water soluble extractive value were determined by cold extraction method and hot extraction method. Values have been tabulated (Table 2). The result of fluorescence analysis of the drug powder is presented in (Table 3).

Preliminary phytochemical screening

Preliminary phytochemical screening revealed the presence of phytosterols, fats and oils, saponin, protein, glycoside, diterpine, phenolic compounds, carbohydrates, flavonoids and minute quantity of alkaloids in different extracts. Result presented in (Table 4).

HPTLC studies

HPTLC finger printing profile of methanolic extract of *Hedychium spicatum* was performed to find out Rf value of present constituents in the extract by using the solvent system n-Butanol:acetic acid:water in the ratio 5:1:4.. The Rf value of different constituents present in extract were found to be 0.13,0.28,0.34,0.45,0.54,0.72, and 0.83 respectively.

CONCLUSION

The present study on Pharmacognostic screening of *Hedychium spicatum* will provide useful information for its identification. Macroscopic, microscopic and physiochemical parameters discussed here can be considered as the identifying characters to substantiate and authenticate the drug.

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Table 1: Results of Physicochemical parameters

Parameters	Value% (w/w)
Foreign matter	0.292
Loss on Drying	8.108
Total ash	5.154
Sulphated ash	6.134
Acid insoluble ash	1.615
Water soluble ash	1.738

Table 2: Results of extractive value

Parameters	By Cold extraction method %	By Hot extraction method%
Petroleum ether extract	1.271	1.541
Chloroform extract	3.293	4.523
Ethyl acetate extract	4.401	5.147
Methanol extract	7.729	8.886
Aqueous extract	11.795	14.483

Table 3: Result of Fluorescence analysis

Treatment	Day light	UV light 254n m	UV 366 nm
Powder as such	Light yellow	Dark yellow	Dark yellow
Powder treated with dist. H_2O	Dark yellow	Dark yellow	Light black
Powder treated with 5% aq. NaOH	Yellowish brown	Yellowish brown	Dark brown
Powder treated with NH_3	Light green	Light green	Black
Powder treated with conc. H_2SO_4	Light brown	Light brown	Black
Powder treated with 50% HCl	Light brown	Light brown	Black

Table 4: Results of Phytochemical screening

Extract Constituents	Pet. ether	Chloroform	Ethyl acetate	Methanolic	Aqueous
Alkaloids	-	-	-	+	+
Carbohydrates	-	-	+	+	+
Glycosides	-	-	+	++	+
Phenols	-	-	-	++	++
Flavonoids	-	-	+	++	
Proteins & amino –acids	-	-	-	+	+
Saponins	-	+	-	+	+
Diterpine	-	-	-	++	+
Resins	-	-	-	+	+
Fat and oils	+	+	+	+	+
Phytosterols	+	+	+	++	++
Tanins	-	-	-	+	+

(++) Strongly positive, (+) Positive test, (-) Negative test

Fig. 1: Plant of *Hedychium Spicatum*

Fig. 2: Dried rhizomes of *Hedychium Spicatum*

Fig. 3: Powder of Rhizome of *Hedychium Spicatum*

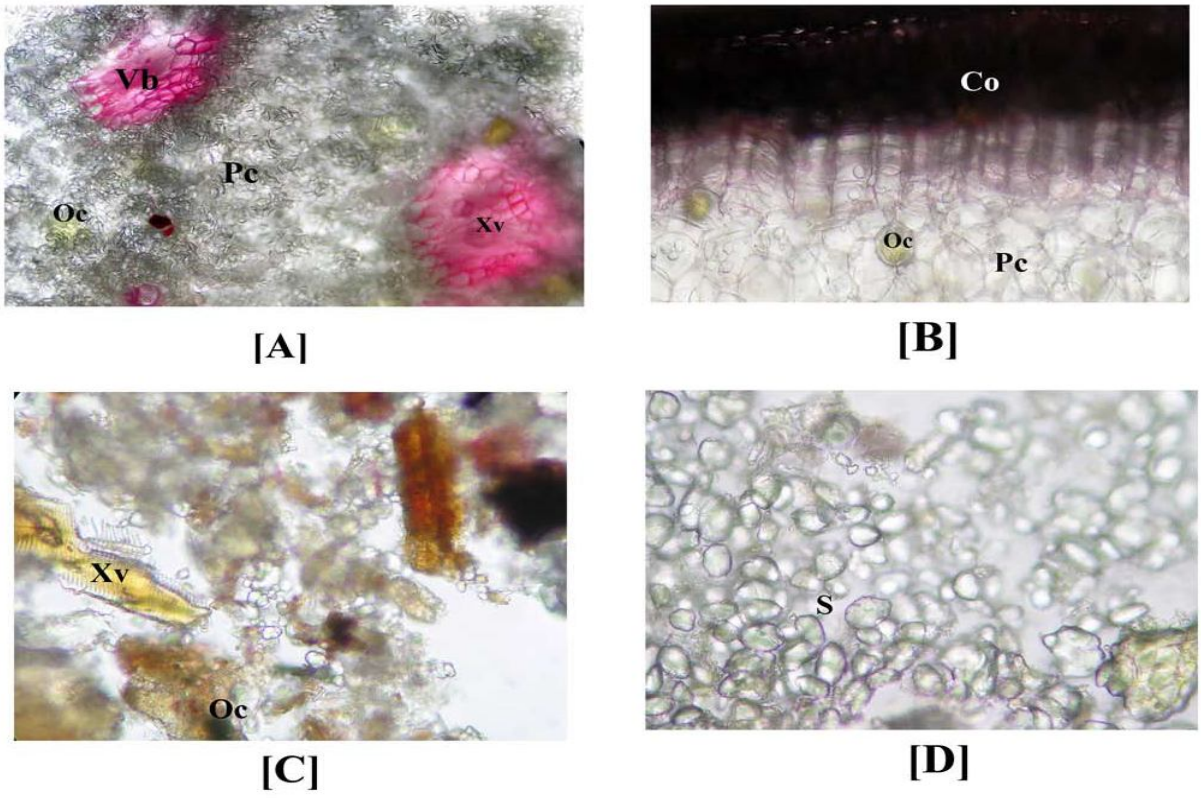

Fig. 4: Microscopic Characters of *Hedychium Spicatum* (Vb: Vascular Bundle, Pc: Parenchymatous cells, Xv. Xylem Vessel, Oc: Oil cell, Co: Cortex)

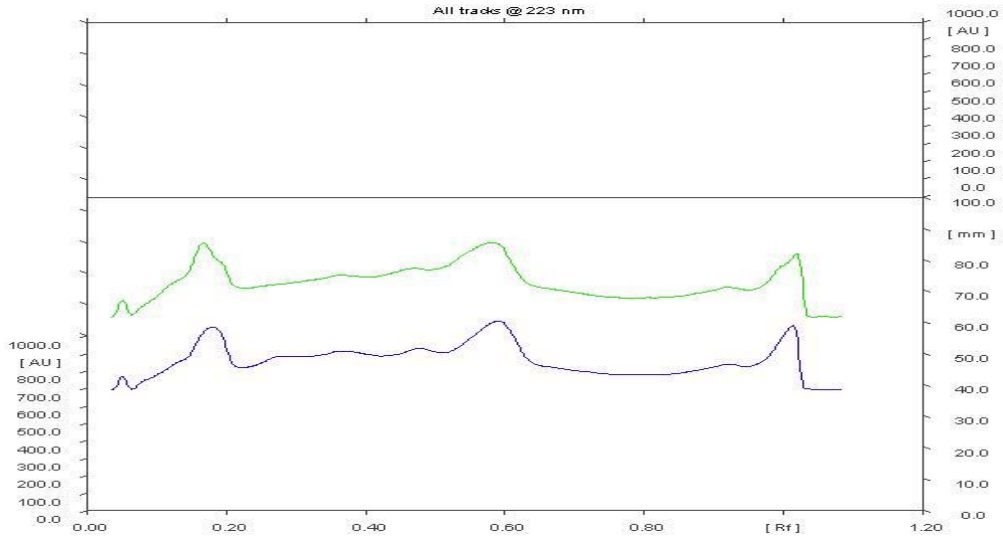

Fig. 5: Fingerprinting profile of methanolic extract of *Hedychium spicatum*

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