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Pharmacognostic studies on the pseudobulb of *Coelogyne cristata* Lindl. (Orchidaceae)-An epiphytic orchid of ethno-Medicinal importance

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Abstract
Herbal medicine has been practiced worldwide in accordance with the recognition of WHO as an essential building block for preliminary healthcare. India, as a rich biodiverse country, has a long history of traditional system of medicine. Orchids, one of the largest diverse angiospermic group of the family Orchidaceae, have occupied a distinct place in human life in terms of their beautiful flowers and medicinal values since long. *Coelogyne cristata* Lindl. (Orchidaceae) is an ethno- medicinally important epiphytic member of orchid which is used widely in healing fractured bones, tremors, epilepsy, nerve disorders etc. by the native people of temperate Himalayas. The anti-aging and anti-stress property of the above plant makes it a good alternative of health tonic and rejuvenator. The present paper, deals with pharmacognostic studies on the pseudobulb of *C. cristata* Lindl., is an attempt to mitigate the adulteration to the crude drugs.

Keywords: *Coelogyne cristata* Lindl., Pharmacognosy, ethnomedicinal uses

Introduction
From the primitive periods, medicinal plants have occupied significant places in daily healthcare regimes of human and animals. The backbone of traditional system of medicine is based on thousands of drug plants due to their pharmacological properties. Orchids, consisting of *c*. 25,000 species under 850 genera [1][2], though are mostly cultivated for their ornamental values, some groups possess medicinal potentialities. *Coelogyne cristata* Lindl. [Syn.: *Cymbidium speciosissimum* D. Don; *Pleione speciosissima* (D. Don) Kuntze], commonly known as "Jibanti", is an Indian medicinal plant which is mostly used for treatment of fractured bones in folk tradition of Kumaon Himalayas, Uttarakhand. The plant is distributed in temperate Himalayas from Garhwal and Kumaon regions eastwards to Uttar Pradesh, Sikkim, West Bengal, Assam, Meghalaya and Arunachal Pradesh, at an altitude of 1600-2600m [Map 1]; often grown for cut flowers. Outside India, the plant is reported from Bhutan, Nepal, Tibet and mountainous regions of Northern Thailand. *C. cristata* Lindl. is generally found in moss forests associated with tree bark and rocks, often exposed to sun [3].

Map 1. Distribution of *Coelogyne cristata* Lindley in India(●)

The plant is reported to possess bone healing properties which is widely practiced by native people of Kumaon Himalayas. It possesses good effects in nerve disorders, headache, epilepsy, tremors etc. The pseudobulb is the officinal part which is reported to possess adaptogenic, anti-aging and anti-stress properties [4]. Juice of the pseudobulb is applied to the boils and also put in wounds of wooves of domestic as well as willd animals [5]. Fruit resin is effectively used to heal bone fracture of domestic animals. Native people of some remote villages of Almora district of Uttarakhand apply the resin externally on the injured portion of body for coagulating the blood [6]. An infusion of pseudobulbs is given by folk medical practitioners of Uttarakhand as aphrodisiac to get relief from chronic constipation [7].

In addition to ethno-medicinal potentialities, *C. cristata* Lindl. is commercially renowned for its magnificent flowers and long lasting fragrance.

The present study is an endeavour in the direction of reducing adulteration to the drugs plant, "Jibanti" (*C. cristata* Lindl.) by means of pharmacognostic standardization. Macro- and micro-morphological characters provide additional support towards authentication of crude drugs.

Materials and Methods

The pseudobulbs of *C. cristata* Lindl. Were purchased from the local drug market of Kolkata as well as collected from its natural habitat. The collected plant specimens were identified with the help of authentic literature in Department of Pharmacognosy, NRIADD, Dept. of Ayush, Kolkata. The organoleptic study of the crude drug were performed in terms of its shape, size, color, odour, taste etc. For anatomical study, hand sections of water soaked pseudobulbs were done, stained and mounted following standard method [8]. The fluorescence and physico-chemical parameters of the powdered drug (such as total ash, acid insoluble ash, water soluble extractive value and alcohol soluble extractive value) and fluorescence characters were determined according to the standard procedures mentioned in Anonymous [9][10]. Air dried coarse powder of pseudocarp was examined under ordinary and ultraviolet light according to the standard method [11].

Extract preparation

Drug plant samples were air dried in room temperature for 2-3 weeks depending upon climatic condition. The dried plant were then ground to crude powder. 200 gm of powdered drug sample were shaken separately in ethanol for 24 hours on the orbital shaker at room temperature. Extracts were filtered using a Buckner funnel and Whatman No. 1 filter paper. Each filtrate was concentrated to dryness under reduced pressure at 40 ^{0}c through evaporator. The extract was re-suspended in ethanol to obtain a 50mg/ml stock solution.

Results and Discussions

Macroscopic characters

C. cristata Lindl. is an epiphytic orchid with creeping rhizomes and pseudobulbs. Rhizomes are covered with scales. The pseudobulbs, not the true bulb, are actually secondary stems which are highly specialized, thickened to some extent, consisting of one or more internodes acting as storage organs for foods and moisture. It develops from creeping rhizomes, of variously shaped, mostly ovoid or elongated, with distinct ridges and furrows, 2.8-8.0 x 2.0-5.5cm, surface smooth, not punctated; fracture longitudinal-fibrous; odour undistinguishable; mature pseudocarp bright golden-yellow to brown in colour, shining. Roots develop at the union of the rhizomes and the pseudobulbs [Plate 1].

Plate 1. *Coelogyne cristata* Lindley: A. & B. Pseudobulb; C. Flowering branch; D.Single flower; E. Dried pseudobulb

Microscopic characters

Pseudobulb

In transverse section, pseudobulb shows uneven outline with ridges and furrows; layers of uneven thick velamen followed by single layer of epidermis, the cells of which are mostly penta or hexagonal. Next to the epidermal layer, parenchymatous cells extend unevenly forming ground tissues. Ground parenchyma cells are irregular in shape with air spaces. Starch grains and aleurone grains are frequent within parenchyma cells of ground tissues. Vascular bundles are distinct, scattered throughout the ground tissues and surrounded by thick sclerenchymatous cells [Plate 2].

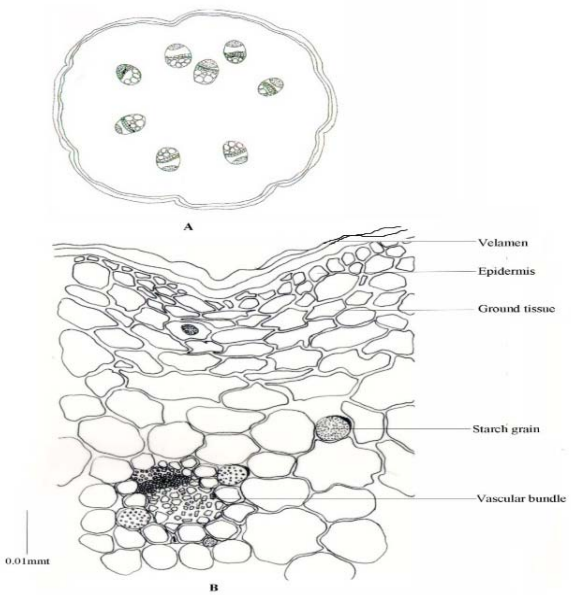

Plate 2. Transverse section of pseudobulb of *Coelogyne cristata* Lindl.: **A.** Diagrammatic; **B.** Cellular details

Powder drug analysis

Powder (# 60) is greyish-brown in colour with no distinguishable smell, slightly bitter and astringent in taste; shows groups of mesophyll cells, thin layer epidermal cells, parenchymatous cells, clusters of starch grains, aleurone grains, Ca-oxalate crystals, septate fibers, pollen grains and vessels with pitted and annular thickening [Plate 3].

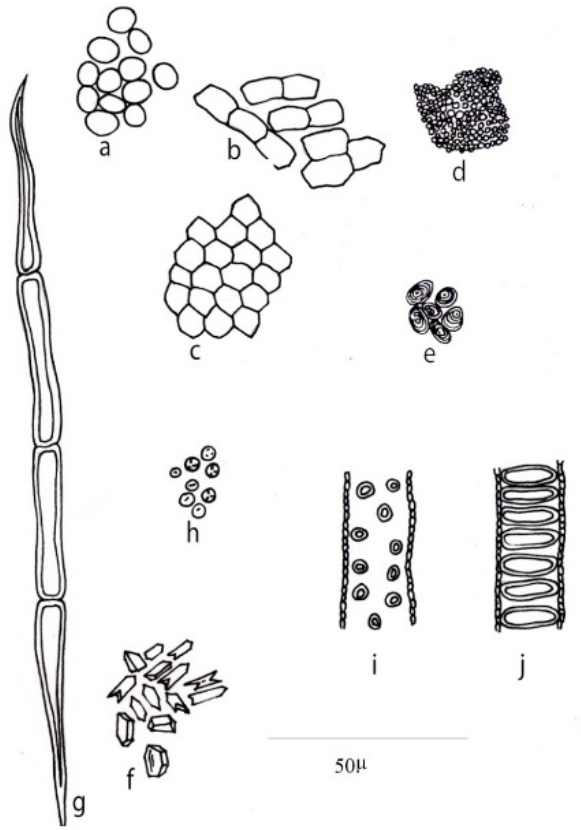

Plate 3. Powder drug analysis of *Coelogyne cristata* Lindl.: a. Mesophyll cells; b. Epidermal cells; c. Parenchyma cells; d. Starch grains; e. Aleurone grains; f. Prismatic Ca-oxalate crystals; g. Septate fibres; h. Pollen grains; i & j. Vessels

Physico-chemical/ fluorescence studies

Physico-chemical values and fluorescence characters of the Powder drug under ordinary light and ultra violet light (UV 254 nm and 366 nm) are presented in Table 1 and Table 2.

Table 1: Physico-chemical Characteristics of *Coelogyne cristata* Lindl.

Particulars	Observation-I (%)	Observation-II (%)	Observation-III (%)
Total ash	5.33	5.30	5.30
Acid insoluble ash	1.30	1.25	1.20
Water soluble ash	2.15	2.18	2.15
Alcohol soluble extractive	4.1	4.15	4.12
Water soluble extractive	11.6	11.7	11.0

Table 2: Fluorescence Characters of *Coelogyne cristata* Lindl.

Sr. No.	Treatment	Under ordinary light	Under UV light	
			Short UV (254nm)	Long UV (366nm)
1.	Powder as such	Greyish-brown	No fluorescence	No fluorescence
2.	Powder+1N NaOH (Aquous)	Yellow with distinct brown boundary	Yellowish green with green border; no fluorescence	Fluorescence present
3.	Powder+1N NaOH (ethanolic)	Straw yellow	Straw yellow; no fluorescence	Fluorescence present
4.	Powder+1N HCL	Yellow	No fluorescence	No fluorescence
5.	Powder+H_2SO_4 (1:1)	Dark slate	No fluorescence	No fluorescence
6.	Powder+HNO_3 (1:1)	Light slate	No fluorescence	Fluorescence present
7.	Extract+Petroleum ether(40-60^0)	Faint yellow	Faint yellow; no fluorescence	Fluorescence present
8.	Extract+Benzene	Light yellow	No fluorescence	Fluorescent pink colour
9.	Extract+Chloroform	No colour	No fluorescence	No fluorescence
10.	Extract+Methanol	Straw yellow	No fluorescent	Fluorescence present
11.	Extract+water	No colour	No fluorescence	No fluorescence

The macroscopic and microscopic characters of any plant drug are considered to be the preliminary steps for establishing their quality control profile. As per the guidelines of WHO, pharmacognostical standards should be proposed as a protocol for the diagnosis and authentication of the herbal drugs. Physico-chemical standards, such as total ash value help us in determining both physiological ash of plant tissues and non-physiological ash of extraneous matters like sand and soil, whereas acid insoluble ash detects presence of the heavy metals in the earthy matter in the drugs. Extractive values (both water soluble and alcohol soluble) help us in determining the amount of active constituents present in the drug sample.

Conclusion

The pharmacognostic characters along with physico-chemical and fluorescence values reported in this article could be used as the diagnostic tool for the standardization of the medicinal plant. Adulteration, if any, can be easily identified using these parameters. The microscopic features along with powder drug analysis could help in laying down microscopical standards as per WHO guidelines for authentication of the drug plant.

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References

1. Stewart J, Griffith M. Manual of Orchids. Timber Press Portland, Oregaon, 1995.
2. Gutierrez RMP. Orchids: A review of uses in traditional medicine, its phytochemistry and pharmacology. J Med Plants Res. 2010; 4(8):592-638.
3. Cindy H. Coelogyne: Sparkling Stars of Asia. Orchid Digest 2008; 72(2):60-76.
4. Mohammad MH. Therapeutic Orchid: Traditional Uses and Recent Advances-An Overview. Fitoterapia 2011; 82(2):102-140.
5. Dipesh P, Khilendra G. Orchids in Rolpa District of Western Nepal: Documentation, Stock, Trade and Conservation, 2008.
6. Priti K, Joshi GC, Tewari LM. Diversity and status of ethno-medicinal plants of Almora District in Uttarakhand, India. Biodiversity and Conservation 2011; 3(7):298-326.
7. Joshi GC, Tewari LM, Lohani N, Upreti K, Jalal JS, Tewari G. Diversity of Orchids in Uttarakhand and their conservation strategy with special reference to their medicinal importance. Report and Opinion 2009; 1(3):47-52.
8. Johansen DA, Plant Microtechnique. ed 1, Mc Graw Hill Book Co., New York, 1940; 182-203.
9. Anonymous, Pharmacopoeia of India. ed. 2, Ministry of Health and Family Welfare, the Controller of Publication, New Delhi, 1996; 947-948.
10. Chase CR, Prett RJ. Fluorescence of Powdered vegetable drugs with particular reference to development of a system of identification. J Am Pharm Assoc. 1949; 38:324-331.
11. Kokaski CJ, Kokaski RJ, Slama FJ. Fluorescence of powdered vegetable drug under ultraviolet radiation. J Am Pharm Assoc (Sci. edn.). 1949; 47(10):715-717.