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Pharmacognostic Standardization of *Cedrus deodara* stem Bark.

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Abstract
Cedrus deodara (Roxb), Pinaceae, is a species of cedar native to the western Himalayas in eastern Afghanistan. Northern Pakistan (Kashmir), north central India (Himachal Pradesh and Uttarakhand) .It is a large evergreen conifer tree reaching 40-50 tall. The stem bark of the plant is astringent and febrifuge. Scientific parameters are not yet available to identify the exact plant material (stem bark) and to ascertain its quality and purity**.** The present study deals with the pharmacognostical like macroscopical, microscopical, physical parameters like loss on drying, ash values, extractive values, the stem bark of the plant were subjected to the successive extraction in the increasing polarity order of the solvents, the extracts were used to various phytochemical tests, the stem bark of the plant *Cedrus deodara* shows the presence of Flavonoids, tannins, Proteins and amino acids in the different extracts, These studies provided referential information for correct identification and standardization of this plant material.

Key Words
Cedrus deodara, pharmacognostical, stem bark, quality control.

Introduction
The *Cedrus deodra*. Roxb is also known as Himalayan cedar mostly found in western Himalayas, eastern Afghanistan, Northern Pakistan (Kashmir), north central India, occurring at 1500-3200 m altitude. *Cedrus deodara* is a large evergreen conifer tree reaching 40-80 m tall, and the trunk about 2-3 m in diameter. The leaves of the plant are needle like mostly 2.5-5 cm long.[8] The oil of the heartwood is used in skin disease, sores, wounds and ulcers and also for headache, fever, urogenital disease, the leaves are used in inflammation and the bark is used as astringent and febrifuge.[2] The present research works provide the requisite pharmacognostical and phytochemical details of the stem bark of the plant. The results of this study can be useful in the setting some diagnostic parameters which is currently not available.

Material and Methods
Materials
Stem bark of *Cedrus deodara* was collected from the Institute of Biotechnology, Patwadanger, (Nainital) campus, and were authenticated by Dr. H. B. Singh, Chief Scientist & Head Raw Materials & Museum (RHMD), NISCAIR, New Delhi. A voucher specimen No-NISCAIR / RHMD / Consult / 2012-13/2010/18) was deposited in the herbarium of NISCAIR, New Delhi. The stem bark was shade dried and powdered with the help of mechanical grinder and pass through the sieve no. 40, this coarsely powdered stem bark is used for the pharmacognostical and phytochemical investigation.

Reagent and chemicals
All reagent and chemical used for testing were analytical grade and obtained from the High media laboratories pvt.ltd, Mumbai.

Methods
The freshly peeled bark of the plant were spreaded on a clean dry plastic sheet and investigated different organoleptic features like colour ,odour, taste, shape, size, fracture by repeated observation using magnifying glass and ruler(where required) and recorded. Similarly dried stem bark were subjected to organoleptic evaluation. For the powder microscopy take a small amount of powdered drug in the petridish. Clear the powder with clearing reagent e.g. chloral hydrate, Stain the cleared powder with staining reagent e.g. Phloroglucinol and hydrochloric acid, Iodine solution, Sudan red III etc, the stained powder mount in glycerin and observed under microscope for microscopic evaluation.[7]

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Physicochemical parameters like loss on drying, ash values (total ash, water soluble ash, acid insoluble ash), extractive values (water soluble extractive, alcohol soluble extractive) were determined as per Indian Pharmacopoeia.[1] For phytochemical analysis the powdered drug was extracted with the different solvent according to the polarity of the solvent with the help of Soxhlet extractor, finally the marc was macerated with the chloroform water. Each extract was concentrated by distilling off the solvent which was recovered subsequently. The concentrated extracts were evaporated to dryness and the extracts obtained with each solvent were weighed. Their percentages were calculated in terms of initial air dried plant material. The colures of extracts were observed. The successive extracts (as mentioned above) were subjected to various qualitative phytochemical tests for the identification of chemical constituents present in the plant material.[4,7] For florescence analysis small quantity of dried and fine powdered stem bark powder was placed on the grease free clean microscopic slide and added 1-2 drop of freshly prepared reagent mixed by gentle tilting and wait for 1-2 minute than the slide was placed inside the U.V chamber and viewed in day light, short U.V(254nm), long U.V (365nm) radiation . The colors observed by the application of different reagent in different radiation were recorded. [3,6]

Result and Discussion

Pharmacognostical Characteristics of stem bark

Macroscopical characteristics

The macroscopical characteristics of the stem bark of the *Cedrus deodara* are tabulated in Table 1.

Powder Microscopy

Powder microscopy of the bark of the *Cedrus deodara* shows the following characteristics

a. **Cork cells**- 4-6 layers of tangentially elongated cells, with yellowish brown matter, Fig 2.
b. **Lignified fibers**-Thick heavily lignified with pointed ends. Fig 3.
c. **Phelloderm**- 6-8 layers of thin walled rectangular cells with starch grains and calcium oxalate crystals. Fig 5.
d. **Calcium oxalate crystals**-calcium oxalate crystals in prism, hexagonal in shape. Fig 6.

Physico-chemical Parameters

Physico-chemical parameters like loss on drying, ash values, extractive values were given in the Table 2.

Florescence analysis

The results of the florescence analysis were tabulated in the Table 3.

Phytochemical investigation

The results of phytochemical analysis were given in Table 4.

Discussion

The heart wood, leaves, bark of the plant *Cedrous deodara* is used in the tradional system of medicine for the treatment of the various disease. As there is no work on record on it's macroscopically and microscopically standards of this traditionally much valued drug. So the present research work gives us some parameter for the standardization and authentication of the plant material.

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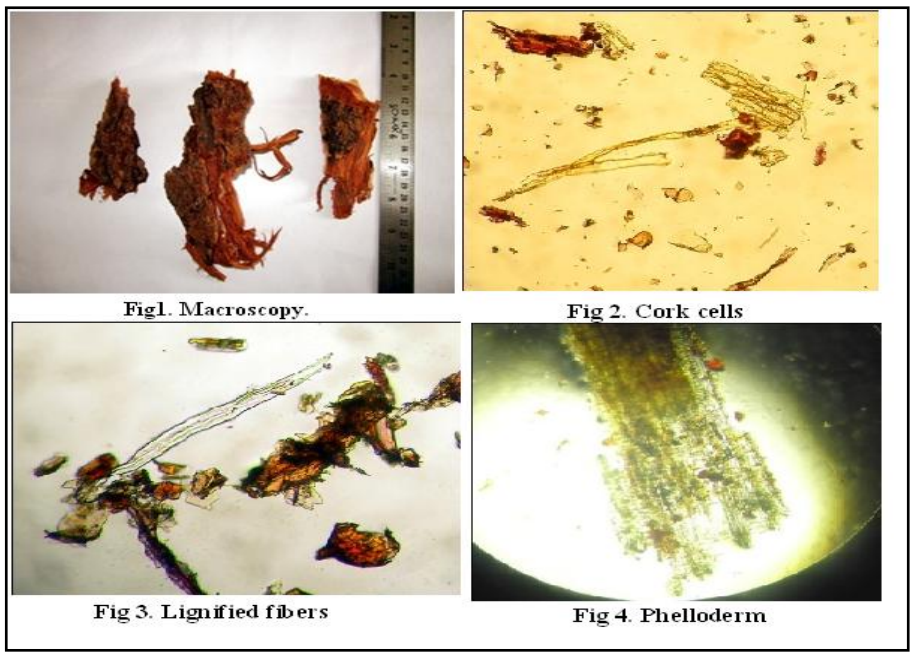

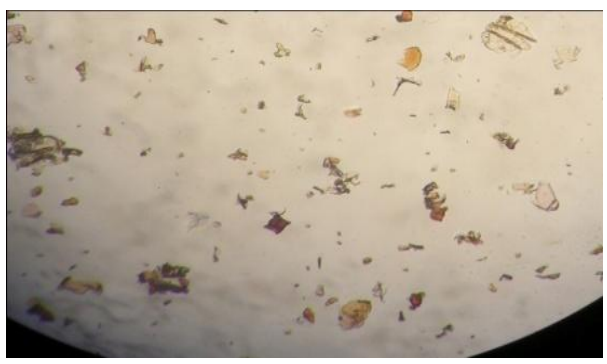

Fig. 5: Calcium Oxalate Crystal

Table 1: Macroscopical Characteristics of *Cedrus deodara* bark.

Condition	Hard
Shape of pieces	Flat strips
Dimensions	Varies 8-10 cm long, 2-4 cm wide
Colour	Outer surface dark brown, inner surface brownish buff coloured
Odour	Slight
Taste	Bitter
Fracture	Short

Table 2: Physico-chemical Parameters of C*edrus deodara* Bark.

S.No	Parameters	Values (%w/w)
1	**Loss on drying**	12
2	**Extractive values**	
	Alcohol soluble	8.8
	Water soluble	9.6
3	**Ash values**	
	Total ash	5.63
	Water soluble ash	.52
	Acid insoluble ash	.93

Table 3: Fluorescence analysis of powdered drug of bark of *Cedrous deodra.*

S.No.	Treatment	Observation (Visible light)	Observation (Short wavelength)	Observation (Long wavelength)
1.	Powder as such	No fluorescence	Dark brown	Black
2.	Powder + 1M NaOH	No fluorescence	Dark brown	Black
3.	Powder + petroleum ether	No fluorescence	Dark brown	Black
4.	Powder + picric acid	No fluorescence	Green	Black
5.	powder+ 5% ferric chloride	No fluorescence	Dark green	Black
6.	powder+ 1N NaOH in methanol	No fluorescence	Black	Black
7.	Powder + 1N NaOH IN water	No fluorescence	Black	Black

Table 4: Phytochemical screening of extracts of the bark of *Cedrus deodara.*

Constituents	Pet. Ether	Chloroform	Methanol	Ethanol	Aqueous
Alkaloids	-ve	-ve	-ve	-ve	-ve
Glycosides	-ve	-ve	-ve	-ve	-ve
Proteins and amino acids	-ve	-ve	+ ve	+ ve	+ ve
Flavonoids	-ve	-ve	+ve	+ve	+ ve
Steroids	-ve	-ve	-ve	-ve	-ve
Saponins	-ve	-ve	+ ve	+ ve	+ ve
Tannins	-ve	-ve	+ve	+ve	+ ve
Fixed oil and fats	+ve	-ve	-ve	-ve	-ve

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