

Research Article On *Pharmacognostic And Physicochemical Standards of Stem Bark of Cedrus Deodar*

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Abstract

Ayurvedic system of medicine is one of the world's oldest holistic healing systems. It was developed more than 3,000 years ago in India. This medicinal system incorporates the use of dravyas medicinal plants, which proved to be an effective means of human care. One among many such plants is *Devadaru*. The word '*Devadaru*' itself means the plant as '*Devta*' or 'divine' tree. Each part of the *devadaru* tree has some medicinal property and is thus commercially exploitable.

The present study was carried out to investigate morphological, microscopical and Physicochemical screening of *Cedrus Deodara* stem bark. To authenticate the sample of *devadaru*, comparison of organoleptic characteristics of stem bark was done which reveals that stem bark has some aromatic compounds. The microscopy

study of cut section of stem bark was done. The observations could be considered as the reference standards in future studies.

Key Words- *Cedrus deodara*, Pharmacognostical stem bark, Physicochemical, standardization

INTRODUCTION

Ayurveda is one of the ancient medical sciences, it made up of two words *Ayur* (life) and *Veda* (science or knowledge) So, collectively it means "The science of life Medicinal herbs, plants and trees play a key role in *Ayurvedic* form of treatment; it involves the use of plants or parts of plants to treat injuries or illnesses. Since time immemorial the crucial authority of herbal medicine in serving the therapeutic requirements of the population worldwide needs no evidence. Nearly 80% of the global

population still depends upon the herbal drugs for their health care.^[1]

It is a very large and tall ever green tree, upto 75m in height and ranging from 2.4m to 3.6m in girth, occasionally even upto 13.5m in girth, found in North western Himalayas from Kashmir to garhwal between 1200m to 3000m and also cultivated in Kumaon.^[2] Himalaya is considered be the home of Gods; it is believed that the forests are the part of their house. The landscape around temple is considered sacred and is preserved as temple grove. The tree *cedrus deodar* is believed to be the tree of God and is planted around temples, the word deodar comes from *devadaru* comes from *Devadaru* a Sanskrit word that translates to "divine wood" or "timber of God". The *devadaru* is revered in the Himalayas and frequently mentioned in Hindu stories. Kashmiri and Punjabi villagers worshipped the "*devadaru*" tree God^[3,4]. About 80% world population is still using the herbal drugs; However, a key factor responsible for its acceptability in developed countries is lack of documentation. A necessity is always felt of the evidence-based research studies to be carried out on traditional system of medicine for error free identification, authentication and standardization Pharmacognosy is important and necessary, keeping this in mind, It becomes exceptionally important to evolve the quality of plant based medicine.

The authenticity of drugs to prevent their exploitation and adulteration, documentation and stringer quality control, researching and discovering the availability of medical ingredients in the different parts of the plant to reduce the use and removal of large number of

plants, or evaluating the therapeutic potential of the drugs, official standards are necessary to control the quality and safety of drugs using proper modern scientific techniques^[5]. So, in the present study the stem bark of *Devadaru* has been evaluated Pharmacognostically.

Aim and Objectives

- 1) To evaluate the macroscopic characters of stem bark of *cedrus deodara* Roxb. by organoleptic methods.
- 2) To study microscopic characters of stem bark of *cedrus deodara* Roxb.

Material And Methods

A) Material- The stem bark of fully developed *devadaru* tree (*cedrus deodara* Roxb.).

B) Collection Of Samples- The selected samples of stem bark of *Devadaru* tree were collected from their native habitat from the forest range of Uttarakhand, Chopta.

C) Pharmacognostical Study- The pharmacognostic study of the sample for macroscopic and microscopic characters was carried out at central research laboratory of Shri Ayurved Mahavidyalaya.

1) **Macroscopic Study-** The cut sections of samples of stem bark of *devadaru* were spread on clean dry plastic sheets and were separately investigating for different organoleptic features by using sense organs Colour, odour, taste and texture, size, shape, fracture surface were noted.^[6]

2) **Microscopic Study-** The small pieces of stem bark were soaked in distilled

water and sodium hydroxide solution for anatomical sections and standard microtomy technique were followed. Transverse sections were followed. Transverse sections of 10µm to 12 µm thickness were prepared. The sections were stained with 0.5% safranin stain adjusted to neutral pH.^[7] Here the dried stem bark sample was soaked overnight in distilled water for 48 hours, then transverse sections, done and structures are observed after proper staining and mounting.

Physicochemical analysis

The physical standards help in the assessment of crude drugs. These are rarely constant, but help in the evolution of drug quality of the drug can be assessed with this analysis and thus biochemical variation, adulteration, substitution effects of storage treatment occurring in it can be tested.

Material and Methods

The samples of stem bark of *Devadaru* were cleaned washed dried well and has been used for this study. The following physicochemical parameters of the sample were analysed.^[8]

a) Foreign matter

Foreign matter in herbal drugs consists of either parts of the medicinal plant or it may be an organism, part or product other than that specified in the standard. This is usually referred to as Foreign Organic Matter (FOM). Foreign matter may consist of part of organ or organs from which the drug is derived or parts of other drugs, matter coming from other sources of contamination, moulds insects or other animal contamination. Also, foreign matter includes stones, soil, dust and other inorganic contaminants.

b) Loss on drying Procedure

Sample drug of weight 10gm was taken in a pre-weighed dried petri dish. It was dried in an oven at 105°C until reaching a constant weight. The petri dish was taken out, self-cooled and weighed immediately. The weight loss i.e., loss on drying was calculated and expressed as % w/w.

c) Ash Values

The residue remaining after incineration of the plant material is the ash value, which simply represents inorganic salts naturally occurring in the crude drugs or adhering to it or deliberately added to it, as a form of adulteration.

1) Total ash- Total ash is the measure of the total amount of material left after burning. The total ash usually consists of carbonates, phosphates, silicates and silica which include both physiological ashes derived from the plant tissue itself and non-physiological ash which are the residue of the extraneous matter like sand and soil particles to the plant surface.

2) Acid insoluble ash- Acid insoluble ash is the residue obtained after boiling the total ash with dilute hydrochloric acid and igniting the remaining insoluble matter. This ensures the amount of silica present especially as sand and siliceous earth.

3) Water soluble ash- Water soluble ash is the difference in the weight between the total ash and the residue after treatment of total ash with water.

d) Determination of Extractable Matter -The extracts obtained by exhausting plant materials with specific solvents are indicative of approximate

measures of their chemical constituents extracted with those solvents from a specific amount of air-dried material.

i) Water soluble extractive (WSE) - The Five gm of the sample was weighed accurately. To it 100ml of distilled water was added and (shook for 6 hrs. Retained for 18 hours) kept overnight. It was stirred intermittently in the initial period, next day it was filtered. A 25ml of the filtrate was accurately measured with pipette and transferred to the already weighed evaporating dish. The evaporating dish was placed on a water bath for evaporation of the water. After evaporation of the water, it was dried in an oven, allowed cooling and weighed immediately. From the weight of the residue obtained the percentage of water-soluble extractive was calculated and expressed as % w/w.

ii) Alcohol soluble extractive (ASE) - Five gm of the sample was weighed accurately. To it 100ml of ethyl alcohol was added and shook for 6 hrs. The same was retained for 18 hours. It was stirred intermittently in the initial period, next day it was filtered. A 25ml of the filtrate was accurately measured with pipette and transferred to the already weighed evaporating dish. The evaporating dish was placed on a water bath for evaporation of the alcohol. After evaporation of the alcohol (it was dried in an oven), allowed cooling and weighed immediately. From the weight of the residue obtained the percentage of alcohol soluble extractive was calculated and expressed as % w/w.

e) Determination of pH

The pH value of an aqueous liquid may be defined as the common logarithm of the reciprocal of the hydrogen ion

concentration. The pH value conventionally represents the acidity or alkalinity of aqueous solution. 5 % w/w aqueous solution of the samples was prepared, it was filtered, and pH of the filtrate was noted 25°C.

Observation and Results

Based on the Pharmacognostical, Phytochemical study done of the sample of stem bark of *C. deodara* in the following observations were made and results were obtained.

Observation

- 1) Microscopic Study- Microscopic characters of obtained sample of stem bark of *Cedrus deodara* on the basis of observations are, that the transverse section of stem bark shows cork cells with 3-5 layers of long hexagon cells in which inner layer is yellowish brown in colour and outer layer of bark is brownish red. Inner layer shows immature tracheid cells and resin ducts.
- 2) Organoleptic characters of obtained sample of stem bark of *Cedrus deodara* on the basis of observations are given in table 1.

Sr.No.	Parameters	Results
1.	Texture	Rough
2.	Colour	Surface is dark brown in colour
3.	Odour	Aromatic
4.	Taste	Bitter
5.	Shape	Irregular shape
6.	Size	17cm-17cm long, 6cm-7cm wide, 2cm-3cm thick.
7.	Fracture	Short, Fibrous
8.	Surface	Uneven, coarse

3) Organoleptic characters of obtained sample of stem bark of *Cedrus deodara* on the basis of observations are given in table 2.

Sr. No	Physicochemical Parameters	Values obtained (% w/w)
1.	Foreign matter	0
2.	Loss on drying	15.6±0.04
3.	Total ash	4.3±0.05
4.	Water soluble ash	1.7±0.09
5.	Acid insoluble ash	2.2±0.06
6.	Water soluble extractive	5.8±0.09
7.	Alcohol soluble extractive	8.6±0.7
8.	PH	4.23

Discussion

The study we have done we found that the organoleptic characters of the bark are rough, aromatic, Bitter, Irregular shape with short, fibrous fractures and surface is dark brown in colour and have uneven coarse surface. These observations shows *devadaru* stem bark has some aromatic compounds, The T.S section of the bark shows that bark have cork cells with 3-5 layer of long hexagon cells, where inner layer is brownish red colour. Inner layer shows immature tracheids cells and resin ducts.

In physicochemical study, the loss on drying of any sample is directly related to its moisture content, and if the moisture content is high then the chances of contamination and cause decomposition of crude drug. Hence, loss on drying of the sample was found to be 15.6±0.04% for stem bark. The residue remaining after incineration is the ash content of the drug, it represents inorganic salts, naturally occurring in

drug or adhering to it or deliberately added to it, as a form of adulteration. Ash value was found to be 4.3±0.05% for the stem bark, Acid insoluble ash content was found to be 2.2±0.06% and water-soluble ash value content was found to be 1.7±0.09%. Water soluble and alcohol soluble extractive values are indicative of bioavailability of the plant compounds in the extracts. Value obtained for W.S.E and A.S.E were 5.8±0.09% and 8.6±0.7 respectively. These values reveal that stem bark shows the presence of chemical constituents available in their extracts. The pH of the water extract of the sample of *Devadaru* stem bark showed that it is acidic in nature.

Hence, through the organoleptic characteristics the microscopic observations and observations of section cutting provides the basis for the identification and process standardization can be achieved.

CONCLUSION

The authenticity of the raw material was established based on organoleptic characteristics and microscopic observations obtained during study. The values of physicochemical parameter for stem bark are noted down and will be beneficial for further work done in this field.

The study lays the ground for setting standards for crude drugs, as the physical constant evaluation is an important Parameter in detecting adulteration or improper handling of drug and it will help for further drug discovery and development.

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