Pharmacognostic study of Chamaecyparis lawsoniana (Murr.) Parl.: A drug used in Homoeopathy

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ABSTRACT

The pharmacognostic profile of crude drug has a key role in standardization for quality, purity and drug identification. The present study deals with pharmacognostic evaluation of aerial part of Chamaecyparis lawsoniana (Murr.) Parl. a drug used in homoeopathic system of medicine for diverse clinical uses such as terrible pain in stomach, tumors, keloid, warts and lipoma of thigh. The study includes collection, identification, macroscopy, microscopy and organoleptic characteristics of aerial part of Chamaecyparis lawsoniana. Anatomically the leaf is distinguishable into a layer of the epidermis followed by parenchymatous mesophyll and resin duct in the parenchymatous cortex. Powder microscopy shows the presence of epidermal cells, parenchymatous cells and tracheids. These observations may be used as pharmacopoeial standards for identification of Chamaecyparis lawsoniana.

Keywords: Chamaecyparis lawsoniana, Pharmacognosy, Resin duct

INTRODUCTION

Chamaecyparis lawsoniana (Murr.) Parl. (Synonym: Cupressus lawsoniana Murr.) of the family Cupressaceae, is a large tree 43–55 m in height. The plant is known by the name Port-Orford-Cedar or Lawson's cypress. Its distribution is restricted to the coastal forests of Southwestern Oregon and Northern California in the USA.¹ In India, it is grown in gardens of the hills of West Bengal and Nilgiris of South India. Leaves are scaly 3–5 mm long, opposite in pairs, closely appressed to the branchlets, with narrow white markings on the underside. The lateral leaves are much longer than facial leaves. Flowers are monoecious, minute, at the ends of the branchlets. Female cones are globose, green at first but turn brown when mature, about 8 mm diameter, with 6–10 scales, each subtending 2–5 winged seeds. The male cones are 3–4 mm long, dark red, turning brown after pollen release in early spring. The bark is reddish brown and fibrous to scaly in vertical strips. The wood has a characteristic pungent, “ginger-like” odor.²³

The aerial part of Chamaecyparis lawsoniana is often employed in traditional medicine. The drug is mentioned in the homoeopathic literature and used clinically for severe pain in stomach, keloid, tumors, lipoma of thigh and warts. Its characteristics have been proved in a fragmentary way by Burnett, who had to relinquish the proving on account of the “terrible pains it caused in the stomach.” He concludes from his experience that the action is very like that of Thuja, and he has successfully used it as a variant of that remedy and of Sabina in the cure of tumors: Cocks-comb growth in the mouth; lipoma of thigh;
keloid.\[6,7\]

Chemical compounds of *Chamaecyparis lawsoniana* have been reported to demonstrate antioxidant, antiviral, antibacterial and antifungal properties.\[16-16]\n
Earlier publications have shown that *Chamaecyparis lawsoniana* wood has excellent decay and termite resistance.\[17-20\] Chemically, the plant is reported to have essential oils, viz. Terpinen-4-ol (22.0%), Sabinene (21.0%), camphor (7.8%), Citronellol (7.3%), γ-Terpinene (7.0%), Diterpenes viz. Ferruginol, Pisiferol and its epimer 5-epipisiferol, formosanoxide, trans-communic acid, torulosal, sesquiterpene oplopanonyl acetate and the germacrane 4b-hydroxygermacra-1 (10)-5-diene.\[21,22\] However, literature reveals that there are no pharmacognostic standards recorded especially for aerial part of this drug. In view of this fact and importance of *Chamaecyparis lawsoniana* in Homoeopathy, the present study has been carried out involving, macroscopical and microscopical analyses of stem, leaf and cone of the plant\[23\] and the microscopical method is one of the best methods for establishing the correct identification of the source of material.\[24\] The results of this study may be useful in the determination of characters for its quick identification and quality assurance of raw drug.

**MATERIALS AND METHODS**

The plant materials (aerial part) of *Chamaecyparis lawsoniana* were collected during the month of July 2013 from Kodaikanal hills (Dindigal district, Tamil Nadu,) and taxonomically identified by the Survey of Medicinal Plants and Collection Unit, Emerald, Nilgiris District, Tamil Nadu, India were preserved in Formalin-acetic acid-alcohol fixative and used for anatomical studies following the method of Wallis.\[25\]

Epidermal peels were taken by scraping the leaves with a razor blade. Free hand sections were cut and stained in safranin-fast green combination, following the method of Johansen.\[26\]

**OBSERVATIONS AND RESULTS**

**Macroscopical Studies**

The macroscopical descriptions based on Figures 1(a) and 1(b) is as follows:

**Twigs**

Fan-shaped, flattened, upper surface dark-green, lower surface significantly lighter in color.

**Leaves**

Decussate scale such as closely imbricate, ovate, acute, 2–3 mm long, linear to circular, apex acute to acuminate; facial leaves flat and lateral leaves folded.

**Cones**

Purplish to reddish brown, glaucous, globose, 6–12 mm in diameter; scales 5–9, each fertile scale with 2–4 seeds. Seeds 2–5 mm; wing equal to or wider than seed.

**Microscopical Studies**

**Leaf**

The Transverse Section (TS) of leaf showed isobilateral structure with obtuse triangular shape in outline [Figure 2a]. The epidermis is single layered, covered with thick cuticle, and traversed with sunken stomata. The hypodermis is single layered as well as multi-layered at the edges. resin ducts vary from 2 to 4 and are present on abaxial side. The mesophyll is differentiated into single layered palisade cells [Figure 2b] and 3–4 layered spongy tissue with small intracellular space. The meristele is present in the center with single vascular bundle which consists of phloem (ph), xylem (xy) and transfusion tissue (tt) [Figure 2c]. Surface study showed stomatal zone at the lower corner of the abaxial surface of a lateral leaf [Figure 2d and e].

**Stem**

The TS of stem showed 3–4 layered more or less lignified tangentially elongated cork cells with occasional patches of single layer of epidermal cell covered with thick cuticle; cortex 8–10 layers of parenchyma, cells polygonal and often contains starch grains and crystal of Calcium oxalate; followed by 3–4 layers of collapsed cork cambium. Endodermis is not distinct. phloem consists of sieve tubes and
Rathi: Pharmacognostic study of Chamaecyparis lawsoniana

parenchyma with alternate layers of isolated phloem fibers and mrs which often interrupt the ph which get widened toward cortex and filled with starch grains. The xylem is broad, and separated by 1–2 seriate and composed of tracheids, early and late wood and pith composed of small parenchymatous cells [Figure 3a-d].

Seed
The seed coat showed the presence of three layers: The outer most layer is epidermal consisting of round to rectangular papillate cells; the middle layer is tough and stony with wavy margin and have 4 alternate resin vesicles (rvs), innermost layer consists of 2–3 layers of collapsed parenchyma tissue towards the terminal side of the wing. Perisperm consists of papery layer surrounding the embryo. Cotyledons (cots) parenchymatous, thin-walled without any aleurone/starch grains [Figure 4a and b].

Organoleptic Character
Odor balsamic when rubbed between the fingers; taste camphoraceous, turpentine and bitter.

DISCUSSION AND CONCLUSION

The macroscopic and microscopic methods are the simplest methods for establishing the correct identification of plants or plant raw drugs or plant parts.[27] The macroscopic characters of twigs, leaves and cones of Chamaecyparis lawsoniana serve as diagnostic parameters. Microscopical studies indicated the presence of meristele in the center with single vascular bundle which consists of phloem, xylem and transstution tissue in leaves. Resin ducts vary from 2 to 4 and are found on abaxial side of leaves. Four alternate resin vesicles, epidermis papillate and thin cots parenchymatous are seen in seed. Broad xy composed of tracheids and parenchymatous cells and elongated cork cells with occasional patches of a single layer of epidermal cells covered with thick cuticle of stem are the important diagnostic characteristics of the plant Chamaecyparis lawsoniana.

The pharmacognostic evaluation of Chamaecyparis lawsoniana which comprises of macroscopic and microscopic characteristics is the important features

![Figure 2: (a) Transverse section of leaf scale X4 (b) Transverse section of leaf scale through lamina showing Single layer of palisade X40 (c) Transverse section of leaf scale showing vascular bundle X40 (d) Surface views of leaf with papillate epidermal cells ×10 (e) Surface views of leaf with stomata ×40. rd-resin duct, lfb- leaf bundle, s-stomata, e-epidermis, pal-paliside, tt-transition,xy-xylem, pc-papillate cells](http://www.ijrh.org)

![Figure 3: (a) Transverse section of stem X4 (b) Transverse section of stem X10 (c) Transverse section of stem showing alternate layer of phloem fibre X40 (d) Transverse section of stem showing prismatic crystal X40. c-cortex, pf-phloem fiber, prcr- prysmatic crystal, pd-periderm, xy-xylem, mr-medullary rays, pi-pith](http://www.ijrh.org)
for selection of genuine raw drug or plant parts. Therefore, the pharmacognostic standards laid down for the first time in this study would be useful in identification and standardization of the plant material toward quality assurance of raw drug and for preparation of monograph on the plant, which may also act as reliable pharmacognostical markers in determining authenticity and identifying adulteration of crude drug.[28] The drug manufacturers can also utilize above described characters for identification and authentication of raw drug material for preparation of homoeopathic drug Chamaecyparis lawsoniana.

REFERENCES


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होम्योपैथी में प्रयुक्त औषधि कैमीसाइलेरिस लासोनियाना का भेंज अभिज्ञानी अध्ययन

परिशुल्क प्रीति की भेंज अभिज्ञानी प्रोफाइल की गुणता, सुदृढ़ता तथा औषधि निर्धारण हेतु मानकीकरण में प्रमुख भूमिका होती है। वर्तमान अध्ययन भयानक पेट, दर्द, अर्ब्युर्ड (टूमर), कॉर्टीसा, चर्मकोयल (सर्स) तथा ऊर्थ वसाॉम जैसे विविध नैदानिक उपयोगों हेतु होम्योपैथिक आयुर्विज्ञान प्रणाली में प्रयुक्त औषधि कैमीसाइलेरिस लासोनियाना अथवा कूपरसरस लासोनियाना (कुल: कूपरसरसी) के वायति भाग के भेंज अभिज्ञानी मूल्यांकन से संबंधित है।

अध्ययन में कैमीसाइलेरिस लासोनियाना के वायति भाग में संप्रद, निर्धारण, स्थलदर्शीकरण, सुदृढ़करण तथा प्रदर्शित अभिलक्षण सामर्थ्य हैं। शायर की त्रिश के पर्य बाह्यता की किसी परत में विभेद होती है, जिसके नीचे सार-ऊँटकी पर्वमक्योतक तथा सार-ऊँटकी प्रांतक्ष में रेज़िन वाहिनी होती है। दूर्ष सुदृढ़करण अध्ययन कोशिकाओं, रेज़िन वाहिनी, सार-ऊँटकी कोशिकाओं तथा वाहिनिकाओं की उपस्थिति दर्शाता है। इन प्रक्षणों का उपयोग कैमीसाइलेरिस लासोनियाना के निर्धारण हेतु मान्य औषधीकोशीय मानकों के रूप में किया जा सकता है।

मुख्य शब्द: कैमीसाइलेरिस लासोनियाना, भेंज अभिज्ञान, रेज़िन वाहिनी।