

PHARMACOGNOSTIC STUDY OF LEDUM PALUSTRE

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KEY WORD INDEX: *Ledum palustre* L., Ericaceae, Anatomical Studies.

ABSTRACT: Microscopic studies of *Ledum palustre* L. (Ericaceae) were carried out for quality control purposes. Diagnostic features include anomocytic stomata on lower epidermis, palisade ratio 2-2.75, presence of 4 types of trichomes (i) simple unicellular, (ii) glandular, non-peltate, multicellular, highly developed and thickened at base, (iii) biseriate, multicellular with free ends coiling; collenchyma in midrib, petiole and stem; suberised cells representing pericyclic cork in stem; fibre tracheids and septate fibres in stem; secretory cells both in stem and leaf; brachysclereids and scalariform tracheae with scalariform perforation plates in stem.

INTRODUCTION

Ledum palustre L. is used in Homoeopathy (Boericke, 1927) in rheumatic diathesis, for punctured wounds produced by sharp-pointed instruments particularly if the wound parts are cold, red pimples on forehead and cheeks, cough and bloody expectoration, dyspnoea, whooping cough and anal fissures.

There are eight species of the genus *Ledum*, but anatomical characters of *L. palustre* have not been reported so far.

MATERIALS AND METHODS

Samples were obtained from two sources and identified as *Ledum p.* on the basis of morphological characters as per U.S.S.R. flora (Shishkin and Bobrov, 1967) and as per standard procedure. For cross section studies, samples were revived with cold and hot water treatment and then dehydrated using different grades of ethyl alcohol, cleared with xylene, impregnated with bees and paraffin wax (1:2). Sections were obtained 15-20 μ in thickness, stained, mounted and studied. For study of powdered samples, the powdered drug was treated with 5% aqueous NaOH solution for 24 hours and teased. Comparative thin layered chromatographic studies were made using solvent system butanol: acetic acid: water (4:1:1) on silica gel. All the samples gave 5 spots under U.V. light with uniform Rf values (0.21, 0.41, 0.50, 0.61, 0.74).

RESULTS

Microscopy: Leaf in trans-section (fig. 1) is dorsiventral with lobular lamina; midrib, pronounced abaxially; epidermis single layered, containing

three types of trichomes (i) glandular (stalked), (ii) simple unicellular and (iii) multicellular on lower aspect; epidermal cells papillose on midrib; palisade 2 layered followed by spongy parenchyma. Collenchyma in midrib, single layered below the epidermis, followed by a spongy parenchyma enclosing within an arc-shaped conjoint, collateral, stele (figs. 2 and 3), encircled around or abaxially by a band of sclerenchyma cells. Aggregates of micro-crystals occasional in spongy parenchyma.

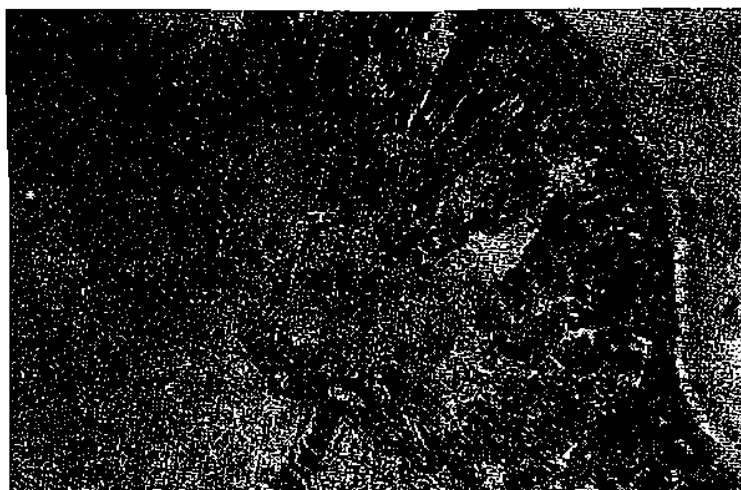


Figure 1. *Ledum palustre* L.T.S. lamina (400 x).

Petiole in transection (fig. 4) with epidermis, single layered of papillose cells, bearing multicellular and glandular trichomes; collenchyma 2-3 layered followed by a large parenchymatous ground tissue, enclosing a collateral, conjoint stele surrounded adaxially by numerous sclerenchyma cells.

Stem in transection (fig. 5) composed of epidermis, single layered; collenchyma, 2-3 layered; cortex 3-5 layered of irregular parenchyma cells; small, interrupted band of sclereids; a zone of suberised cells, 2-layered, below the sclereids, representing the pericyclic cork; phloem in a ring; xylem in a ring; ray uniseriate; pith of spongy parenchyma with lignification at places.

Powdered drug (fig. 6): Powdered leaf consisted of four types of trichomes (i) simple unicellular, (ii) glandular, non-peltate, stalked, stalk and head being multicellular and head globose, (iii) branched, stellate, multicellular, highly developed, with fairly thickened walls towards the base, (iv) uni- and bi-seriate, multicellular, fairly long with free ends coiling; palisade cells, 12-30 μ by 6-12 μ , palisade ratio 2-2.75; epidermal cells, irregular; oval parenchyma cells; anomocytic stomata on lower epidermis; vessels



Figure 2. *Ledum palustre* L.T.S.(midrib (400x) showing collenchyma and spongy parenchyma below the epidermis.



Figure 3. *Ledum palustre* L.T.S. midrib (400x) showing stele.

spiral; sclerenchyma fibres thick-walled, narrow-lumened with taper ends; secretory cells. Upper epidermis lacked stomata. Distinct bi-celled scars of biseriate trichomes on epidermis were occasional.

Powdered stem composed of thick walled rectangular epidermal cells, 33-55 μ by 22-49.5 μ lodging rectangular, cubical crystals 13.2-22 μ by 13.2-22 μ ; elongated polygonal secretory cells 20-38 μ by 16-30 μ ; fibre tracheids; septate fibres 770-979 μ by 88 μ ; suberised cells, 40-50 μ by 12-20 μ ; branched sclereids; isodiametric cortical parenchyma cells; scalariform vessels with scalariform perforation-plates from secondary xylem; spiral vessels few.

DISCUSSION

Metcalf and Chalk (1972) had described general anatomical characters of leaves and stem of *Ledum* reporting presence of fibres in the mesophyll or group of sclerenchyma elements at the margin in leaves, and absence of collenchyma in stem, but in the present studies, fibres in mesophyll or group of sclerenchyma elements at margin in leaves were not found, and the collen-

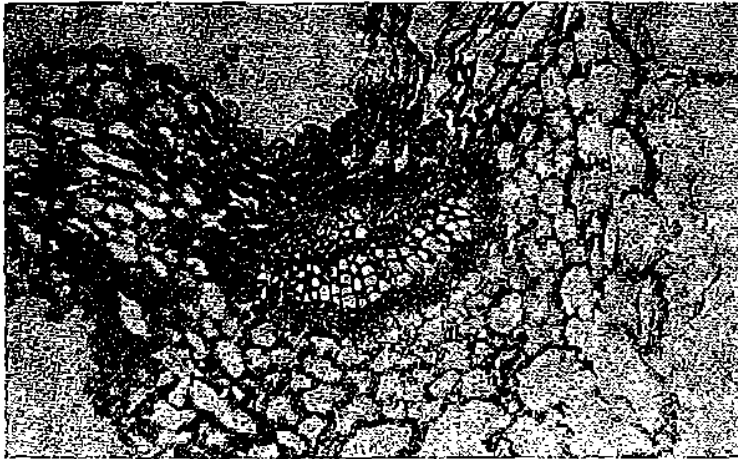


Figure 4. *Ledum palustre* L.T.S. (400x).

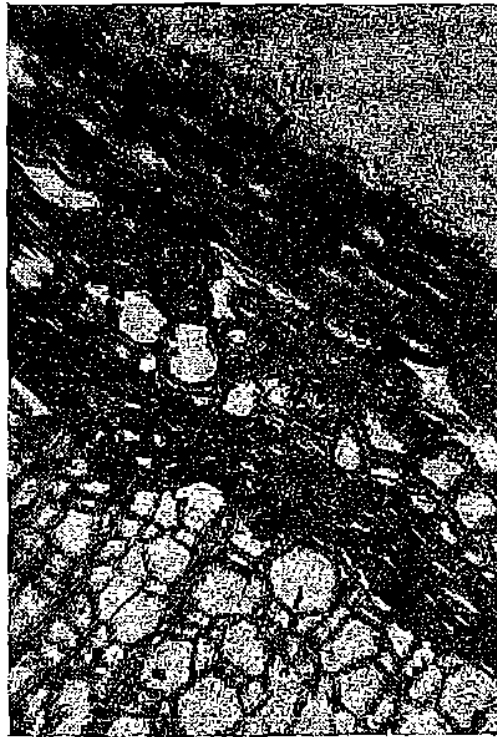


Figure 5. *Ledum palustre* L.T.S. stem (400x) showing pericyclic cork below sclereids.

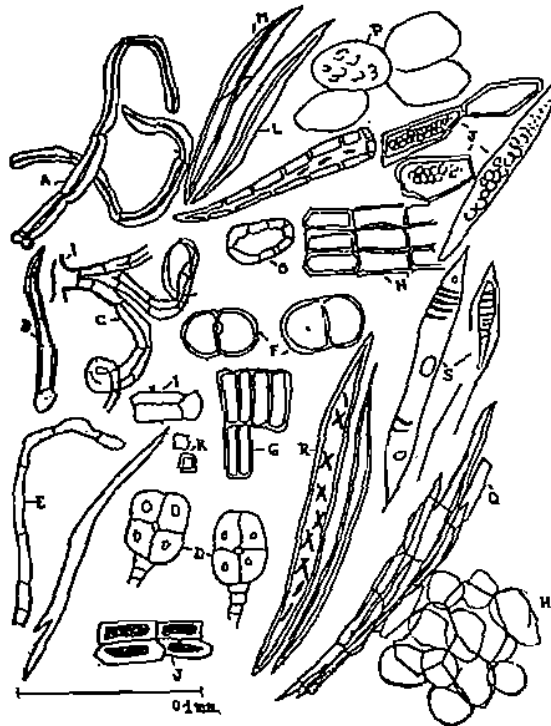


Figure 6. *Ledum palustre* L. powdered drug: A. Trichomes, biseriate, multicellular with free ends coiling, B. Trichomes, simple, unicellular, C. Trichomes, stellate, branched, multicellular with thick walls at base and free ends coiling, D. Trichomes, glandular, non-peltate, stalked, E. Trichomes, uniseriate, multicellular with thickening of walls at base, F. Bi-celled scars of biseriate trichomes, G. Palisade cells, H. Epidermal and palisade cells, I. Secretory cells, J. Crystals, K. Sclerenchyma fibre, L. Septate fibres, M. Cork cells, N. Sclereids, O. Parenchyma cells, P. Fibres masked by elongated parenchyma cells, Q. Fibre tracheids, R. Vessels with scalariform thickenings.

chyma was present in stem. These characters specifically relate to *Ledum palustre*.

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