



MEDICINAL IMPORTANCE OF USNEOID LICHENS IN WESTERN GHATS, SOUTHERN INDIA

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Abstract

Usnea Adans. is a large genus in the family Parmeliaceae with about 451 species that are widely distributed in polar, temperate and tropical regions of the world. The genus is recognized based on the fruticose thallus, branches with cartilaginous central axis and the presence of Usnic acid in the cortex. India is represented by the 60 species of *Usnea* among them 38 are recorded from the Western Ghats. *Usnea* has been used to treat various illnesses in addition to its historical use as dyes, cosmetics, preservatives and deodorants. Among the 38 species of *Usnea* in Western Ghats, 15 species are known to have medicinal values, in various traditional medicines in different part of the world. The secondary metabolites like Usnic acid, salazinic acid, stictic acid, diffractic acids produced by lichens are unique with respect to those of higher plants. Whole thallus is used in the preparation of medicines. *Usnea longissima* is used as an ingredient in the medicinal for bone settings, *U. ghattensis* is known for its antioxidant and anti microbial activity. The study aims at the medicinal value of less known group of plants and role of their bioactive compounds.

Key words : *Usnea*, medicinal lichens, Parmeliaceae

Introduction

Lichens are unique group of organisms showing symbiotic association between algae and fungi. These lichens have been used as a house hold item since ancient days. The medicinal uses of lichens have been recorded from different cultures in Europe, India, China, Tanzania, USA, South Africa, Nepal, Philippines, West Malaysia, Spain, Brazil, Argentina, Korea, Tibet, Russia, Japan, Mangolia, Canada, Libia, Ireland (Prateeksha *et. al.*, 2016). Shipal in Atharveda is the first record of the use of lichen as medicine. In Ayurveda, the Indian medicinal system, it has been widely used in the name of Charila. The Indian subcontinent harbours a rich lichen flora with 2,450 species (Awasthi, 2000). Lichens collected from the different part of India have been used indigenously and exported for many purposes such as food, fodder, medicines, cosmetics, perfumes and dyes.

Western Ghats harbours 949 lichen taxa, belonging to 929 species, 20 varieties, 150 genera and 54 families which is around 45% of the total lichens in India, highest

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for any lichenogeographic region in the country (Nayaka and Upreti, 2006). The genus *Usnea* is represented by 38 species in Western Ghats (Mesta *et al.*, 2015).

There are about 800 secondary metabolite identified from lichens and these are unique with respect to those produced by higher plants (Huneck and Yoshimura 1996). These secondary metabolites are useful chemical characteristics in lichen taxonomy (Hegnauer 1962). The slow growth and harsh environmental conditions are responsible for the production of secondary metabolite in lichens. The secondary metabolites have been produced to protect from herbivores (Lawrey, 1989). The secondary metabolite are responsible for the use of lichens in different fields such as medicinal, decorative, food, brewing, spices, dyeing, cosmetic and perfumery properties.

Among the lichens those belonging to the genus *Usnea* are used in medicines from ancient ages. Many species of *Usnea* are used as medicine from ancient ages. *Usnea* are used as an ingredient of medicines by ethnomedicinal practitioner in India and also in the world (Upreti and Chatterjee, 2007). The most commonly used

lichen genus as medicine is *Usnea*, which is used all over the world except Australia (Branislav Rankoviæ 2015). Western Ghats harbours 38 species of *Usnea*, which is more than 50% of *Usnea* found in India. The main aim of the present work is to document the medicinal uses of these precious wealth of the Western Ghats.

Materials and Methods

The study area, Western Ghats comprises the

mountain ranges that runs along the west coast of India, Tapti valley in the north to Kanyakumari in the south. The Western Ghats comprises variety of vegetations such as scrub jungles, grasslands, dry and moist deciduous forests, semi-evergreen and evergreen forests. The complex topography and heavy rainfall have made certain areas inaccessible and have helped the region retain its diversity.

Survey was done regularly in different habitats of

Table 1: List of *Usnea* species used in treatment of different diseases with their secondary metabolites.

Sl. No.	Lichen Species	Uses	Secondary Metabolites	References
1.	<i>U. aciculifera</i>	Used for bladder infection, painfulurination, urinary retention,swelling, and edema in heart andkidneys	Usnic acid, constictic and stictic acids	16
2.	<i>U. austro indica</i>	Used as medicine and spice	Usnic acid with or without barbatic acid	3
3.	<i>U. baileyi</i>	Mixed with other aromatic herbs,such as Valeriana jatamansi forfavoring and curing tobacco	Usnic acid, norstictic acid and an unknown substance; Eumittrin A, Eumittrin B, norstictic acid, Salazinic acid, connorstictic acid, galbinic acid(trace), hyposalazinic acid (trace)	10
4.	<i>U. bismolliuscula</i>	Inhibition of tyrosine activity	Usnic acid, stictic and constictic acids	11
5.	<i>U. galbinifera</i>	Used as lockets for those suffering from phobias	Galbinic and norstictic acids	6
6.	<i>U. ghattensis</i>	antioxidant, hepatoprotective and antibacterial activity	Usnic acid sometimes with an unknown substance	11
7.	<i>U. gigas</i>	<i>U. gigas</i> are chewed freshand the bitter juice swallowed, relieving stomach pain.	Usnic acid	2
8.	<i>U. himalayana</i>	Burned as a “lichen cigarette”	Usnic, norstictic,salazinic, and stictic acid complex	13
9.	<i>U. orientalis</i>	Used as medicine and spice	Usnic and salazinic acid	3
10.	<i>U. pectinata</i>	Used for stopping bleeding fromexternal injuries, relieving pain,bloody feces, and swelling	Usnic acid and stictic acid complex	15
11.	<i>U. sinensis</i>	It is used for the treatment of children suffering from common ills such as fever, head ach and intestinal worms.	Usnic acid	6
12.	<i>U.subflorida</i>	Mixed with other aromatic herbs,such as Valeriana jatamansi forfavoring and curing tobacco	Usnic, protocetraric acids: barbatic acid present or absent	11
13.	<i>U. subfloridana</i>	Applied for treating sore eyes, mixedwith tobacco and butter, boiled,cooled, and applied as lotion to eyesUsed for painful and reddened eyes,bleeding from external injuries, andswelling	Usnic acid and norstictic acid	8, 14
14.	<i>U. thomsonii</i>	Used as medicine and spice	Usnic acid alectorialic and diffractic acid	3
15.	<i>U. undulata</i>	It is also used to make pillows in the Mysore regions and is made into lockets to be carried around the necks of those suffering from phobias.	Galbinic, norstictic, and salazinic acids	6

Western Ghats. The medicinal value of the lichens is recorded by the traditional knowledge holders of different parts of the Western Ghats and also literature survey was done on the medicinal uses of the *Usnea* lichens. The information on medicinal uses of the *Usnea* lichen was collected through interviews with tribal elders and knowledgeable people using questionnaire modified by Sinha 1996.

The representative lichen materials used by the practitioners are collected and identified. The data on locality, altitude, vegetation type, and microhabitat were recorded. The specimens were identified with the help of morphological, anatomical and chemical tests. The identification of collected lichens is done by using standard manual (Awasthi 2000).

Results and Discussion

A total of 15 *Usnea* species have been recorded from the Western Ghats which have been used in the traditional medicine in Western Ghats and also all over the world. Table 1. Among the 15 species, those of *U. bismolliuscula*, *U. ghattensis*, *U. himalayana* and *U. undulata* have been used extensively in traditional medicine practises such as antioxidant, hepatoprotective and antibacterial activity inhibition of tyrosine activity and some are also used to make pillows in the Mysore regions and is made into lockets to be carried around the necks of those suffering from phobias.

These lichens majorly contains Usnic acid, Norstictic acid, salazinic acid and stictic acid as the secondary metabolite. Around 15% of lichens have been used to treat wounds and bone fracture.

Conclusion

Western Ghats are the treasure house of different varieties of life forms including lichens. 63.3% of the Genus *Usnea* from India is found in Western Ghats. The knowledge on the medicinal value of *Usnea* lichens is very useful. The sustainable harvesting of these lichens and preparation of pharmaceutical formulation utilizing the traditional knowledge will lead to the success.

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