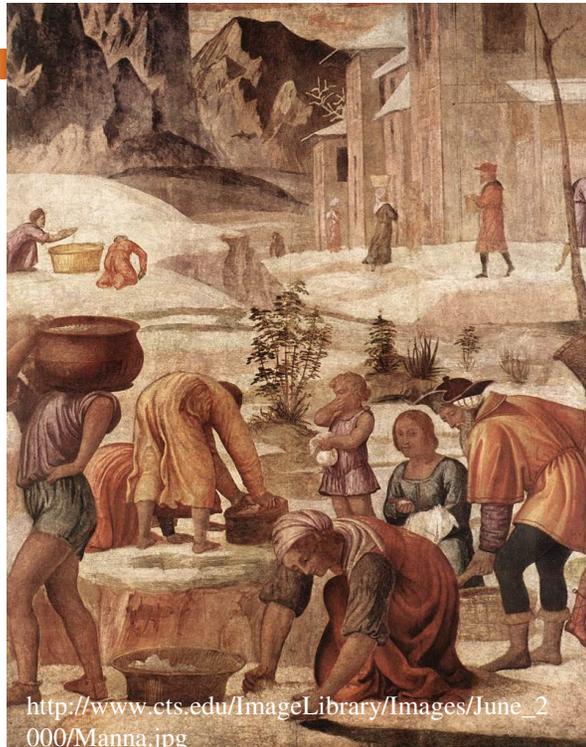




# **Economic Importance of Lichens**

# Lichen as Food



The Gathering of the Manna

*Lecanora esculenta* considered as the “MANNA LICHEN”

Location

Highlands of North Africa and Deserts of West-central Asia

Species

*Lecanora esculenta*

Formation & appearance

Thick wrinkled crusts on rocks. Detached as they grow older

Sudden appearance of large quantities of lichens blown around by winds or washed into depressions by rainshowers is termed “MANNA LICHEN”

# Lichens as Food

Lichen species	Common name	Country used
<i>Cetraria islandica</i>	Iceland moss	Scandinavian countries
<i>Umbilicaria mühlenbergii</i>	Iwatake	North Africa and Deserts of West Central Asia
<i>Umbilicaria esculenta</i>	Iwatake	North America
<i>Peltigera canina</i>	Dog lichen	India
<i>Ramalina sinensis</i>	Cartilage lichen	Nepal and India
<i>Bryoria fremontii</i>	Black lichen	North America and British Columbia

Iwatake  
Delicacy in Japan



[http://research.kahaku.go.jp/botany/chii/04/images/watake\\_tempra.jpg](http://research.kahaku.go.jp/botany/chii/04/images/watake_tempra.jpg)



*Umbilicaria esculenta*



Iceland moss  
*Cetraria islandica*



[http://www.arcticatlas.org/species/photos/300ceis60\\_3](http://www.arcticatlas.org/species/photos/300ceis60_3)

# Lichens as Food flavoring agents



**Fresh Lichen collection  
ready for sale in Wayanad,  
Kerala**

**Collecting tribe: Kattunaika  
Lichen Collection is accepted  
by the State Forest  
Department**

**Photo: Dr N. Anil Kumar &  
team  
CABC, Wyanad**

Species mixture of *Parmelia*, *Heterodermia*, *Pyxine* and *Physcia* are extensively used to increase the flavor of the Indian spicy dish 'Briyani' from Kashmir to Kanyakumari.

## Vernacular Names

**Sanskrit**-Sailaja, saileya; **Hindi**-Charila, Pathar-kaphul; **Telugu**-Rathipoovvu; **Tamil**-Marappasi, Kalpasi, maraottu; **Punjabi**-Chalchalira, charcharila, ausneh, hiunsew; **Malayalam**-Kalpasi, **Marathi**-Mota dagada phul, barik dagada phul.

A wild collector will approximately destroy more than  $45 \times 10^3 \text{ cm}^2$  well grown lichen cover at one shot for collecting 1 Kg of lichen biomass.

On the contrary the foliose lichen can grow up to 2-3 mm/year.

Once destroyed partially it will take min. 2-5 years to attain the recollecting stage.



# Lichen as Fodder

Some of the fodder species of lichen include *Cladonia rangiferina*, *C. alperstris* and *C. sylvatica*

Other fodder species include *Cetraria*, *Stereocaulon* and *Alectoria*.

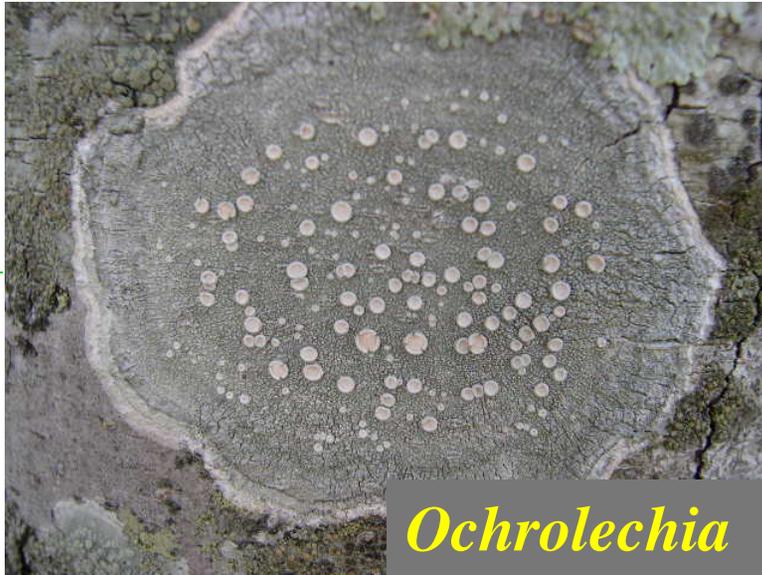


A Nenets woman digs away snow so a young reindeer calf can reach lichens to eat. Yamal. Siberia. Russia.



A reindeer uses its hooves to clear away snow to reach lichen at its winter pastures. Yamal, Siberia.

# Lichens as Dyes



*Ochrolechia*



*Roccella*

Lichen acids were the source of important dyes for cotton and wool in medieval Europe.

Two purple and red dyes, orchil and cudbear, were obtained from the lichens *Roccella* and *Ochrolechia*.

Lichen dyes were dissolved in human urine, and the yarns were immersed in this mixture.

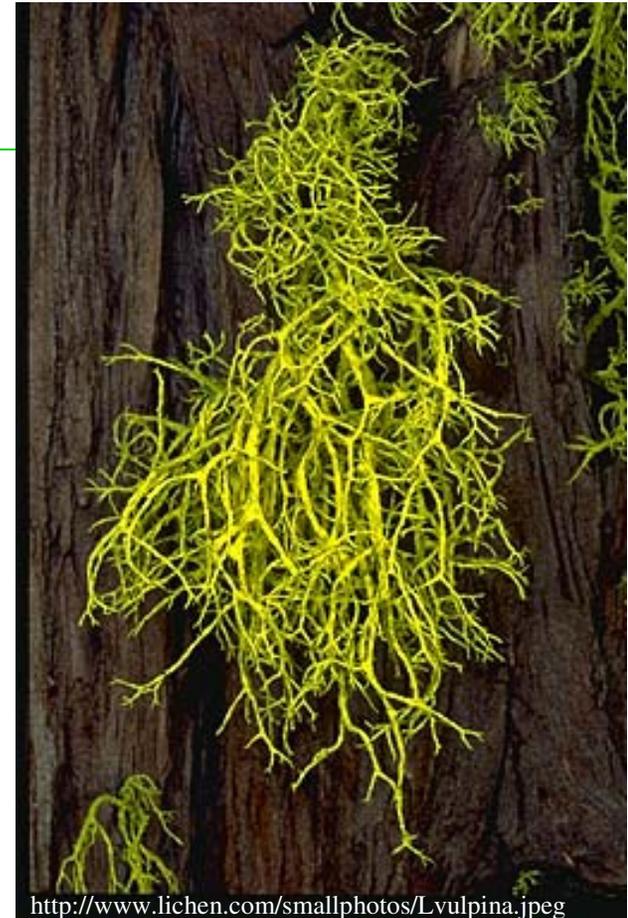
Ammonia salts in the urine functioned as mordants to make the dyes permanent

# Poison to Wolves

*Letharia vulpina* ("wolf lichen")

This lichen is poisonous that the Achomawi in Northern California used it to make poison arrowheads, mix the lichen with meat and poison wolfs.

The Okanagan-Colville made a weak tea of it to treat internal problems, and it was a Blackfoot remedy for stomach disorders.



## Litmus (an acid/base indicator) from *Roccella montagnei*

The tinctoral properties of lichens are due to the presence of lichen secondary metabolites, some of which contain chromogens from which the colouring matter is derived.



Under the combined influence of ammonia and oxygen, lecanoric acid and erythrin in *Roccella montagnei* give orcin and subsequently orcein, which are the colouring matters of orchil and which, in the presence of sodium or potassium carbonates, form azolitmin and erythrolitmin (colouring matters of litmus)

- *Wealth of India*

# Lichens in Perfumes



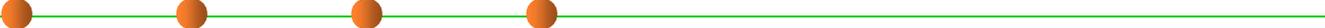
## "Oakmoss lichen"

### (*Evernia prunastri*)

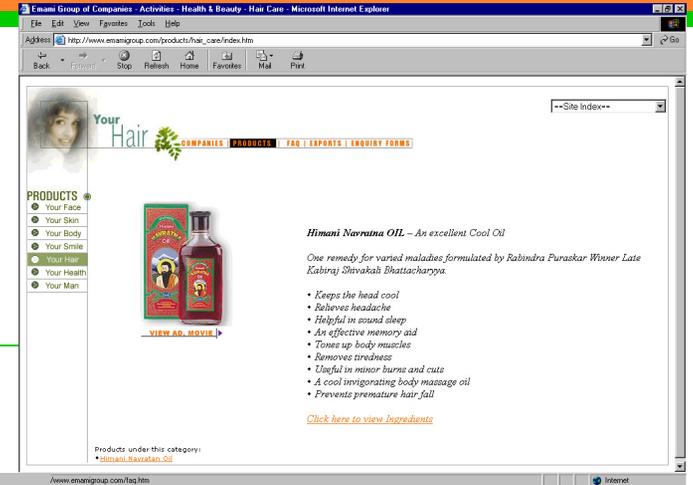
*Evernia prunastri* (oak moss), *Pseudevernia furfuracea* (tree moss) and *Ramalinae* spp. are mostly used as ingredients in soaps, cosmetics, after shave lotions or perfume for a peculiar, earthy, mossy fragrance. This species is harvested commercially in south-central Europe, and then sent to France where it is used in the manufacture of fine perfumes. The lichen acts as a fixative for other scents, and also adds a subtle herbal fragrance of its own.



## Lichens in Medicine

- 
- *Umbilicaria esculenta* found to contain anti-HIV substances. *Usnea* spp. found to contain anti-cancer compounds.
  - *Parmelia* spp. are used in wound healing in parts of Eastern Ghats, India.
  - Lichens contain several secondary metabolites, which are antibiotic in nature.
  - **Skin Allergens:** *Evernia prunastri* – for wild lichen collectors and the users of the perfume containing extracts of this lichen

# Lichen *Parmelia perlata* in Ayurvedic Medicine



## List Of Ingredients Of Navratna Oil

S.N	Indian Name	English Name	Botanical Name	Purpose Of Use
0.				
1.	Benamool	Vetiver	<i>Vetiveria zizinioides</i>	Refrigerant and anti-burning action. Keeps brain cool. Keeps
2.	Latakasturi	Musk Mallow	<i>Hibiscus</i>	Keeps head cool.
3.	Kakoli	-	<i>Roscoea purpurea</i>	Refrigerant and it has good aromatic odour.
4.	Sailaia	-	<i>Permalia parlata</i>	Relieves headache. Cooling and refrigerant action.
5.	Gatella	-	<i>Polygonanum</i>	Cures itches and prevents bad odour.
6.	Muramansi	-	<i>Erythrina stricts</i>	Relieves burning sensation.
7.	Kunch	Jequirity	<i>Abrus precatorius</i>	Prevents pre-mature hair fall, relieves headache and useful in
8.	Amla	Emblic	<i>Emblica officinalis</i>	Promotes hair growth, removes dandruff. Refrigerant action.
9.	Musta	Nut Grass	<i>Cyperus rotundus</i>	Helpful in hair growth.
10.	Gandhamatra	-	<i>Paederia foetida</i>	Used as aromatic.
11.	Kapoor	Spiked Ginger	<i>Hedychium</i>	Promotes hair growth.
12.	Gulab Phool	Rose	<i>Rosa damascena</i>	Aromatic, keeps brain cool and refrigerant.
13.	Kesut	-	<i>Eclipta alba</i>	Promotes hair growth, improves blackening of hair, relieves
14.	Brahmi	Thyme Leaves	<i>Bacopa monnieri</i>	Prevents hair fall, refrigerant and improves memory.
15.	Kardoor	Camphor	<i>Cinnamomum</i>	Cooling effect.
16.	Pudina ka phool	Menthol	<i>Mentha arvensis</i>	Removes headache.

# Lichen *Parmelia perlata* in Ayurvedic Medicine

Antifungal, antibacterial and anti-inflammatory properties

Promotes spermatogenesis by improving the testicular, seminal vesicle and epididymal & Seminiferous tubules, brings about improvement in semen quality.



Confido\* is a non-hormonal therapy acting through the neuro-endocrine pathway, regulates the process of ejaculation.



Speman promotes spermatogenesis by improving the testicular, seminal vesicle and epididymal functions.



V-Gel possesses antifungal, antibacterial and anti-inflammatory properties, effective in the treatment of vaginitis and cervicitis.

## Animal health

SPEMAN VET (powder)



NEFROTEC (tablets)

>> Contact >> Feed Back >> Dua-e-Said



HAMDARD LABORATORIES (WAQF) PAKISTAN.  
*A House of Herbal Products.*

## Laboob-e-Kabir ( Sexual stimulant and tonic )



Laboob-e-Kabir

# Lichen in Siddha Medicine



Reference

**Agathiar Gunappaadam**

**Basic Siddha Medicine book  
explaining nature of herbs in the  
form of Hymn**

Siddha Vaithiya Pathaartha Guna Villakkam

Sri Kannusamy Pillai

B. Ratthina Nayakkar & Sons

26, Venkatrama St

Chennai 79

151. கற்பாசி - Karpasi

*Parmelia perlata* (Huds.) Ach.

Eng.	Stone flowers, Rock moss	Sans.	Silapushpam
Tel.	Rati-pachi, Rati-puvvu.	Hind.	Patthar-ka-phu
Mal.	Kalp-pausi	Pers.	Gule-sang.
Kan.	Kallu-huvvu	Arab.	Khirazus-Sakhar.

இது, சுவர், பழைய மரக்கட்டைகள், பெரு மரங்கள், கற்பாறை இவைகளில் உண்டாகின்ற ஒரு வகைப் பாசி; இது மிகுதியாய் கற்பாறையில் உண்டாவதால் கற்பாசி எனப்பெயர் பெற்றது.

இது மழையாற் பிறக்கும்.

சுவை-கைப்பு, தன்மை-வெப்பம், பிரிவு-கார்ப்பு

செய்கை:

வெப்பகற்றி	ஐவரஹரகாரி	Febrifuge
துவர்ப்பி	ஸங்கோசனகாரி	Astringent
வீக்கங்கரைச்சி	சோபானாசினி	Resolvent
வறட்சியகற்றி	ஸ்நித்தகாரி	Emollient
உள்ளழலாற்றி	அநதர்ஸநித்தகாரி	Demulcent

குணம் : இது நீடித்த மேகத்தையும், பெருங் கழிச்சலையும் நீக்கும்.

பண்டைமே கத்தைப் பறக்கடிக்கும் பேதிகட்கும்

மண்டையெறி வாசனையி லாருங்காண்-தொண்டைக்

கனிக்குமொழி லூட்டுமிதழ்க் காரிகையே! காரநற்

கனிக்குமொரு கற்பாசிதான்.

(அ.கு.)

வ-கு. இதைப் புற்கைசெய்து அடிவயிற்றிலும், முள்ளுந்தண்டின் அடிப்பாகவெலும்பிலும் சூசு சிலு நீரை மிகுதியும் இரக்கச் செய்யும்.

இதை உலரவைத்து முலைப்பால் சேர்த்தரைத்து, நெற்றியிற்றடவத் தலைவலி போம்.

D. Johann Schröders  
PHARMACOPOEIA UNIVERSALIS,

das ist:  
Allgemeiner Medicinisch-Chimischer

# Arznei-Schatz

Nest  
D. Friedrich Hoffmanns darüber verfaßten  
Serrlichen Anmerkungen  
Dritter Theil,

worinnen  
die Kräuter und Gewächse  
nebst  
der Thier-Lehre,

durch  
Bereitung und Gebrauch der aus dem Regno Vegetabili & animali herkommenden Stücke,  
nach  
der Meynung und Anweisung der neuesten und besten Autorum

sewohl nach der  
Salernischen als Chimischen Art beschrieben;  
In auserlesenster Wahl und Ordnung gefunden werden:

So,  
daß es sowohl einem Medico und Apotheker  
als auch in

## Material-Handlungen

zur Erkennung guter Waaren erprießliche Dienste thut;

Vierde Auflage

gegen die vorhergehenden Editionen um ein grossis vermehret, und von vielen Fehlern gesäubert und verbessert.

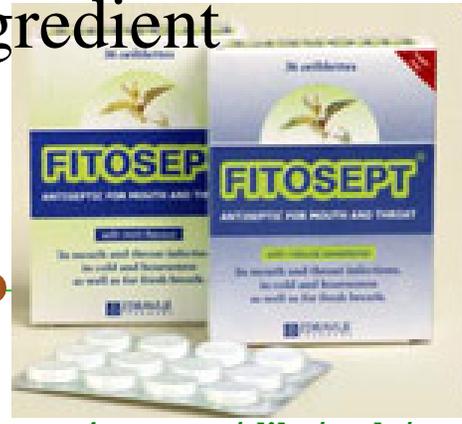
Nebst einer allgemeinen Apotheker-Tax,  
wie auch vollständigen Registern über das ganze Werk.

Mürnberg,

bey Johann Adam Stein und Gabriel Nicolaus Raspe. 1748.

Lists about  
12 lichen  
drugs

# Pharmaceutical products using *Usnea spp.* as ingredient



[www.yu4you.com/slike/male/ostalo/490.jpg](http://www.yu4you.com/slike/male/ostalo/490.jpg)

Fitosept oriblets

Sodium usninate ... 0.1mg

Menthol ..... 2.0mg



Fytotherapie:  
Weerstand:

Yeast & Fungal  
D'Tox Euro 18,25

<http://www.azmira.com/ProductHerbalExtracts.htm>

## *Usnea sp.*



Supplement Facts	
Serving Size 40 Drops	
Servings Per Container 22.5	
Amount Per Serving	mg
<b>PROPRIETARY BLEND</b>	<b>90 mg*</b>
Extracts from USNEA LICHEN● ( <i>Usnea spp.</i> ), UVA URSI LEAF● ( <i>Arctostaphylos uva ursi</i> ), PIPSISSEWA HERB● ( <i>Chimaphila umbellata</i> ), ECHINACEA SUPREME▲ ( <i>Echinacea angustifolia</i> root, <i>Echinacea purpurea</i> root, flower head and seed), 40-50% PURE GRAIN ALCOHOL USP and SPRING WATER.	
<b>AVERAGE HERB STRENGTH RATIO: 1:1.25</b>	
*Daily Value not established.	

[www.gaiaherbs.com/images\\_prod/UsneaUvSup.gif](http://www.gaiaherbs.com/images_prod/UsneaUvSup.gif)



SPILANTHES

• USNEA  
COMPOUND  
Anti-Fungal  
Remedy

<http://www.absolutelythepurest.com/HEALTH%20SITE/herbal/spilanthesusnea.gif>



Deodorant Spray -  
Aluminium & Zinkfrei.  
Euro 21,80



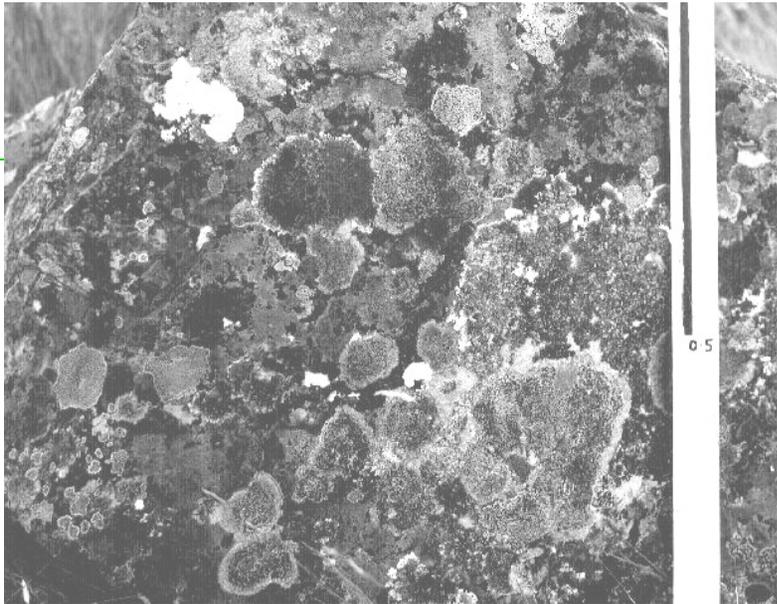
After Shave Herbal Water  
for Men. Euro 27,70

Männerserie -  
spagirische  
Kosmetik von  
Jurlique.

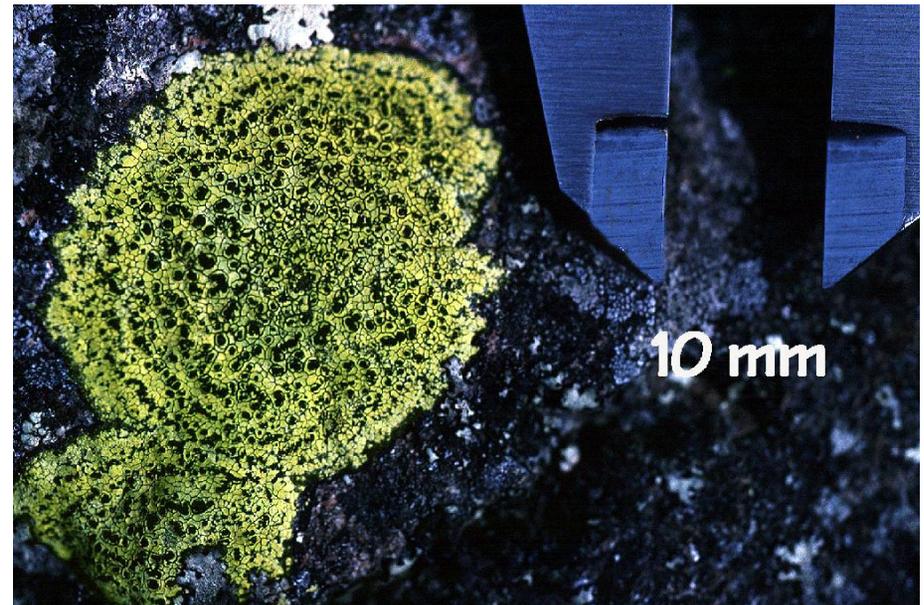
<http://store.dinakhader.com/Categories.bok?category=Jurlique>

# Lichenometry

Lichenometry is the method of determining the age of substrates using lichens. Growth rate of lichens is characteristic and it is used in the lichenometric analysis of substrates.



1. Geologists go to a number of rock fall sites
2. Measure the largest lichens on each rock face
3. Graph of the frequency of each size of lichens
4. Convert size of lichens to years



- A. Premise is based on the assumption that an earthquake causes rocks to fall
- B. A new rock face is exposed to the elements
- C. Lichens colonizes the new rock face
- D. Lichens grows at a relatively steady pace

***Rhizocarpon geographicum*** –species used in lichenometry



# Lichens in Air Pollution and Biomonitoring

- 
- The symbiotic nature and lack of protective, conductive and assimilatory tissues make lichens more dependent on atmospheric humidity and nutrients.
  - Lichens are very responsive to environmental stressors, including changes in forest structure, air quality and climate.
  - Epiphytic lichens provide a clear indication of potential air quality and used to monitor the ecosystem.

For more information on lichen in air pollution and biomonitoring see section **Air Pollution and Biomonitoring**