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### c) Cosmetics & Perfumery -

• Essential oils extracted from Ramalina and Evernia species are used in manufacture of cosmetic soaps, whiten hair of wigs etc. Species of Usnea are used in perfumery. Evernia prunastri and Pseudevernia furfuracea are widely used in perfumery.

### d) Brewery and Distillation:-

Lobaria pulmonaria are used in brewing of beer. Cladonia rangiferina and Ramalina fraxinea are used in production of alcohol.

### iv) Ecological Importance:-

#### i) Pioneer of Rock Vegetation:-

Lichens are pioneer colonisers on dry rocks. Crustose lichens <sup>can</sup> do this work early. Lichen acids help in weathering rocks and assist in soil formation. In this way they help in succession on rocks.

#### ii) Sensitive to air pollution:-

Lichens are very much sensitive to air pollutants like  $SO_2$ ,  $CO$ ,  $CO_2$  etc.; therefore they act as bio-indicators for air pollution. Lichens don't grow near air-polluted industrial areas. Absence of Lobaria (an ascolichen) in the area indicates higher degree of industrial pollution.

#### HARMFUL ACTIVITIES

1. Cladonia parasitica on mosses -
2. crustose lichens cause serious damage to window glass and marble stones -
3. Letharia vulpina (Wolf moss) are highly poisonous -
4. Accumulate radioactive substances e.g. Cladonia rangiferina & Cetraria islandica

i) Source of food & fodder:-

Lichens contain polysaccharides, lichenin, cellulose, vitamin and certain enzyme, hence are used frequently as food and fodder. Example - *Cladonia rangiferina*, *Cetraria islandica* (island moss), *Dermato-carpus miniatum* (stone mushroom), *Lobaria pulmonaria*, *Evernia* etc.

ii) For medical purposes:-

*Peltigera canina*, *Lobaria pulmonaria*, have medicinal use. *Cladonia*<sup>spp</sup> are used in fever and whooping cough. *Xanthoria parietina* for jaundice. Several species of *Pertusaria*, *Cladonia* and *Cetraria islandica* for the treatment of intermittent fever.

Usnic acid, a broad spectrum antibiotic obtained from species of *Usnea* & *Cladonia*. *Cetraria islandica* & *Lobaria pulmonaria* are used tuberculosis and other lung diseases. *Parmelia saxatilis* for epilepsy.

iii) Industrial use:- lichens are used in various industries.

a) Tanning industry - *Lobaria pulmonaria* and *Cetraria islandica* are used in tanning industry.

b) Preparation of dye - Different types of dyes are obtained from different species i.e. -

• Brown dye - *Parmelia omphalodes* for wool & silk.

• Red & Purple dyes - *Ochrolechia androgyna* and *O. tartaria*.

• Blue dye (Orchil) - *Cetraria islandica* - for woollen goods. Orcein obtained from orchil is used in laboratory for histological study & chromosomes staining.

• Litmus (an acid-base indicator dye, is extracted from *Rocella tinctoria*, *R. montagnei* etc.