



Lac Insect and their Useful Products

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The word Lac is derived from Sanskrit word Laksha meaning one Lac. Lac is a natural resin, is a secretion of Lac insect *Kerrica Lacca* is belong to family Tachardidae (Kerridae) and order Hemiptera. Lac is the harden secretion or outer protective covering of Lac insect. Lac insect produce mainly resin, dye and wax they are commercial importance. Resin of the Lac insect is commonly called as Lac and this is the only product of animal origin. Resin is natural, biodegradable, nontoxic and application in food, textiles and pharmaceutical industries. It is commercially available in the market as shellLac or seedLac or button Lac. Lac is a cash crop of commercial importance providing an importance source of livelihood to millions of resources poor growing inhabiting tribal dominated forests and sub-forests regions of the country. Rearing of Lac insects for production of Lac is known as the Lac cultivation. In India the leading producer of Lac is Jharkhand, followed by the Chhattisgarh, West Bengal, Maharashtra. The production of raw Lac in India is approximately 20,000 metric tonnes per year. Lac is been use in India since Vedic period. Indian Lac Research Institute (Current named as Indian Institute of Natural resins and Gums) is been established at Namkuran, Ranchi in 1925. This institute produces white Lac. White Lac is good quality and better than the red and other colored Lac.

Life Cycle

In the Life cycle of the Lac insect consists of four stages: Egg, Nymphal Instars, Pupa and Adult. Total life cycle is complete in the six months. The male is winged and walks over to female to fertilize them. The female laid a large number of eggs in the "Ovisac". Lac is protecting the insect from the predators.

Eggs: Ovoviviparous mode of reproduction present in the Lac insect. A single female lays 200-500 eggs. Embryo are fully when egg laid. Hatching is done within the few hours of laying; first instars larva is called as the crawlers this crimson-red.

Nymph: The larvae are minute, boat shaped, red colored and half millimeter in length consists of head, thorax and abdomen. Head consists a pair of antennae, a pair of simple eyes and a single proboscis. All three thoracic segments are provided a pair of walking legs. The mass movement of larvae from the female cell to the new off-shoots of host plant is termed as 'swarming'. The larvae of Lac are very sluggish and feed continuously when once they get fixed with twig.

Adult: After the pupation is completed, Male emerges from its cell and moves on Lac incrustation and enters the female cell for fertilization. In this way the life cycle is completed. Male is red in color measure about 1.2-1.5 mm in length reduced eye and antennae. Thorax consist a pair of hyaline wings. While female is larger than male, measure about 4-5 mm in length and has a pyriform body. The head, thorax and antennae are not clearly distinct. The antennae and legs are in degenerated form, and wings are absent.

Favorable Conditions

- Maximum temperature 110 F
- Average humidity 40-70%

Rearing of Lac Insects/Cultivation of Lac

Three steps involve in the Cultivation of LAC

- Host plant selection and cultivation
- LAC Brood inculation
- Processing of Lac

1. Host plant selection and cultivation

Following are the Lac host plant

1. *Zizyphus jujube* (Ber)
2. *Ficus spp.* (Fig)
3. *Acacia arabica* (Kiker)
4. *Albizzia labbak* (Siris)

Cultivation of host plant for the Lac production in two ways:

- 1) The plant grows in natural way and the Lac- culturist is only protect and care for proper growth of plant.
- 2) On the other way, a particular piece of land is taken for purpose and systemic plantation of host plant should be made there. Proper care of plant is required which include:
 - Regular visit to the field
 - Proper Ploughing and Hoeing
 - Timely irrigation facilities should be provided
 - Suitable application of Artificial manure
 - Protecting the plants from cattle and human beings

2. Lac brood inoculation Lac cultivation is done by putting brood Lac on suitably prepared specific host plant. The Lac brood contains gravid females which are lay eggs to give birth to young larvae. After the emergence of mother cell, the young larvae settle on fresh twigs of host plant, suck the plant sap and grow to form encrustation

Composition of LAC

Constituen	Percentage
Lac resin	68
Lac wax	6
Lac Dye	1-2
Others	25

3. Processing of LAC

Stick Lac: The Lac encrustation is removed from the twigs of host plant by scarping is known as stick Lac or raw Lac or scrapped Lac.

Seed Lac: The storage of the stick Lac is more compatible for lump formation, and breeding of storage pests thus the processing of stick Lac soon after harvesting is necessary. Crushed Lac immersed in water in cement tube for 3 days and stir the contents. Drain off the supernatant coloured liquid and transfer the material that settle at the bottom to large vats. Add water and lime at 1 kg/160 kg of vat then collect the Lac dye which settles down. Remove the bits of twigs, parts of insect body and fibrous that floats in the vats.

Shel Lac: The shellLac is the finished product of Lac orange to pale yellow in color used across the world. Seed Lac is processed into shellLac by three methods:

- Handmade country process

- Heat process
- Solvent process

Lac Products and Their Uses

Lac is used at industrial level in manufacturing of various products and their uses are given below:

1. Lac dye: Lac dye is used to color wool and silk and also used in food and beverage industry for coloring.

2. Lac wax

- Lac wax are used for polishes applied on shoes, floor, automobiles etc.
- Food and confectionary, and drug tablet finishing
- Lipsticks
- Crayons

3. Shel Lac

- Used in fruit coatings, e.g., for citrus fruits and apples, parting and glazing agents for sweet, marzipan, chocolate etc.
- Also used as binder for foodstuff stamp inks, e.g., for cheese and eggs.
- It is used as binder for mascara, conditioning shampoo, nail varnish additive, film forming agent for hair spray, micro-encapsulation for perfumes.
- It is used for enteric (i.e., digestive juice resistant) coatings for tablets and as odor barrier for dragees.
- Jewelers and Goldsmith use Lac as a filling material in hollows in Ornaments.
- It is also used in buttons, Pottery, artificial leather, preparation of Toys.

4. Bleached shel Lac

- Paint Industry (Primer for plastic parts and plastic film)
- Aluminum industry (Primer for Aluminum and Aluminum foils)
- Pharmaceutical Companies (Coating for pills, tables, get caps)
- Confectionery (in coating of confection, chewing gums, marzipan chocolate, jelly and coffee-beans etc.)
- Textiles (used as textile auxiliaries and felt hat stiffening agents)
- Cosmetics (used in hair spray, hair shampoos, hair and Lacquers. And binder for mascara)
- Electric (as binder for Lamp cements)
- Plastic (it is Primer for plastic parts and films)