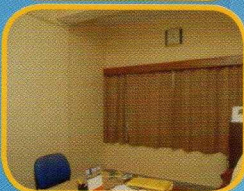


Commercializable Technologies

Indian Institute of Natural Resins and Gums (IINRG)



INSTITUTE TECHNOLOGY MANAGEMENT UNIT

**INDIAN INSTITUTE OF NATURAL
RESINS AND GUMS**

(Formerly Indian Lac Research Institute)

Namkum, Ranchi - 834 010, Jharkhand



Introduction

Indian Institute of Natural Resins and Gums (IINRG) is a Nodal Institute at National level for research and development on natural resins and gums. IINRG is working under Indian Council of Agricultural Research (ICAR), the apex body of agricultural research in the country. It was formerly known as Indian Lac Research Institute. The Institute was upgraded to take up research on processing, product development and technology dissemination on natural resins and gums w.e.f. September 20, 2007. In the past, Institute has rendered services for the lac development in the country in the areas of lac cultivation, processing, value-addition and product development. The Institute Technology Management Unit (ITMU), IINRG has identified some of the promising technologies which have commercial viability and these are listed below:

- Small scale lac processing Unit
- Lac-based fruit coating formulation for kinnow
- Improved lac-based wood varnish
- Recovery of by-product Lac dye
- Lac-based glazing varnish
- Lac-based water - thinnable interior paint
- Value added products -Bleached lac, DDL, Aleuritic acid & Isoambrettolide

1.Small Scale Lac Processing Unit

The Institute has developed a set of four machines viz. Lac crusher, Lac washer, Lac Grader and Lac winnower for establishing Small Scale Lac Processing Unit (Capacity-100 kg sticklac/day) required for primary processing of lac (making of semi-refined product seedlac) at village



level. Lac in the form of seedlac can be stored for longer duration without lump formation which is a problem with the storage of raw material (sticklac). These machines can be driven manually or with electric motor. By establishing such an unit, a net profit of about ₹25,000 per month can be earned and employment generation of 750 man-days/year can be done. For establishing the Unit, about 50 decimal of land is required including building

- Capacity : 100 kg sticklac/day (single shift)
- Building : ₹ 5 Lacs (approx.)
- Machinery & Equipments: ₹1 Lakh (approx.)
- Manpower- Motor operated-3, Manual-5
- Monthly income : ₹25,000 (approx.)

2. Lac-Based Fruit Coating Formulation for Kinnow

Lac-based fruit coating formulation for kinnow has been developed in the Institute. Its application produced good results in respect of gloss, spread area and provides firmness to the fruits. The formulation is natural and non-toxic and addition of fungicide is not required in its preparation compared to commercially available formulation in market due to inherent fungistatic property of lac. Unlike commercial formulations, lac based formulation is operator friendly which means it doesn't produce any obnoxious smell during operation in the waxing plant. Since it is a water based emulsion, hence can be used in waxing plant combining washing and wax treatment in one operation

- Capacity – 100 litre/day (single shift)
- Machinery & Equipments – ₹ 1 Lakh (approx.)
- Retail price of lac-based formulation (10% solid content, safe) works out to be cheaper due to lower input (raw material)



3. Improved Lac-based Wood Varnish

The improved lac-based varnish developed in the Institute incorporates a non-spirit solvent. It is suitable for polishing wooden furniture, musical instruments, etc. The varnish is amenable to conventional application method: by



pad and brush. The film dry quickly (10-15 min.) in comparison to commercial samples(4-5 hrs) which saves labour & time. The shorter drying time, compared to commercial varnishes, protects the surface from sticking of the dust particles and reduces the time for consecutive coatings. Old films can be removed easily by emery paper for re-polishing.

- Capacity – 100 litre/day (single shift)
- Machinery & Equipments – ₹0.60 Lakh
- Use of non-spirit solvent as manufacturers faces difficulty in getting permission/license for using spirit in varnish.

4. Recovery of by-product Lac Dye

Lac dye is a by-product of lac industry which is generally lost in the effluent during washing of stick lac in primary processing of lac, i.e. making of seed lac. The stick lac apart from lac resin, also contains water soluble lac dye (laccic acid upto 1% by weight of sticklac).



A pilot plant of 1kg lac dye /batch has been developed in the Institute. It is first recovered as technical grade of dye which can be purified into pure grade for its possible use in food additives. Lac dye is used in textile as mordant for dyeing animal fibers like wool and silk. Lac dye is natural and non toxic, so in pure form it can also be used as food colouring material.

- Capacity- 1 kg pure lac dye /day (single shift)
- Machinery & Equipments – ₹19 Lacs (approx.)
- The technical grade lac dye has market price of ₹2000-2500/kg whereas price of pure/food grade lac dye is above ₹5,000 /kg.

Properties of lac dye

Colour - Bright red

Solubility - Soluble in DMF

- Sparingly soluble in water (0.13 mg/100ml)

Volatile matter - (6-7%)

Ash content - 1% (max.)

Acid Value - (234-240)

Melting point - 234°C with charring

5. Lac-based Glazing Varnish

Metal objects/artefacts of brass, copper, aluminium materials requires periodic cleaning of oxidative coating by rubbing/polishing formulation. The lac- based glazing varnish developed at Institute can be used for

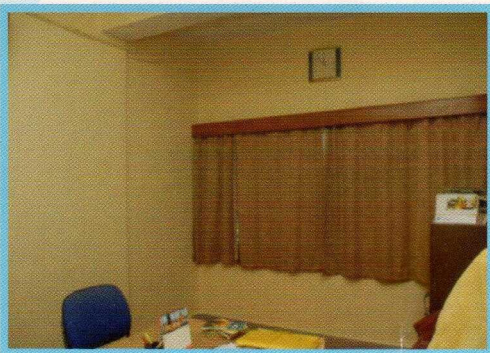
polishing such type of items. The varnish is multipurpose type and can be applied on other materials like plastic, rexin, leather, painted artworks, murals, rubber etc. which become dull with the passage of time. Restorer/commercially available grinding/polishing formulations do not provide long lasting protection from tarnishing of metal objects and require to be applied periodically, whereas film of lac based glazing varnish maintain glossy appearance for a period much longer than varnish from shellac alone or compared to commercial formulations even after exposure to environmental stress. Application of this provides sheen on the above surfaces which remains unaffected for 2-3 years.



- Capacity- 100 litre /day (single shift)
- Equipments – ₹ 0.70 Lakh (approx.)

6. Lac-based Water - Thinnable Interior Paint

Lac based water thinnable coating material has been developed in the Institute by modifying lac with suitable synthetic resin for cementitious surfaces. It can be applied by brush to produce matt finish on POP treated surface, lime surface, asbestos and masonry surfaces. The paint film on interior wall remains



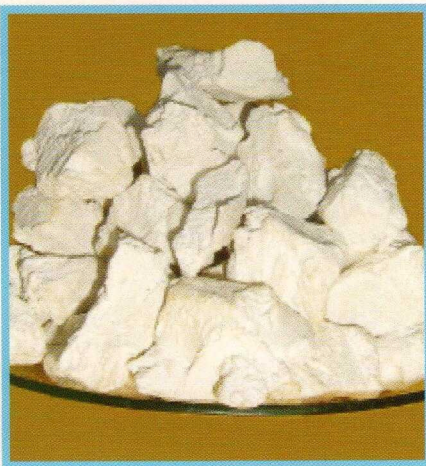
unaffected for more than four years of its application on PoP treated surfaces (no flaking, peeling off or discoloration). The paint is based on natural resin lac which is bio degradable. Moreover, it is water based having no harmful solvents as most synthetic paints do. They don't contain VOCs and don't have offensive smell.

- Capacity – 100 litre /day (single shift)
- Machinery & Equipments – ₹ 2.50 Lacs (approx.)
- Retail price of this lac-based water thinnable paint is comparable with commercially available products in the market.

Value added products of lac

(Bleached lac, Dewaxed Decolourised lac, Aleuritic acid & Isoambrettolide)

There are a number of value added products from lac like Bleached lac, De-wax decolourised Lac, Aleuritic acid, Isoambrettolide etc of which Institute possesses technologies for their preparation. These products have wide application like surface coating, pharmaceuticals, perfumery and cosmetic industries and provide good opportunities for small and medium scale entrepreneurs.



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