AND OTHER LAC BASED PRODUCTS MAKING VALUABLE CONTRIBUTION TO INDIA’S EXPORTS DESPITE STRUGGLING AGAINST POLYMERS

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[ Framework of the Article :

The article has been developed and framed into four parts. Part-I gives account of a brief historical background of shellac and lac based products and transformation of lac- a resinous secretion of an insect -to shellac and other lac based products. Part-II delineates in brief the various industrial uses of shellac and other types of lac products. An analysis of shellac and lac based products has been done in Part-III. Part-IV gives a description on Govt. incentive policy and the pro-active role being played by Shellac Export Promotion Council in boosting exports of shellac and lac based products with a conclusion. ]

PART-I Introduction giving a brief historical background and Transformation from Lac to Shellac

Historical Background :

Lac is the resinous secretion of a kind of tiny insect, known as Laccifer Lacca. History of the use of lac goes back to several thousand years. Atharva Veda gives in brief account of lac, viz. the lac insects, medicinal use of lac. It is interesting to note that even in early days people had fairly accurate knowledge of the biology of lac insect.

Trade with Western Europe started with the lac dye for use as substitute for cochineal for dyeing woods. By 1825, it emerged as an important export commodity exceeding Rs. 7 lakh in value. However, after the advent of synthetic dyes, the demand for lac dye declined drastically and export practically ceased in 1898.

However, trade in resin continued to expand as shellac began to find many new uses in the rapidly industrializing west - in making of varnish, stiffening of hats, grinding wheels and for insulation in electrical industry.

A JOURNEY FROM LAC TO SHELLAC :

i) Cultivation of lac.

Lac is mainly cultivated in India and Thailand. Bihar, Madhya Pradesh, West Bengal, Maharastra and Orissa account for about 90% of the lac production and tribal
Population are mainly engaged in lac cultivation and processing of lac into shellac. In India the principal lac hosts are palas and Ber trees for Rangani strain and Kusum tree for Kusum strain.

For cultivation of lac the trees are properly nurtured in proper season. When new shoots come out, two /or three sticks of broodlac with living insects are tied on to branches near them. The larvae grow in large number and settle on the new shoots and go on producing resin. After infection of the trees with broodlac, a little care is taken till the harvesting of lac. For harvesting, the crop is cut and after keeping a portion for broodlac for next crop, the rest are separated from the twigs and sold in the market as sticklac. Freshly collected sticklac contains a plenty of moisture and need to be kept normally under shade to dry.

Sticklac is then marketed by cultivators in small quantities in village markets to manufacturers or their agents and thus supplementing the incomes of 2-3 millions of rural folk, mostly Adivashi. The quality and consequently the value of sticklac depend on a variety of factors namely, the broodlac and the host trees, the climatic condition, the seasons of harvesting and also how the crops are being dried up. Among the Rangini crop, baishaki is better than kartiki but in case of Kusumi, Aghani is superior to Jethui. In case of lac from Ber tree, Baisacki is superior than that produced in Palas. In India, the yield of sticklac averages 3 or 4 times of the weight of broodlac.

**Sticklac and Seedlac**

**Refining of Sticklac :**

Sticklac is converted to commercial grades of seedlac and shellac. The yield of refined lac from seedlac varies between 40% to 60% depending on the host tree, area of cultivation and other factors. Apart from lac resin, sticklac contains 6%- 7% lac wax, 3-5% water moisture, colouring matters(lac dye) and impurities like debris, wood pieces, sand, etc. The refinement of sticklac into seedlac is mostly carried out in cottage scales or in semi-mechanized factories in lac growing areas. Seedlac is then converted to shellac of various grades either by handmade process in cottage industries or in machine-made process in mechanized industries.

**Conversion into Seedlac :**

Seedlac is first crushed and sieved to remove sand and dust and at the same time rubbing the lac against the sides of the Vat to break open the insect bodies and dissolving the colouring matters in water. The lighter impurities float on the surface which can be easily removed. The colour water containing lac dye is drained out. The washing is repeated until the dye and impurities are removed. The lack thus cleaned is
spread on large, open air floor to dry. After drying, it is winnowed and sieved to get the commercial variety of seedlac. The dusty lack which is eliminated by sievering is known as Malamamma lack and falls under the category of Refuse lack. Malamamma contains approximately 55% to 80% lack.

**Part II : Industrial Uses of Shellac:**

Thanks to versatile properties of lack resin, it finds innumerable uses in different industries. From the standpoint of industrial uses of shellac, one or more of the following properties are of great importance:-

i) Shellac dissolves in a wide variety of Alkaline or rapidly drying solvent, but is resistant to a number of other solvents, particularly hydro carbon.

ii) It films show excellent adhesion to a wide variety of surfaces, possessing high gloss, hardness and strength.

iii) Shellac is a powerful bonding material with low thermal conductivity and a low co-efficient to expansion. Its thermal plasticity and capacity of absorbing large amount of filters are noteworthy.

iv) It is resistant to the action of ultra violet rays.

v) Shellac is non-poisonous.

Scientific and technical developments in the field of synthetic resin have made lac being replaced in many of its traditional fields; but at the same time science has helped to explore the complex nature of lac resin and open up new potentialities.

Some of the important and popular uses of shellac and other types of lac are delineated in the ensuing paragraphs:

1. **WOOD FINISHING**

Shellac is unparallel for wood finishing and furniture polishing. Polishing with Shellac consists of producing on a carefully prepared surface of a very clean film of the resin from its solution in alcohol. Two or three coats, applied with a pad, result in a rich glossy and durable finish. Shellac may also be brushed or sprayed. Bleached shellac is used to produce a transparent finish to bring out the natural beauty of the light coloured wood. Large quantities of bleached shellac are used for floor polishes. Shellac is also used as undercoat.

2. **PRINTING INK:**

In recent years the use of Shellac in printing ink industry has considerably increased. Various types of ink particularly flexographic ink and water-proof ink contain shellac. The former is fast drying aniline ink, transparent or opaque, much used for
rotary printing of numerous types of packing materials ranging from foils to plastics. The chief characteristics of shellac are strong adhesion and excellent binding power for dyes and pigments, superior flow, gloss slip and abrasion resistance and good definition in printing. It is also free from objectionable odour and possessing long shelf life. In addition shellac enhances colour intensity and strength of print. The addition of pigments to shellac solution to obtain opaque light fast ink greatly increases viscosity.

3. ELECTRICAL INDUSTRY

The excellent electrical property of shellac, its freedom form tracking, its good adhesion and thermoplastic property have established this natural resin a very important place in electrical industry. In all its uses it is either applied dissolved in alcohol as an insulating varnish or in the molten state as a binder in large moulded articles. It is mainly used in the manufactures of insulating varnishes and cement, moulded insulators, laminated and moulded mica products, paper boards, tubes and coated or impregnated paper, cloth and silk.

4. LEATHER AND FOOTWEAR INDUSTRY

Tanner used shellac, suitably pigmented, to produce a flexible, water-proof and glossy finish on leather. Shellac is also applied for a final durable non-tacky and glossy finish to leather articles. Shoe polishes can be made with shellac wax.

5. SHELLAC FOR PHARMACEUTICAL, CONFECTIONARY GLAZES AND FRUIT COATINGS

Superior grades of shellac dissolved in special denatured alcohol are glazes employed for coating pharmaceuticals tablets and confectionaries. In confectionaries these glazes are sometimes are applied by brush or spray. In pharmaceuticals tablets coating, the function of shellac are:-

i) To serve as a moisture barrier protecting the co-ingredients,
ii) As an enteric coating,
iii) To control disintegration,
iv) As a granulating agent,
v) As a finishing coat over wax prior to the printing of trade marks
The main use of shellac in confectionary industry are for coating chocolates, chocolates covered nut and similar products. Shellac has become an important ingredient for fruit coating composition. Substantial quantity of shellac is consumed in fruit coating industry.

6. COSMETIC INDUSTRY:

Shellac has a worldwide use in hair spray and hair lacquer industry. It contains all the chemicals and physical properties required by the cosmetic chemists in formulating hair-grooming products. The ability of the shellac to hold the hair is a primary requirements and its non-hygroscopic nature ensures that hair keeps well groomed in high humidity or when exposed to rains. Its solubility in alcohol makes for easy formulation and its solubility in mild alkalis makes for easy remover by shampoos. Shellac has a wide range of compatibility with other resins plasticizer and softner used in hair lacquers. Normally, decolourised or bleach shellac is used in this industry.

7. RUBBER INDUSTRY:

When shellac is mixed with rubber, it tightens the latter and make it more resistant to wear as in rubber soles and heals, flow tiles and moulded rubber articles. Vernishes for finishing rubber articles are also made from shellac.

8. AUTOMOBILE INDUSTRY:

Most important use of shellac in the automobile industry is the gasket cement. Shellac in insoluble to petroleum and this property is utilized in shellac based gasket cement.

9. PAINT Industry

A number of formulations have been developed on the use of shellac in paint industry. Primers for undercoating having excellent protection capacity have been formulated with shellac. Based on shellac, enamel and emulsion paints are also being produced. In road marking, shellac has an important application.

10. GRINDING WHEELS

In grinding wheeling, shellac as bond is used for abrasive grains, such as aluminum oxide, silicon, carbide and energy. Wheels bonded with shellac have considerable elasticity are very much in use for precision works viz. final grinding of camshafts, hardened steel, chilled rolls and for polishing of lenses and razor-blades.
11. PAPER VARNISH

In making glazing papers, wrappers, labels, display cards, light coloured shellac is an essential ingredient due to its high adhesion property.

12. HAT INDUSTRY

Manufacture of hat is a major consumer of shellac. The hood is treated with an aqueous solution of shellac – a process known as proofing.

13. SHELLAC MOULDING

Shellac is an excellent moulding resin capable of very high degree of accuracy.

14. DENTAL COMPOSITION

Dental plate blanks are plastic compositions comprising of shellac fatty acid and waxes with filters and colouring matter. Sufficiently softened in warm water, they take an impression from which the hard mould is made.

15. SEALING WAX

Sealing wax contains shellac turpentine, rosin and fillers including colouring material. Shellac is essential for good adhesion, toughness, tenacity and preventing discolouation on melting.

The list of industrial uses of shellac and other lac based uses covers most of the important uses. There may be some minor uses of shellac and other lac materials.

PART- III : EXPORT CONTRIBUTION OF SHELLAC AND OTHER LAC PRODUCTS:

As already mentioned, domestic demand for shellac and other lac based products constitutes about 30% of the total supply of the country. Hence it is obvious that exports of shellac and other lac related products has a close and intimate relationship with the domestic production and a positive impact on the economy of the poorest of the poor section of our population, mostly the Adivashi engaged in cultivation, processing and marketing of shellac and other types of lac products for supplementing their income. Sustainability as well as achieving high rate of export growth of shellac and lac based other products are essential not only from the angle of
contribution to our export earnings but also for the well-being of the economic condition of 2-3 millions people, mostly of Adhivashi population, spread over West Bengal, Jharkhand, Bihar, Orissa, North Eastern States, Madhya Pradesh, Maharastra, etc. Before embarking on the Government’s incentives provided for boosting exports of shellac and also the pro-active role being played by the Shellac Export Promotion Council, Kolkata, let us have a glimpse of our export performance during the last five financial years from 2001-02 to 2005-06.

**Table at Appendix- A** will indicate the trend of exports of shellac and other lac products over the period from 2001-02 to 2005-06.

As may be evident from the Table at Appendix -A, exports of Shellac has increased from 4,607.8 metric tons, valued at Rs.5,462.25 lakh in the year 2001-2002, to 7181.3 metric tons with value at Rs. 11792.1 lakh in the year 2003-2004. Thereafter, a down trend was noticed and export of Shellac declined to 5691.9 metric tons with value at Rs. 10,509.3 lakh in the year 2005-06. Over the years from 2001-02 to 2005-06, annual compound growth rate of Shellac increased by 5.42% in terms of quantity and in terms of value by 17.77%. Likewise export of seedlac recorded gains during the period from 2001-02 to 2003-04 and soared to 2539.1 metric tons valued at Rs. 3253.52 lakh in the year 2003-04 from a small quantity of 544.8 metric tons valued at Rs. 482.02 lakh in the year 2001-02. Thereafter export of seedlac slackened to fall at 1682.3 metric tons, valued at Rs. 2299.19 lakh in the year 2005-06. Similar trend was visible in dewaxed and decolour lac during the period from 2001-02 to 2005-06. Exports of such lac increased from 92.6 metric tones valued at Rs. 183.43 lakh in the year 2001-02 to 208.65 metric tons, worth of Rs. 420.64 lakh in 2003-04, but thereafter, fell down to 63.2 metric tons, worth of Rs. 103.8 lakh in 2005-06. Over the period dewaxed and declour lacs recorded negative annual compound growth rate at 9.08% in terms of quantity and 13.27% in terms of value. The exports of total lac products, including shellac, recording a strong rallies up to 2003-04, slipped thereafter. Exports of total lac products which was recorded at 5590.36 metric tons, valued at Rs. 6521.68 lakh in the year 2001-02 rose to 10256.5 metric tons with value at Rs. 15940.5 lakh in the year 2003-04. Thereafter total exports sought lower levels to close at 9180 metric tons, worth at Rs. 14787.2 lakh in the year 2005-06. Over the period, annual compound growth rate of export of total lac products increased by 13.20% in terms of quantity and 22.71% in terms of value.

Shellac is an important component in the total export basket of lac products and it accounted for 82.4% of the total lac exports during the year 2001-02. However, from 2003-04 and onwards, its share underwent a mild meltdown and in the year 2005-
06, its share has come down to 62%. It speaks that items of lac exports have got diversified and taken different basis and different destinations. It will be our efforts to encourage such trend and to take advantage of the new emerging markets.

During the financial year 2005-06, six major destinations of our exports of shellac were i) U.S.A with 20.9% export, ii) Egypt with share of 14.8%, iii) Indonesia with share at 11.63%, iv) Germany with 9.63%, v) Spain with share of 8.37% and vi) Italy with share at 6.26%. Combined export figure to these six countries, constituted to 71.59% of the total exports of lac based products.

PART-IV : GOVERNMENT POLICY AND VARIOUS ESCORT SUPPORTS BEING PROVIDED BY SHELLAC EXPORT PROMOTION COUNCIL, Kolkata:

For promotion and development of exports and their sustainability, Government of India introduced Marketing Development Assistance Scheme in shellac and other lac based products. Assistance to individual exporters for export promotion activities abroad encompass- i) participation in EPC /Govt. led foreign trade Delegations, ii) Buyer-Seller-Meets, iii) Foreign Trade Fairs and Exhibitions etc.

1) Exporters with an f.o.b. value of export up to Rs.5 crores in the preceding year would be eligible for MDA assistance for participation in EPC etc. led trade delegations, BMS/Fairs/Exhibitions abroad to explore new markets for their products and commodities. This is subject to the condition that the exporter is having 12 months membership with the concerned EPC etc. and filling up the returns with the concerned EPC/ Organizations regularly.

2) Assistance would be permissible on travel expenses by air in economy excursion class fair and/or charges of the built up furnished stall, @ 90% for exporters having valid SSI registration certification and @ 75% for others including merchant exporters. This would be subject to an upper ceiling mentioned below in the table per tour:
<table>
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<tr>
<th>S No.</th>
<th>Area/Sector</th>
<th>No. of Visits Eligible</th>
<th>Maximum Financial ceiling per event</th>
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<tr>
<td></td>
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<td></td>
<td>BMS/Trade/Fair/Deligation/Exhibition Etc. abroad (Travel grant) (In Rs.) (A)</td>
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<tr>
<td>1</td>
<td>Focus LAC</td>
<td>1</td>
<td>90,000/</td>
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<tr>
<td>2</td>
<td>Focus Africa incl. Ding WANA countries</td>
<td>1</td>
<td>60,000/</td>
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<td>3</td>
<td>Focus CIS</td>
<td>1</td>
<td>60,000/</td>
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<td>4</td>
<td>Focus ASEAN</td>
<td>1</td>
<td>60,000/</td>
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<td>5</td>
<td>General Areas</td>
<td>1</td>
<td>Nil</td>
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<td>Total</td>
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Role of Shellac Export Promotion Council in promotion and development of shellac and lac based products:

Shellac Export Promotion Council, sponsored by the Ministry of Commerce and Industry, set up in June 1957, in partnership with industry has been working as a catalytic agency for the long term development and promotion of exports of shellac and other lac related products over the last 30 years by providing invaluable services as indicated below to its members:

1. Maintenance of Broodlac farms and distribution of free broodlac to needy cultivators. Regular publicity campaign for improved farming and nursing are being conducted for the benefit of cultivators.
2. Maintaining laboratories at different centres to encourage and ensure quality control at manufacturing level and also providing guidance to the entrepreneurs to manufacture qualitative and value-added shellac and other lac based products.
3. Shellac Export Promotion Council have rendered indispensible services to the exporters and they include:
i) Pre-shipment inspection of export consignment and issuance of certificates after laboratory analysis;

ii) Providing market intelligence covering production, exports, price trend, etc.;

iii) Assisting and guiding interested entrepreneurs by providing technical know-how for manufacturers and marketing value-added shellac and lac based products;

iv) Undertaking research and product development for the long term improvement of product-mix leading to increase in industry’s capability and competency.

**Conclusion**: To conclude, it may be pointed out that although exports of shellac and other lac based products contribute to our exports in a meagre way, efforts through Research and Development should be made vigorously and uninterruptedly to augment supply of value-added shellac and lac based products. Competitiveness and cost effectiveness in the context of added thrust on environment–friendly products and fierce competition in the liberal market economy are the last words for sustainability. It is heartening to note that over the years from 2001-02 to 2005-06, unit price realization in respect of exports of shellac and lac based products have appreciably increased and India may capture this opportunity by increase its product bases and also quality. Efforts may also be undertaken to diversify the export base of other lac products- apart from giving emphasis on shellac exports and suitable steps for awareness of cultivators, collector and efficient marketing may also be taken for dewaxed and decoloured lac and seedlac since a rising trend is noticeable in recent years in such lac based products. With regard to access to international markets, Shellac Export Promotion Council, Kolkata, apart from giving thrust on focused countries as declared in Govt. policy, should encourage the entrepreneurs and merchant exporters to participate in BSMs, trade fairs, exhibitions in countries like U.S.A., Germany, Egypt, Italy, U.A.E. Spain and Indonesia which are the prominent buyers of lac products.

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Appendix –A :

*Item wise Export Statistics of Shellac and other Lac based Products : Quantity : in Metric Ton; and Value : in Rupees Lakh*

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<td>5462.25</td>
<td>544.8</td>
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<td>92.5</td>
<td>183.43</td>
<td>83.4</td>
<td>136.46</td>
<td>13.42</td>
<td>13.5</td>
<td>6.4</td>
<td>10.02</td>
<td>0.1</td>
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<td>6.91</td>
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<td>2003-04</td>
<td>7181.3</td>
<td>11792.1</td>
<td>2539</td>
<td>3253.5</td>
<td>0.22</td>
<td>0.31</td>
<td>208.7</td>
<td>420.64</td>
<td>110.89</td>
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<td>4.75</td>
<td>6.02</td>
<td>6.53</td>
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<td>1877.1</td>
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<td>0.53</td>
<td>84.15</td>
<td>177.76</td>
<td>25.36</td>
<td>27.15</td>
<td>0.88</td>
<td>1.23</td>
<td>77.15</td>
<td>83.44</td>
<td>1.5</td>
<td>1.98</td>
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<tr>
<td>2005-06</td>
<td>5691.9</td>
<td>10509.3</td>
<td>1682</td>
<td>2299.2</td>
<td>0.23</td>
<td>0.202</td>
<td>63.2</td>
<td>103.8</td>
<td>67.5</td>
<td>103.8</td>
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<td>361.6</td>
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<td>Annual</td>
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<td>17.77</td>
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<td>162.39</td>
<td>267</td>
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*Source : Directorate General of Commercial Intelligence & Statistics, Kolkata*