

NON-TECHNICAL NOTES

COTTONSEED OIL BASED PAINTS AND OTHER COATING COMPOSITIONS

Drying oils form an essential ingredient of paints, varnishes, and other coating compositions. The resources of drying oils like linseed and tung oils being limited in our country, research work was started at the Central Laboratories on the improvement of the drying property of cotton seed oil, a semi-drying oil abundantly available in the country.

Pakistan produces about 600,000 tons of cottonseed annually, the area under cultivation in 1953-54 being 2,928,000 acres. Of this about 50,000 can be deducted to allow for requirements of seeds and wastage, leaving a balance of 5,50,000 tons. Calculating on the basis of an average yield of 12% of refined oil, approximately 69,000 tons of cottonseed oil can be produced in the country. This figure will be still higher when the Government target of increasing the cotton production by another 40% by the end of 1957, is achieved (see also appendix A & B).

Cottonseed oil has so far been used in the paint industry only to a limited extent as an adulterant for the usual drying oils. It can be combined to a maximum of 20-25% with linseed oil and about 30-35% with tung oil for the making of oleo-resinous varnishes, without impairing the quality of the films produced. A larger proportion of cottonseed oil produces a tacky film.

As a result of researches carried out at the Central Laboratories, it is now possible to eliminate the natural drying oils and to use cottonseed oil alone for the preparation of oleo-resinous varnishes. In their performance, these varnishes compare favourably with similar compositions made from linseed oil. These coating compositions can be used :—

1. as a varnish.
2. for the manufacture of general-purpose quick drying paints by the incorporation of appropriate pigments.
3. for emulsion paints (oil bound washable distempers).
4. for water proofing packing paper.

Different qualities of the varnishes can be prepared to suit various requirements and may be classified as follows :—

Class 'A': wherein the acidity of rosin is decreased by lime alone or by a mixture of lime and zinc-oxide.

Class 'B': wherein the acidity of rosin is reduced partially by lime and zinc-oxide and partially by esterification with glycerol.

Class 'C': wherein the acidity of rosin is reduced merely by esterification with glycerol.

The greater the quantity of glycerol used for neutralisation of the rosin, the better is the quality of the varnish obtained. Class 'C' is therefore superior to Class 'B', which in turn is superior to Class 'A'. The quality is further dependent on the oil length of the varnish. The greater the oil length the greater is the flexibility and water resistance. (Oil length signifies quantity of oil in gallons per 100 lbs. of rosin.)

Process

The process consists mainly of cooking the oil with rosin and metallic salts under controlled conditions of temperature and time.

Equipment

No special equipment is required. Ordinary open varnish-cooking kettles usually installed in paint and varnish factories in this country can serve the purpose. These kettles can be fabricated locally.

The adoption of the process developed at the Central Laboratories should eliminate the use of linseed oil for the manufacture of :—

1. Oleo-resinous varnishes and paints (oil length '1' to '18' gallon varnish).
2. Oil bound washable distempers.

Furthermore with current prices of the oils, cottonseed oil based coatings would be about 20% cheaper than the corresponding linseed oil coatings.

All the materials required for the manufacture of these coatings based on cottonseed oil are available in the country with the exception of a few chemicals.

The total capital investment for a unit with a production capacity of 36,000 gallons per annum is Rs. 100,000. The average cost of the cottonseed based coating composition is Rs. 7 per gallon. In comparison the average cost of a similar composition based on linseed oil would be about Rs. 9/4/- per gallon.

Pre-Construction Cost Estimation

Production Capacity :—

Class 'A' 12,000 gallons per annum.
Class 'B' 12,000 gallons per annum.
Class 'C' 12,000 gallons per annum.

I. Capital Expenditure

	Rs.	Rs.
A. Equipment ..	15,000	
B. Building ..	27,000	
Total capital expenditure ..		42,000

II. Running Expenditure

1. Direct Expenses per annum

Raw materials ..	1,51,556	
Direct wages ..	13,020	
Containers ..	45,000	
Fuel ..	2,500	
Contingencies ..	5,000	
Depreciation @ 10% ..	4,200	
		2,21,276

Establishment .. 1,5600
Promotion of the project
@ 2½% on Rs. 1,00,000/- 2,500

18,100

2. Selling expenses ..	4,200	
3. Interest on capital @ 4% on Rs. 1,00,000/- ..	4,000	
4. Insurance @ 2½% on Rs. 2,00,000/- ..	5,000	

Total cost of production for
36,000 gallons .. 2,52,576

Average cost of production
of 1 gallon. Rs. 7

Appendix A

1. Quantity of cottonseed available in Pakistan ..	6,30,000 tons
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2. Quantity of cottonseed used as cattle food ..	1,00,000 tons
3. Quantity of cottonseed oil actually produced ..	50,000-60,000 tons

(These figures have been obtained from Seed Merchants' Association).

Installed capacity of the plants for hydrogenation is 22,000 tons. Actual production is about 14000-15000 tons.

(Information from D.G.S.&D., Development Wing).

Appendix B

LOCAL PRODUCTION OF LINSEED OIL

Year	Area under cultivation (acres)	Linseed production (tons)	Linseed oil production (tons)
1953-54 ..	74,000	12,000	3,000
1954-55 ..	76,000	14,000	3,500

IMPORT OF LINSEED OIL

Period	Quantity		Value
	Galls.	Tons	Rs.
July '50-June '51 ..	83,024	297	3,43,448
July '53-June '54 ..	98,944	354	4,17,040
July '55-Dec. '55 ..	100,302	359	7,62,360

N.B.—Exact figures for the local production of linseed oil are not known. The quantity shown in the table indicates the probable production of the oil, based on the information of available seeds.