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CASHEW NUT SHELL LIQUID (CNSL)

PRODUCT CODE	:	319102004
QUALITY AND STANDARDS	:	ISI Specification for CNSL is IS 840:1964
PRODUCTION CAPACITY	:	CNSL 45MT@Rs.28000/tonne Value : Rs. 12.60 Lakh
MONTH AND YEAR OF PREPARATION	:	February, 2003
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INTRODUCTION

Cashew Nut Shell Liquid (CNSL) is a versatile by-product of the cashew industry. The nut has a shell of about 1/8 inch thickness inside which is a soft honey comb structure containing a dark reddish brown viscous liquid. It is called cashew nut shell liquid, which is the pericap fluid of the cashew nut. It is often considered as the better and cheaper material for unsaturated phenols.

C.N.S.L. has innumerable applications in polymer based industries such as friction linings, paints and varnishes, laminating resins, rubber compounding resins, cashew cements, polyurethane based polymers, surfactants, epoxy resins, foundry chemicals and intermediates for chemical industry. It offers much scope and varied opportunities for the development of other tailor - made polymers.

MARKET POTENTIAL

The use of this oil by indigenous industry is at present limited, however an upward trend has been noticed. U.K. USA and Japan were the large scale buyers of this commodity until recently but due to changes in technology, UK and USA have stopped buying this product from India. At present, Japan and Republic of Korea buy a sizeable quantity of this commodity from India.

The production potential for the product is very high. The total production of raw cashew nut in the country could be as much as 2 lakh tonnes and at 10% recovery by weight, the production potential for C.N.S.L is as much as 20,000 tonnes. There is a good scope for the export of C.N.S.L to other countries which at present is on the decline. Statement showing export of C.N.S.L from India during the last 7 years is as under:

Year	Qty. (MT)	Total (Rs. in Crores)
1995-96	760	1.46
1996-97	1735	2.77
1997-98	4446	7.17
1998-99	1912	4.21

Year	Qty. (MT)	Total (Rs. in Crores)
1999-2000	754	1.84
2000-2001	2246	3.89
2001-2002	1814	4.91

In view of the sustaining demand for C.N.S.L from the indigenous as well as outside countries, we may encourage more SSI units in this line of activity.

BASIS AND PRESUMPTIONS

1. The economic viability of the scheme depends upon the location of the unit. It is preferable to set up units in an area where there is concentration of raw cashew nut processing industry.
2. The yield of oil is calculated at about 10%.
3. The unit proposes to work for 300 days on single shift basis.

IMPLEMENTATION SCHEDULE

Oil expeller and filter press are the major machines involved in the project. These machines are available from local suppliers, as such the project can be implemented within 8 to 12 months time.

TECHNICAL ASPECTS

Process of Manufacture

Cashew nut is processed by two methods i.e.

(a) Roasting process, and

(b) Oil extraction process.

Some manufacturers use the first method while some others prefer the second method from which the oil is obtained as a by-product.

Raw Cashew nut shell contains over 20% CNSL. In the oil bath process about 10% of oil is recovered as a by-product. By using expellers for extraction, it is possible to extract a further quantity of about 10% more from the shells. Thus from 1 tonne of shells using oil bath process, upto 100 Kg of good quality of CNSL could be extracted by using oil expellers. It is advisable that a small unit of the size given below for extraction and recovery of CNSL is set up adjacent to each good cashew processing unit in view of the economic importance and ready foreign as well as internal demand of the product.

Quality Control and Standards

(i) *The revised specifications of the Indian Standards Institution, New Delhi, for untreated cashew nut shell liquid (IS 840:1964) is reproduced below:*

Specific gravity 30 degree C	0.950 to 0.97
Viscosity at 30 degree C, in centipoises	550
Moisture, % by weight	1.0
Matter insoluble in toluene, % by weight	1.0
Loss in weight on heating, % by weight	2.0
Ash, % by weight	1.0
Iodine value	
a) Wij's method	250
b) Catalytic method	375
Polymerization	
a) Time in minutes	4
b) Viscosity at 30 degree C, in centipoises	30
c) Viscosity after acid washing at 30°C, in centipoises	200

Colour shall be not deeper than dark brown when viewed by transmitted light.

(ii) *Specification for treated Cashew Nut Shell Liquid*

The cashew nut shell liquid as extracted has a strong vesicant dramatic action. Before this liquid is utilised for preparation of resins, it requires treatment to get rid of metallic impurities as well as traces of sulphur compounds. The liquid thus treated is known as treated Cashew Nut Shell Liquid. The specification of treated cashew liquid is as follows:

Specific gravity at 25 degree C	0.955–0.975
Viscosity at 25 degree C (Max)	800cps.
Iodine Value (Min)	240.00
Ash (Max)	1%
Moisture (Max)	0.5%
Acid Value (Max)	14

(iii) *Specification for Cold pressed Cashew Nut Shell Liquid*

Cashew Nut Shell Liquid is also produced by the 'Cold Pressed' method in solvent extraction plant. The specifications of this liquid are as follows:

Specific gravity at 26 degree C	0.9668–1.0131
Refractive index at 41–50 degree C	1.5158
Saponification number	106–119
Iodine number	170–296
Acid number	94–107

Inspection and Quality Control

Quality Specifications:

Revised IS specifications of CNSL No: IS 840:1964.

Motive Power 16 KW

Production Capacity (per annum)

CNSL-45 MT @ Rs. 28,000 per tonne.

Value: Rs. 12,60,000

FINANCIAL ASPECTS

A. Fixed Capital

(i) Land and Building

Sl. No.	Description	Amount (In Rs.)
1.	Building on rent, initial development charges (150 sq mtr building) @ Rs 10,000 per month	50,000
	Total	50,000

(ii) Machinery and Equipment

Sl. No.	Description	Qty.	Rate (In Rs.)	Total (In Rs.)
1.	2 HP Motor for Filter Press	1	5,000	5,000
2.	Miscellaneous Equipments	x	x	25,000
3.	Filter press-22 plates 22'×22' with plunger pump	1	50,000	50,000
4.	Lab. glass equipment balance, etc	x	x	20,000
5.	M.S. 2500 lt. cap	3	10,000	30,000
6.	Oil expeller 4.5MT cap hrs mounted on steel fabricated channel fitted with oil tray. Thrust bearings single helical generator with 20 HP motor, starter and all other accessories	1	200,000	200,000
7.	Installation and Electrification			33,000
8.	Office furniture	LS		20,000
iii.	Pre-operative Expenses			20,000
	Total			4,03,000
	Total Fixed Capital (i+ii+iii)			4,53,000

B. Working Capital (per month)

(i) Raw Material

Sl. No.	Description	Total (In Rs.)
1.	Cashew shell 37.5 MT @ Rs. 500 per MT	18,750
2.	M.S. Barrels 40 nos @ Rs 300 each	12,000
3.	Miscellaneous stores	2,000
	Total	32,750

(ii) Salaries and Wages

Sl. No.	Designation	No.	Salary (In Rs.)	Total (In Rs.)
1.	Accountant/Clerk	1	2,000	2,000
2.	Manager/Chemist	1	4,000	4,000
3.	Peon/Watchman	1	1,500	1,500
4.	Supervisor	1	2,000	2,000
5.	Workers	5	1,500	7,500
		Total		17,000
	Perquisites 15%			2,550
		Total		19,550

(ii) Utilities

Sl. No.	Description	Qty.	Rate (In Rs.)	Amount (In Rs.)
1.	Power	LS	x	4,000
2.	Water	LS	x	500
		Total		4,500

(iv) Other Contingent Expenses

Sl. No.	Description	Amount (In Rs.)
1.	Advertisement and publicity	1,200
2.	Insurance and taxes	500
3.	Postage, stationery and telephone	1,500
4.	Repairs and maintenance	1,500
5.	Sales expenses	2,000
6.	Transport	2,000
7.	Rent	10,000
	Total	18,700

Working Capital (per month) Rs. 32,750 + 19,550 + 4,500 + 18,700 = Rs. 75,500

(v) Working Capital for 3 Months
= Rs 75,500 × 3 = 226,500

C. Total Capital Investment

Particulars	(In Rs.)
Fixed Capital	4,53,000
Working Capital for (3 Months)	2,26,500
Total	6,79,500

FINANCIAL ANALYSIS

(1) Cost of Production (per annum)

Sl. No.	Description	Amount (In Rs.)
1.	Depreciation on Machinery and Equipment @ 10%	38,300
2.	Depreciation on Office Furniture @ 20%	4,000
3.	Depreciation on Tools @ 25%	0
4.	Recurring expenditure	906,000
5.	Interest on capital investment @ 15%	1,02,000
	Total	1,050,300

(2) Sales (per annum)	Amount (In Rs.)
CNSL-45 MT @ Rs 28,000 per tonne	1,260,000

(3) Profit (per annum)	Amount (In Rs.)
Sales per annum	1,260,000
Cost of Production per annum	1,050,300
Profit	2,09,700

(4) Net Profit Ratio

$$= \frac{\text{Profit/annum} \times 100}{\text{Sales/annum}}$$

$$= \frac{2,09,700 \times 100}{12,60,000}$$

$$= 16.64\%$$

(5) Rate of Return

$$= \frac{\text{Profit/annum} \times 100}{\text{Total capital investment}}$$

$$= \frac{2,09,700 \times 100}{6,79,500}$$

$$= 30.86\%$$

(6) Break-even Point

(1) Fixed Cost (per annum)		Amount (In Rs.)
1.	Depreciation	42,300
2.	Rent	1,20,000
3.	Interest on investment	1,02,000
4.	40% of salary and wages	93,840
5.	40% of other expenses and utilities excluding rent	63,360
	Total	4,21,500

(2) Profit (per annum) Rs 2,09,700

Break-even Point

$$= \frac{\text{Fixed Cost/annum} \times 100}{\text{Fixed cost/annum+profit/annum}}$$

$$= \frac{4,21,500 \times 100}{4,21,500 + 2,09,700}$$

$$= 67\%$$

Addresses of Machinery and Equipment Suppliers

1. M/s. Ganesh Expeller Works
   32-37, Dr. D.N. Road, Fort,
   Mumbai-110001.
2. M/s. Kilco Perfect Machine Traders
   Euruppam Road,
   Trichur-1.
3. M/s. S.P. Engg. Corporation.
   Fazal Ganj, Kanpur, U.P.
4. M/s. Sharma Machine Tools
   C-92 Industrial Area,
   Ghaziabad, U.P.
5. M/s. Mavinchandra and Co.
   P.B. No 1578, 180,
   Linghi Chetty Street,
   Chennai-110001.