

PROJECT PROFILE
ON
HERBAL COSMETICS

MONTH & YEAR
JULY 2011

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HERBAL COSMETICS

INTRODUCTION

Herbal Cosmetics consists of herbal based products such as Shampoos, Hair dye, Shikkai Powder, Cream rose skin toner, Skin lotions, Herbal scrubs, Face pack, Hair oil etc.

Herbal cosmetics are particularly preferred since they are eco friendly and would not provide allergic reactions to the skin and the body.

Some of the important herbs and substances required for making herbal cosmetics include the following:

- | | |
|------------------------------|---------------------------------|
| * Alcohol | * Cleavers |
| * Allantoin | * Cloves |
| * Almond | * Comfrey |
| * Aloe vera (Ghee Kanvar) | * Corn Oil |
| * Alum (Fitkari) | * Corn Milk |
| * Amla(or Indian Gooseberry) | * Cucumber(Khira) |
| * Angelica | * Dandelion (Kanphul) |
| * Apple | * Eggs |
| * Apple Cider Vinegar | * Elder |
| * Apricot(Khubani) | * Emulsifying wax B.P. |
| * Ascorbic acid | * Eyebright |
| * Avocado | * Fennel |
| * Baby Oil | * Fuller's Earth(Multani Mitti) |
| * Basil (Tulsi) | * Garlic |
| * Beeswax(Madu Mom) | * Gelatine |
| * Benzoic acid | * Glycerine |

* Bergamot	* Groundnut oil
* Betony	* Gum resin
* Bicarbonate of Soda	* Henna(Mehandi)
* Blackberry	* Hollyhocks
* Borage	* Honey
* Borax(Suhaga)	* Jasmine Oil
* Bran (Chokar)	* Kaolin
* Brewers Yeast(Khamir)	* Kelp
* Calamine Lotion	* Kohi
* Calendula	* Lanolin
* Camomile	* Lavender
* Camphor	* Lecithin Powder
* Canophor Oil	* Lemon
* Carrots(Gajar)	* Lemonbalm
* Castoroil	* Margosa(Neem)
* Celandine	* Marigold(Ganda)
* Marshmallow	* Mineral Oil
* Mint ((Podina)	* Myrrh
* Nettle	* Oak
* Oatmeal (jai Ka Atta)	* Oleic acid
* Orange	* Olive Oil
* Orange flower water	* Orangepeel
* Peach	* Peppermint
* Petroleum jelly	* Pimpernel
* Pine	* Plum
* Potatoes	* Raspberries
* Rhubarb	* Rhubarb
* Road	* Rose Oil
* Rose water	* Rosehips
* Rosemary	* Safflower Oil

* Sage	* Salt
* Sesame Oil	* Soapflakes
* Sodium sesquicarbonate	* Spermaceti
* Stearic acid	* Storax
* Strawberry	* Sulphur
* Sunflower Oil	* Tumeric
* Tarragon	* Tea
* Thyme	* Turtle oil
* Vaseline Oil	* Vinegar
* Vitamins	* Wheatgum flour
* Wheatgum Oil	* Witch Hazel
* Yarrow	* Zinc oxide

PRODUCT APPLICATIONS

The herbal cosmetic products are used for beauty care, skin care, hair care, body care.

The manufacturer has to obtain Licence under State Drug Control Act and manufacturing practices have to be strictly according to the act and the guidelines

MARKET POTENTIAL

India's per capita cosmetic and toiletries consumption is 50 times lesser than that of Hong Kong, 18 of Japan, 15 of Taiwan, 12 of Philippines and Malaysia and half of China, despite high penetration levels for cosmetic products because of its population and size based, according to The Associated Chambers of Commerce and Industry of India (ASSOCHAM).

The Associated Chambers of Commerce and Industry of India (ASSOCHAM) has projected that the market size of herbal industry which is currently estimated at Rs. 7,500 crores (Rs. 75 billion) will double to

levels at Rs. 15,000 crore by 2015 since this industry would be growing at a compounded annual growth rate of over 20% henceforth.

In a study brought out by ASSOCHAM on Herbal Industry and Global Market 2015, it is pointed out that India's rich resource of medicinal plants and traditional treasure of knowledge in this area, its share at present is considered very meager. A quick estimate of the potential reveals that India can generate raw stock of around Rs. 300 billion and easily achieve around Rs.150 billion value added products. Thus, India is hardly able to exploit less than 50% of its potential. Interestingly both raw materials (herbs) and herbal products have ready market globally.

Releasing the study, ASSOCHAM Secretary General, D.S.Rawat said that ideally, the niche market that India can focus on include Ayurvedic Medicines and Dietary Supplements (including health drinks), extracts, Oils and other derivatives , skin care and beauty aids.

According to the study, the Indian domestic market can be broadly segmented into two categories. The first one will cover raw materials required by the industrial units and direct consumption for household remedies, whereas the second category will cover ready to use finished medicines, health supplements, etc.

Herbal cosmetics

The herbal cosmetics industry is "driving growth in the beauty business" in India and is expected to grow at a rate of seven per cent as more people shun chemical products in favour of organic ones.

"During the last decade, the herbal beauty care business has actually driven the growth of the beauty business in India. The emphasis has been on the spectacular growth of the herbal and ayurvedic beauty products business," as per the beauty expert Shahnaz Husain She was the first to introduce the concept of ayurvedic cosmetics to the world when she launched her products way back in 1970.

Today, the Indian cosmetics industry has a plethora of herbal cosmetic brands like Forest Essentials, Biotique, Himalaya, Blossom Kochhar, VLCC, Dabur and Lotus; and many more are adding to the list.

The Indian cosmetics market - defined as skin care, hair care, colour cosmetics, fragrances and oral care segments - stood at an estimated \$2.5 billion in 2008 and is expected to grow at seven per cent, according to an analysis of the sector.

One such brand is Tathaastu, which deals in products made of essential oils.

Divita Kanoria, Tathaastu's chief wellness officer, said the presence of artificial and chemical ingredients in their cosmetic products has made people rethink about suitable alternatives to suit their skin.

"Of late, there have been attempts to find alternatives. Beauty recipes from China and India using traditional herbs have earned a special significance the world over. Ayurvedic recipes from India for skin and hair treatment also serve as cosmetics," Kanoria said.

"The best part about organic cosmetics is that unlike chemical-based cosmetics, these do not interfere with the body's absorption of Vitamin D. Moreover, these help an individual to have a healthy skin, lustrous hair and glowing complexion in a completely natural way," she added. People have also become aware of the "ingredients" of cosmetic products.

"Today awareness of beauty products and treatments, fashion and grooming is at an all time high. The Indian customer is very much aware of the ingredients in cosmetic products, the benefits of plant products

and the harmful effects of chemical ingredients," Husain said.

"Also the concept of 'total well being' has steadily gained ground. There is much more awareness of the wellness concept and its benefits among people today," she added.

Husain recollects how she had to create awareness among people about the benefits of ayurvedic products when she launched her brand four decades ago.

"Very early in my career, I had to create awareness of the benefits of ayurvedic products and herbal healing. I made it a point to reply personally to letters seeking solutions for skin and hair problems," Husain said.

"My philosophy and faith in ayurveda have not only influenced markets and minds but have become an integral part of my person and brand image," she added.

Lakme scores over a host of both Indian and foreign companies with its sheer range of products which span from the lowest to the highest end. Therefore, in this segment Lakme comes out as the leader.

Market share of major cosmetic companies

Pond's India	53%
Lakme	46%
Arugs Cosmetics	1%
Zee (a new entrant) and others	

With the increasing percapita income in the country and raising standards of living, the demand for cosmetic products are registering healthy growth trends.

In view of the suspected side effects of synthetic chemicals used in cosmetics, there is increasing preference for use of natural and herbal materials in cosmetic products.

Under the circumstances, the demand for herbal cosmetics are bound to go up substantially and steadily in the coming years

The Indian herbal cosmetic industry should exploit this favourable conditions by putting forth more product development efforts and R&D work in the field.

INSTALLED CAPACITY

The installed capacity proposed is 45 Tonnes of Fairness cream per annum.

MANUFACTURING PROCESS

General details

Creams and emulsions are all basically mixtures of water, oils, waxes and fragrances perfumery products in varying proportions.

A slight change in the quantities in the preparations changes the character of the preparation and one should be careful when measuring the ingredients.

Generally most of the creams are basically made in the same way and hence when measuring the quality the following rough equivalents should be kept in mind while formulating the product.

Formulation details for sample of cosmetic products

Skin Lotions

Complexion lotions/sunscreen lotions for all skin types

Complexion lotions not only improve the colour of the skin but also protect it from the harmful effects of the sun by providing a screen between skin and the sunrays. Therefore they are generally known as sunscreen lotions.

Lime complexion Lotion

Process Put the lime flowers in boiling water for an hour. Strain and let the mixture cool. Add sodium benzoate to it. This is a very good complexion lotion and for better results add equal part of rose water to it. Keep it under refrigeration and use it with the help of cotton buds.

Lime flowers	25 gm
Distilled water	250 ml
Sodium benzoate	¼ tsp

Lavender Complexion Lotion

Process: Mix borax powder in rose water and add boiling oil to the mixture. Keep stirring, when cool and lavender extract too. It can be kept under refrigeration for more than 2 months.

Borax powder	1 tsp
Rose water	1 cup
Olive oil	2 tbsp
Lavender extract	½ cup

Almond Complexion Lotion

Process: Heat the almond oil and paraffin together and add all the other ingredients to it. Shake it well, apply it and let it remain till it dries. Rinse off with cold water preceded by lukewarm water wash. It leaves the skin looking fairer and smoother.

Almond Oil	1 tbsp
Cucumber/carrot juice	1 tsp
Glycerine	2 tsp
Liquid paraffin	1 tsp
Extract of cornflower	1 tsp

Sesame Complexion Lotion

Process: Mix all the oils together and apply it on the face and neck. It is an exclusive tonic to protect the skin from scorching heat of sun or is a very effective measure to get rid of sun tanning.

Sesame Oil	40 ml
Olive oil	10 ml
Almond oil	10 ml

Brook Lime Complexion Lotion

Process: Boil the water and put the brook lime leaves/stems in it. Leave it for an hour. Strain and let it cool. Now mix sodium benzoate in it. Apply it on the face and neck with cotton. It removes the spots and blackheads. It can be kept under refrigeration for more than 2 months.

Leaves/stems of brook lime	50 gm
Distilled water	500 ml
Sodium benzoate	½ tsp

Pimple Removing Lotions

Process: Mix all the ingredients well and apply the paste on the face. Leave it on for 15 minutes. The wash off with lukewarm water followed by a cold water rinse. It is also very good for removing spots caused by pimples.

Pimple removing tomato lotion	
Camphor lotion	½ tsp
Tomato juice	1 tsp
Honey	1 tsp

Pimple removing garlic lotion

Process: Blend all these together and apply this mask on the face for 20 minutes. After that wash off with lukewarm water. Never forget to give a cold water rinse because the pores which get opened by lukewarm water wash, get contracted if you rinse off with cold water.

Multani mitti powder	1 tbsp
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Honey	1 tsp
Carrot Juice	1 tsp
Garlic (paste)	½ tsp

Pimple removing camphor lotion

Process: Mix all these ingredients well and make a mixture of it. Apply this on the face and leave it to dry. When it is dry, wash off with lukewarm water. Finally rinse off with cold water.

Glycerin	1 tsp
Borax powder	½ tsp
Distilled water	1 cup
Camphor lotion	½ tsp

Astringent Lotions for All Skin Types

Astringent lotions are antiseptic in nature and therefore these should be used by the people having skin problem-for example acne prone skin.

Lemon Astringent Lotion

Process: Mix all the ingredients together and use with a cotton pad.

Lemon juice	2 large lemons
Distilled water	16 tbsp
Tincture of benzoin	1 tbsp

Cornflower Astringent Lotion

Process: Boil the water and soak the corn flower in it. Strain the mixture and mix witch hazel. It can be used by soaking the cotton pad in this mixture and then applying it on the desired places.

Distilled water	250 ml
Cornflower	100 gm
Witch hazel	1 tsp

Rose Astringent Lotion

Process: Boil the water and soak the rose petals in it. Then mix sodium benzoate in the mixture. Apply it with cotton pads. It is very good for tightening the skin and removing the wrinkles.

Rose petals/roots	500 gm
Distilled water	1.50 litres
Sodium benzoate	0.5 tsp

Lilly Astringent Lotion

Process: Soak the lilly flower in boiling water for an hour. Then strain and mix sodium benzoate in it. Soak cotton buds in the mixture and apply it on the face. It leaves the skin fair and soft.

Distilled water	2 litres
Lilly flower	500 gm
Sodium benzoate	0.5 tsp

Nutmeg Astringent Lotion

Process: Mix them thoroughly. Let it stand for 7 days. Then use it. It can be keep for more than 2 months if kept under refrigeration.

Honey	1 tbsp
Nutmeg powder	1 tbsp

Clove powder	½ tbsp
Grated lemon peels	2 tbsp
Brandy	2 tbsp
Rose water	4 tbsp
Orange flower extract	2 tbsp
Tincture of benzoin	1/8 tsp

Peppermint Astringent Lotion

Process: Mix them thoroughly and apply on the face for deep cleansing and opening of pores. Keep the remaining under refrigeration for further applications.

Calomine lotion	4 tbsp
Witch hazel extract	4 tbsp
Peppermint extract	2 tbsp
Vinegar (cider)	1 tsp
Tincture of benzoin	1 tbsp

Sandalwood Astringent Lotion

Process: Mix all these ingredients well. Keep it under refrigeration so that you can preserve it for months.

Sandalwood oil	8 tbsp
Sodium bicarbonate	5 gm
Almond oil	2 tsp
Rose water	4 tbsp
Orange flower extract	4 tbsp
Honey	1 tbsp

Rosemary Astringent Lotion

Process: Soak orange peels, lemon peels and mint leaves in boiling rose water. Leave it so for an hour. Then strain and mix all the other ingredients to the mixture. Mix them thoroughly and keep under refrigeration.

Sodium benzoate	½ tsp
Rosemary powder	2 tbsp
Orange peels	1 tbsp
Lemon peels	2 tbsp
Mint leaves	30 leaves
Brandy	¼ cup
Rose water	1 cup

Witch Hazel Astringent Lotion

Process: Mix them thoroughly. Apply on the face and neck at night and keep the rest under refrigeration for further applications.

Rose water	1 cup
Witch hazel extract	2 tbsp
Tincture of benzoin	1 tbsp

Skin Toning Lotions

* Grapefruit Skin Toning Lotion

Process: Remove the skin of the grapefruit and cut it into small pieces. Put the pieces through the blender then mix with youghurt to make a paste. Refrigerate for an hour and add sodium benzoate, then smear over the face and neck. Leave for 30 minutes until you feel your pores

tightening. Wash off with lukewarm water. It is very good for oily and sensitive skin.

Grapefruit (ripe)	100 gm
Yoghurt	250 gm
Sodium benzoate	0.5 tsp

* Sunflower Skin Toning Lotion

Process: Melt lanolin in a pan over a low flame and stir in sunflower oil. Remove from the heat and stir in wheat germ oil and witch hazel with sodium benzoate. Bottle and refrigerate and then massage a little into the face and neck at bed time. It is an effective tonic for dry skin.

Wheat germ oil or vitamin E oil is very effective for dry skin. Apply it by dipping cotton bud in the oil.

Rub a piece of potato over the face and neck and leave the juice for 15 minutes to dry on and then wash off. It is very effective for oily skin and can also be used for dry skin with a moisturiser.

Lanolin	1 cup
Sunflower oil	1 cup
Wheat germ oil	1 tsp
Witch hazel extract	½ cup
Sodium benzoate	1 tsp

Skin Soothing Preparations

* Cucumber Skin Soothing Preparation

Process: Peel and chop the cucumber and place the slices in a bowl. Squeeze the lemon over cucumber and let them stand for an hour. Then rub the cucumber slices over the face avoiding the area encircling the eyes. Leave it so for 30 minutes and wash off with cold water. It is an extra luxurious preparation for oily skin.

Cucumber	1 medium
Lemon	½

* Yoghurt Skin Soothing Preparation

Process: Put the cucumber through a blender and mix it with the yoghurt. Apply the paste on the face and neck. Leave to dry and then wash off with cold water. This is a good preparation for normal and sensitive skin.

Cucumber	1 small
Yoghurt	100 gm

* Witch Hazel Skin Soothing Preparation

Process: Grind the cucumber and mix honey and witch hazel to the pulp of cucumber. Apply on the face and neck, and leave it on for 20 minutes. When dry, wash off with cold water. This gives a luxurious touch to the dry skin.

Cucumber	1 small
Honey	1 tsp
Witch hazel extract	1 tsp

* Cleansing Creams/Cold Creams

The following cleansing creams can be applied during winter as cold creams because in winter, some creamy substance is needed to protect the skin from the drying effects of cold wind. And cold creams do the same.

Process: Heat the beewax in a saucepan. When it is melted, add almond oil, rose water and borax powder. Mix them thoroughly and keep stirring till the mixture cools. It can be kept under refrigeration for a long time.

Almond Cleansing (ream (1)	
White beewax	120 gm
Almond oil	500 ml
Rose water	1 cup
Borax powder	1 tsp

* **Almond Cleansing Cream (2)**

Process: Mix all the ingredients except sodium benzoate over a low flame. When the mixture cools down, add sodium benzoate. Keep it in a bottle under refrigeration.

Sweet almond oil	1 cup
Bitter almond oil	1 cup
Sodium benzoate	1 tsp
Honey dew soap	30 gm

* **Almond Cleansing Cream (3)**

Process: Beat egg yolk honey. Mix almond oil and powder making them into a paste. Now blend the beaten egg and honey to the paste of almond oil and add sodium benzoate too.

Sweet almond oil	1 cup
Ground almond	120 gm
Egg yolk	Of 4 eggs
Honey	250 gm
Sodium benzoate	1 tsp

* Cucumber Cleansing Cream

Process: Put a bowl in an open pot filled with boiling water. Pour spermaceti and beeswax in the bowl. After they have melted, remove the bowl from the pot. Pour olive oil and cucumber juice. Keep stirring while the mixture is still warm and sodium benzoate.

Beeswax	30 gm
Spermaceti	30 gm
Olive oil	500 ml
Cucumber juice	½ cup
Sodium benzoate	1 tsp

Source of technology

* National Research Development Corporation,
 (A Government of India Enterprise),
 Anusandhan Vikas, 20-22, Zamroodpur Community Centre,
 Zamrudpur, Kailash Colony Extn. New Delhi- 110 048.

PLANT AND MACHINERY EQUIPMENT

Blender and mixer
Packaging machinery

The total value of machines is estimated at Rs.12.00 lakhs.

RAW MATERIAL REQUIREMENTS, UTILITY AND AVAILABILITY

Cleansing creams formulation

The oils and waxes are melted, the usual way over a pan of boiling water. The cucumber juice, glycerine, colouring and borax is heated separately, ensuring that the borax dissolves thoroughly when the contents of both bowls are in molten form and warm, water is added drop by drop to the oil with continuous stirring.

The heating is stopped and the contents of both bowls are mixed till the mixture thickens and cools. The cream is kept in a refrigeration as cucumber juice decays outside.

The cream is made in small latches every time. Formulations details (Raw material requirements)

Beeswax	3 tps
Coconut oil	4 tps
Mineral oil or olive oil	4 tsp
Cucumber juice	4 table spoons
Glycerine	1 tsp
Borax	1 pinch
Green colouring	1 drop

AVAILABILITY

The above raw materials are readily available in the retail market

Calculation of Raw				Rs.
Materials		Qty-MTs	Rate-Rs	lakhs
Beeswax	17%	7.65	990000	75.74
Coconut oil	25%	11.25	98000	11.03
Mineral oil	25%	11.25	90000	10.13
Cucumber juice	25%	11.25	35000	3.94
Glycerine	6%	2.70	53000	1.43
Borax	1%	0.45	36000	0.16
Green colour	1%	0.45	850000	3.83
				106.24

LOCATION LAND AND BUILDING

Built up area-Sq.ft	3000
Rent p.m.-Rs per .10 per sq.ft	30000
Advance-10 months. Rs	300000

UTILITIES

Power	20
I.e	14.92
No. Of Working hours	8
Per day	119
Per annum	35700
Rate per unit	Rs.5.50
Power charge per annum	Rs.1.96
Fuel required per MT	10
Total	450
Rate	Rs.42.00

Fuel per annum-Furnace oil	0.19
Total Power & Fuel	2.15

MANPOWER

Category	Nos.	Monthly Salary	Total monthly Salary
Chemist	1	10000	10000
Supervisor	1	9000	9000
Accountant	1	6000	6000
Substaff	2	5000	10000
Machine operators	2	7000	14000
Skilled workers	3	6000	18000
Sales personnel	3	7000	21000
Total	13		88000
Add Benefits		0.20	17600
			105600
Annually		Rs. lakhs	12.67

SCHEDULE OF IMPLEMENTATION

If the financing arrangements are finalised the project can be implemented in three months time.

COST OF PRODUCTION AND PROFITABILITY

A cost and profitability statement projected for the first 3 years of operations is given in Annexure. The profitability is based on the following assumptions.

Assumptions

Installed capacity	45 MTs of Herbal Cosmetics per annum
Capacity utilisation	Year-1-60% Year-2-70% Year-3-80%
Selling price	Rs.800000 per MT. (Rs.80 per 100 grams cream)
Raw materials	As per the details given above
Packing materials	As per details given above
Power	Rs.2.15 lakh per annum at 100%
Wages and salaries	Rs. 12.67 lakhs with increase 5% every year.
Repairs and Maintenance	Rs.1.20 lakhs per annum
Depreciation	Written down value method -15 % on machinery
Selling general and administrative expenses	Rs.48.00 lakhs per annum
Interest on Term loan	14% per annum
Interest on working capital	14 % per annum
Income tax	34 % on profits

LIST OF MACHINERY SUPPLIERS

Blender and Mixer

ACE Pack Machines

23, V.N. Industrial Estate

Bharathi Colony,

Near Athiparasakthi Temple

Peelamedu, Coimbatore-641 004

Chemfilt

1304/A, GIDC V.U. Nagar-388 120,

Gujarat

Packing Machines

A S & T India Ltd.

C-30, Neeti Bagh, Khel Gaon Marg,

New Delhi-110 049

FINANCIAL ASPECTS

1. COST OF PROJECT

	[Rs.lakhs]
Land	0.00
Building-Advance	3.00
Plant & Machinery	12.00
Other Misc. assets	1.00
Pre-Operative expenses	2.00
Margin for WC	4.69

	22.69

2. MEANS OF FINANCE

Capital	11.44
Term Loan	11.25

	22.69

3. COST OF PRODUCTION & PROFITABILITY STATEMENTS

Years	1	2	3
Installed Capacity MTs per annum	45	45	45
Utilisation	60%	70%	80%
Production/Sales Mts per annum	27	32	36
Selling Price	Rs.800,000	MT	
Sales Value	216.00	256.00	288.00
Sales Value	216.00	256.00	288.00
Raw Materials	70.49	82.25	93.99
Power	1.29	1.50	1.72
Wages & Salaries	12.67	13.31	13.98
Repairs & Maintenance	1.20	1.26	1.32
Depreciation	2.48	2.13	1.83
Cost of Production	88.13	100.45	112.84
Admin, & General expenses	48.00	50.40	52.92
Interest on Term Loan	1.58	1.38	0.98
Interest on Working Capital	3.26	3.26	3.26

Total	140.97	155.49	170.00
Profit Before Tax	75.03	100.51	118.00
Provision for tax	25.51	34.17	40.12
Profit After Tax	49.52	66.34	77.88
Add: Depreciation	2.48	2.13	1.83
Cash Accruals	52.00	68.47	79.71

4. WORKING CAPITAL:

	Months Consumptions	Values	%	Margin Amount	Bank Finance
Raw Materials	1.00	5.87	25%	1.47	4.40
Finished goods	0.50	3.67	25%	0.92	2.75
Debtors	1.00	18.00	10%	1.80	16.20
Expenses	1.00	0.50	100%	0.50	0.00
		28.04		4.69	23.35
Say -					
->		Rs.23.32	lakhs		

5. PROFITABILITY RATIOS BASED ON 80% UTILISATION

<u>Profit after Tax</u>	77.88	
Sales	288.00	27%
<u>Profit before Interest and Tax</u>	122.24	
Total Investment	46.01	266%
<u>Profit after Tax</u>	77.88	
Promoters Capital	11.44	681%

6. BREAK EVEN LEVEL

Fixed Cost
(FC):

[Rs.lakhs]

Wages & Salaries	13.98
Repairs & maintenance	1.32
Depreciation	1.83
Admin. & General expenses	52.92
Interest on TL	0.98
	<hr/>
	71.03
	<hr/>

Profit Before Tax (P) 118.00

$$\text{BEL} = \frac{\text{FC} \times 100}{\text{FC} + \text{P}}$$

	FC x		
	100	71.03	0.80
	<hr/>	189.03	
	FC +P		

30% of installed capacity