

A  
REPORT ON  
AVAILABILITY OF  
CASTOR DE OIL CAKE  
AND  
SAW DUST

**CLARIS LIFESCIENCES LTD.  
"CLARION CAMPUS"  
VILLAGE: CHACHARWADI – VASANA,  
DISTRICT: AHMEDABAD**

## **1.0 Executive Summary**

Claris Lifesciences Limited (CLL) has set up a biomass based cogeneration unit at its Clarion campus with state of the art technology. It is a stand-alone building in the southeast corner of the campus

CLL has installed one 16 TPH FBC boiler and one steam turbine generator of 2 MW capacity. Out of 16TPH steam produced by FBC boiler, around 12TPH of steam goes to process steam demand for our manufacturing facilities and rest 4 TPH goes to multistage steam turbine to generate 0.7 MW of electricity.

The power and process steam requirements of the facilities within Clarion will increase on account of the proposed expansion of manufacturing facilities within Clarion. In this phase, the process steam demand will increase to 16 TPH. This is expected to be operational by Dec 2008.

Castor De Oil Cake (DOC) is the primary fuel that is used in our cogeneration facility. In case of problems in procurement of DOC, Saw Dust is used as a secondary fuel

Our cogeneration plant consumes around 65 to 70 Tons Per Day biomass residues (castor de oil cake or saw dust) around to cater 16TPH steam. To assess the availability of the biomass residues in our region, we did survey for the same and the findings of the study revealed that biomass residues will not be a bottleneck in the operation of our cogeneration facility.

## **2.0 INTRODUCTION**

Claris Lifesciences Limited is an international pharmaceutical company, in the business of manufacturing and marketing sterile parenteral preparations, life saving medicines and hospital products, focusing on delivery systems, for treatment of critical illnesses and diseases. With emphasis on Research, Technology and Quality, Claris offers a range of unique products and delivery systems in bottles, vials, ampoules, pre-filled syringes, non-PVC/PVC bags and oral dosage forms. The company's strength lies in its know-how and expertise in manufacturing and marketing Injectable products.

### **2.1 Background**

The biomass residue based combined steam and power generating facility is designed in accordance with Indian Boiler act, Gujarat Pollution Control Board act, Gujarat Electricity Board and Electrical & Factory Inspectors norms.

This facility will feed power and steam in the manufacturing units as under:

<b>Sr. No</b>	<b>Name Of Plant</b>
01	Clarion – 1
02	Clarion – 2
03	Clarion – 3
04	Clarion – 4
05	Clarion – 5
06	PLD
07	Central Finished Goods Stores
08	Central Warehouse
09	Campus Infrastructure

Following criteria were considered while selecting Castor De Oil Cake and Sawdust.

- Heat Value
- Availability
- Sulphur content

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- Ash content
- Ash fusion temp
- Rate of purchase
- Handling aspects
- Pollutant load

Initially, the entire Cogeneration plant was designed on based of Kutch lignite as main source of fuel. Then, we decided to switch over from Kutch lignite to biomass residue based dry agro waste fuel solely due to environmental concerns. Castor De Oil Cake (DOC) is the 1<sup>st</sup> preferred dry agro waste and as a 2<sup>nd</sup> preferred dry agro waste, we decided to go for Saw Dust.

Biomass assessment was carried out in three zones of 50 kms radius, 50 to 110 kms radius and 110 to 300 kms radius. For the purpose of this survey, Tehsils in the districts of Mehsana, Baroda and Kutch are considered.

**A. 1.1 DISTRICTS, TEHSILS AND BLOCKS FALLING IN GUJARAT ARE**

<b>S.N</b>	<b>District Name</b>	<b>Tehsils Name</b>	<b>Block Name</b>
<b>1</b>	<b><i>50 kms radial distance</i></b>		
	I) Mehsana	1) Kadi	a) Nani Kadi
<b>2</b>	<b><i>50 – 110 kms radial distance</i></b>		
	I) Baroda	1) Makarpura	a) GIDC
	II) Banaskantha	1) Palanpur	a) GIDC
<b>3</b>	<b><i>110–300 kms radial distance</i></b>		
	I) Kutch	1) Gandhidham	a) Mithi Rohar
			b) GIDC
			c) Chudva
		2) Anjar	a) Meghpar Borichi

## **2.2 OBJECTIVES OF THE STUDY**

- To assess the generation of (DOC) as well as Sawdust from agro industries and processors.
- To assess the consumption of DOC & Saw dust.
- To assess the surplus biomass.

## **3.0 METHODOLOGY**

The basic objective of the study was to assess the biomass resources availability, their consumption and therefore, the surplus biomass availability. This objective was kept in mind while devising the methodology. The study was organized stage wise as shown hereunder.

Biomass Assessment Study was carried out in combination of Secondary Data and Primary data Collection.

### **3.1 SECONDARY DATA COLLECTION**

Secondary data was collected from the available publications and from various government offices.

- Director of Agriculture, Gujarat
- Forest Department
- Tehsils Revenue offices for cropping pattern and other details
- District Industry Centre
- Kandla Timber Association
- Informal Markets

### **3.2 PRIMARY DATA COLLECTION**

#### *3.2.1 House Hold Schedule*

Household survey provides information regarding fuel consumption pattern, biomass utilisation pattern, land owned by the individual and the varieties of crops grown by him and its yield per ha. Even though house hold schedules

are not mandatory as a part of our assignment, we are undertook the same for arriving at the fuel consumption pattern if any .

### **3.2.2 Village Schedule**

The village Schedule provides the following information

1. Land details
2. Population
3. Residential Households
4. Nearest town & distance
5. Substation details
6. Biomass generation from agricultural activities, forests and waste land etc
7. Live stock population
8. Industrial status of the village
9. Crops Sowing and Harvesting seasons along with their yield, variety data
10. Biomass Consumption details for cooking, fodder, their consumption for various activities and the surplus biomass available.
11. Biomass balance sheet

### **3.2.3 Industry Schedule**

The Industry Schedule gives the biomass utilisation pattern of the respective industries, which includes details about biomass generation, consumption, surplus availability and cost aspects. The Industry Schedule was designed to collect only information pertaining to the study.

### **3.3 ANALYSIS OF DATA**

Biomass generation was estimated using the cropping pattern and the average yields given by the farmers. These average yields were counter checked with Agricultural Department. Crop residue ratios information was collected from farmers and checked with standard norms. Biomass generation is also calculated from the agro industries, and as well as from wastelands.

Biomass consumption was estimated for domestic fuel, fodder and other requirements. Biomass required for agro industry is also estimated. The net surplus of biomass is estimated.

## **4.0 General Characteristics of Castor:**

- Castor is cultivated for the commercial importance of its oil.
- India is the world leader in castor seed and oil production and dominates the international castor oil trade.
- The Indian variety of castor has 48 % oil content of which 42% can be extracted, while the cake retains the rest.
- India's castor production fluctuates between 6 to 9 lakh tons a year. In 2003-04, India's castor production was 8.04 lakh tons.
- Gujarat accounts for 86% of India's castor seed production followed by Andhra Pradesh and Rajasthan. Castor is mainly grown in Mehsana, Banaskantha and Saurashtra / Kutch regions of Gujarat.
- Castor is a Kharif crop. The sowing season of castor is from July to October and the harvesting season is from October to April.
- India annually exports around 2.0 - 2.4 lakh tons of commercial castor oil and 15,000 - 20,000 tons of castor seed.
- While 90 % of castor seed and oil in India is produced in Gujarat and Andhra Pradesh, the domestic consumption is dispersed all across the country. Castor seed and oil are also exported to various countries, especially European Union, US and Japan.
- The domestic ready market is quite well developed in Gujarat and Andhra Pradesh. The major mandi prices near the producing centers, upcountry prices and export prices from ports are available on a daily basis in public domain. The price dissemination is also up to the mark due to the export orientation of the commodity.

### **4.1 Cultivation pattern**

Castor is basically a tropical crop and it can survive in arid conditions. It is an annual crop and is grown by sowing the seeds in a hot weather. Castor can



survive on various types of soils but it requires an appropriate and consistent rainfall.

In India, it is grown as a khariff crop and is planted generally during the months of July and August. The crop has a duration period of 4 to 5 months and is generally harvested in the months of December and January. However the sowing and harvesting periods within the country differ according to the different regions where the crop is grown. Also, the region only decides that whether the crop is to be grown as a sole crop or a mixed crop. It starts to come to the market from October and comes till April.

#### **4.2 Castor producing countries**

As already mentioned, Castor is produced in about 30 countries lying in the tropical belt of the world. The production of this crop is concentrated in the hands of a fewer countries and that is why the world production of castor and its derivatives is highly fluctuating. Any change in the trend of the production of any of those countries leads to change in the level of world production. The world production of castor seed hovers around at an average of 12.5 lakh tons and of castor oil is 5.5 lakh tons. The major producer countries of castor are

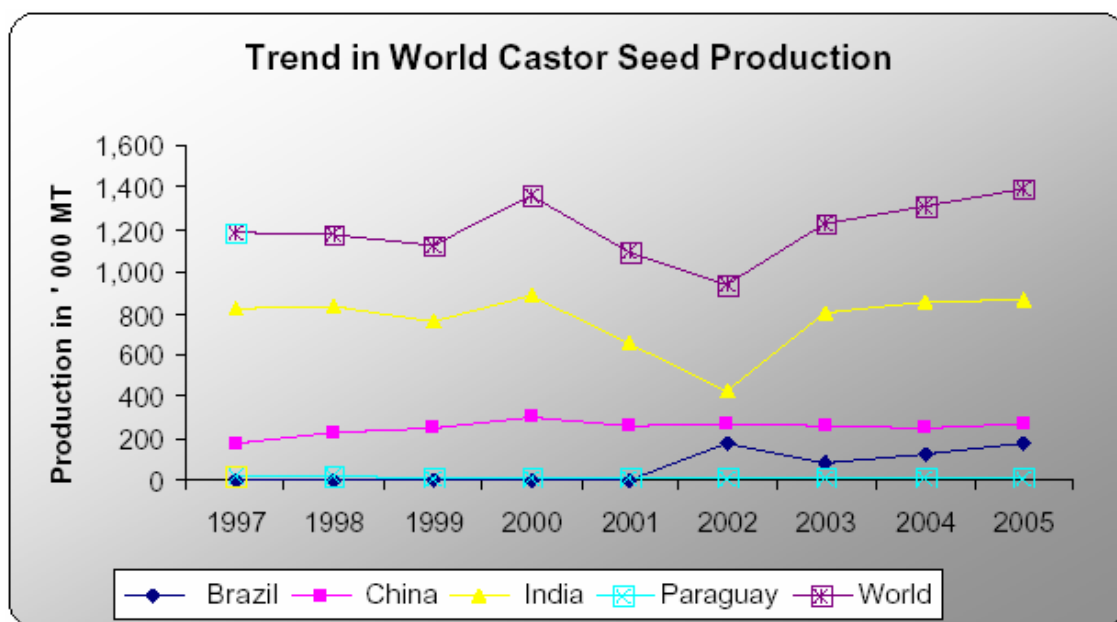
- India
- China
- Brazil
- Paraguay
- Ethiopia
- Philippines
- Russia
- Thailand

The top most country in the list is India with around 65% of the share in production followed by China with 23% and Brazil with 7% of share. The world production levels observed a sharp rise in the year 2001 which took the level to

17.5 lakh tons but it again fell down due to crop failure. Since few years, the countries China and Brazil are having an increase in their domestic consumption demand and hence are consuming a greater share of their production and exporting lesser leaving India to be the dominant player in the international market

#### **4.3 INTERNATIONAL SCENARIO**

The average world area and production for the last five years for Castor seed has been decreasing. However, after a slight decline till 2002, it recovered to some extent in last 3 years. The major producing countries are India, China and Brazil, which altogether constitute 93% of total world production.



The world output of castor seed rose from 11.88 lakh tons in 1997 to 17.48 lakh tons in 2000 before falling to 13.21 lakh tons in 2001. In 2005 the world production again rose to highest ever of 14 lakh tons. India is the world's leading castor seed producer with 62.42% share, followed by China and Brazil with 19.22% & 12.68% share respectively in 2005. All these countries noted fall in

production in 2001 as compared to previous year because of crop failure. However, the drop in China's production was significant, from tons in 2000 to only 3.0 lakh tons in 2001 due to shift in cropping pattern.

#### **4.4 Production of castor in India**

India being the largest producer of the castor contributes to around 65 % of the world's total production.

India produces around 8 lakh tons of castor seed and around 3 lakh tons of castor oil. The states in the country that are the major producers of castor are

- Gujarat
- Andhra Pradesh
- Rajasthan
- Karnataka
- Orissa
- Tamil Nadu
- Maharashtra

The leading of them all is Gujarat, which contributes to 86% of the total castor seeds produced in the country. The districts in Gujarat namely Mehsana, Banaskantha, Sabarkantha, Gandhinagar, Ahmedabad and Kutch are indulged in the production of Castor and it produces around .36 million tons.

#### **4.4 Indian castor market**

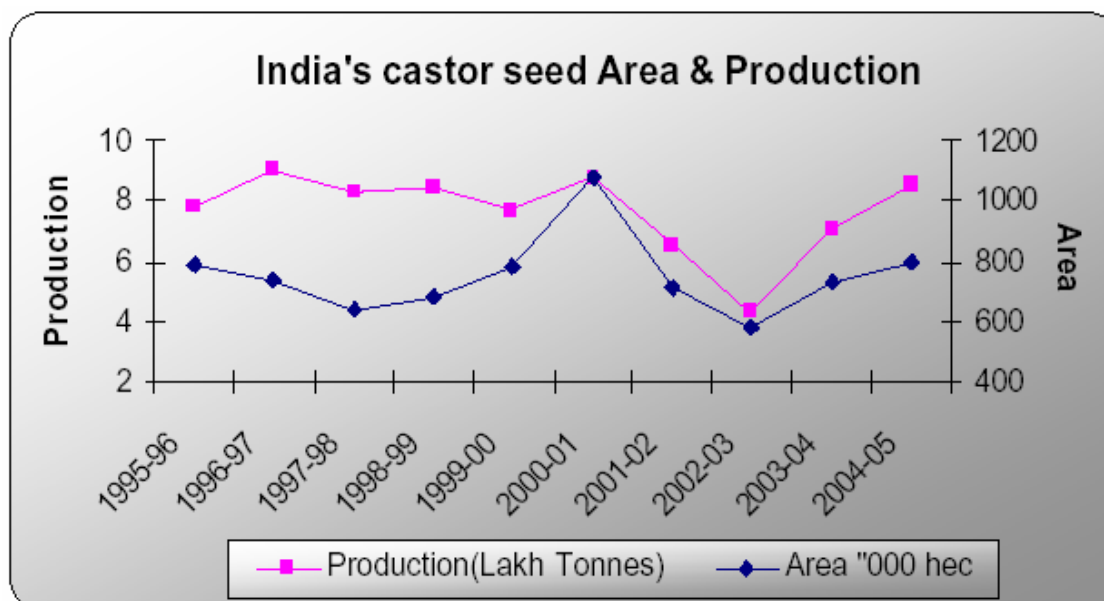
Gujarat is India's leading castor producing state constituting to around 86% of the country's total produce. India nearly consumes ¼th of its total production and exports the rest but it still is the second largest consumer in the world. The major sources of demand of castor oil are the various industries like soap, lubricant and paint industries and the demand of the oil is spread all across of country. This crop is grown over 6.25 lakh hectares of the country. After extracting oil from Castor seeds, the rest part used by farmers as Organic manure (around 55-60%) and substantial part (around 30-35%) goes as wastage to the environment.

#### **PRODUCTION AND ACREAGE IN INDIA**

	<b>2000-01</b>	<b>2001-02</b>	<b>2002-03</b>	<b>2003-04</b>	<b>2004-05</b>
Area (Lakh Ha)	10.80 (59%)	7.16(55%)	5.85 (53%)	7.32 (54%)	8.00 (55%)
Production(Lakh Mt)	8.82(56%)	6.52(58%)	4.28 (41%)	5.80 (50.7%)	8.5 (55%)

(Source: FAO)

NOTE: The figures in the brackets indicate the share of India's Castor seed production in the world.



#### **4.5 Market Influencing Factors**

- Production and acreage variations
- Monsoon and rainfall level
- Size of the yield level of other countries
- Prices of other competitive oils
- Demand of the importing countries and domestic demand
- Seasonal price variations
- Hoarding and black-marketing
- Carry over stocks
- Development of new uses of the oil

## **5.0 Availability of Castor De oil**

### **5.1 Major trading centers of castor**

The major trading centers of castor and its derivatives in Gujarat are: -

- Rajkot
- Ahmedabad
- Gondal
- Gadwal
- Bhabar
- Disa
- Kadi

### **5.2 Fuel Suppliers**

The following DOC suppliers were contacted for the purpose of conducting the survey.

#### **CASTOR DEOIL CAKE SUPPLIERS:**

- N.K. Proteins Limited,  
Village: Thor, Taluka: Kadi, Dist: Mehsana  
Phone: 02764-263667, 263670  
Contact person: Mr. Todi,  
Castor oil plant capacity: 1000 tons per day.
- Ardip Agencies  
201, Parishram ,2<sup>nd</sup> Floor,  
5/B Rashmi Society,  
Mithakhali Six Roads  
Navarangpura, Ahmedabad  
380 009

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- Agrawal Enterprise  
55,Aashara Industrial estate  
Mahalaxmi Mills,  
Narol,Ahmedabad.
  
- Gujarat Ambuja Exports Limited.  
Ambuja Tower, Opp: Memnagar Fire Station,  
P.O. Navjivan, Navrangpura,  
Ahmedabad – 380 014.  
Contact Person: Mr. M.P. Sharma-Vice President (Marketing)  
Castor oil plant capacity: 800 Tons per day  
Location of Plant: Kadi, Dist: Mehsana.
  
- Royal castor (India) limited  
208, 2nd floor, Sakar-II, Ellisbridge,  
Ahmedabad-380 006  
Phone: 079-8011886, 8011986  
Contact Person: Mr. Arif Memon-Managing director.  
  
Castor oil plant capacity: 450 Tons per day.  
Location of plant: Kheda-Dholka Highway  
Village: Hariyala, Dist: Kheda.
  
- Devika Proteins limited  
T.J.R House,  
Opp. Sushrusha Hospital,  
Off. C.G.Road,  
Elilisbridge, Ahmedabad-006  
Contact person: Jayesh Trivedi  
Factory location: Meda adarej, kadi

Phone: 079-2642 3365/66, Fax:079-26423377

- Laxmi Oil Industry  
Kansa road,  
Visnagar-384315.  
Gujarat.  
Phone: 02765-230511.  
Castor oil plant capacity: 50 Tons per day.
- Kisan Agro Products Industries  
NEAR RAILWAY CROSSING, AHMEDABAD HIGHWAY,  
PALANPUR - 385001,  
GUJARAT.  
Phone:02742-257062  
Fax:02742-253562  
Castor oil plant capacity: 100 Tons per day.  
Contact person: Mr. Kalpesh Shah  
Mobile: 9824087062

Out of these, we did site visit of two suppliers.

- M/s N.K. Protein
- Ardip Agencies
- Agrawal Enterprise.

We discussed our technical requirement, availability of biomass fuels, specifications and quality of fuels, which can be provided by the supplier.

Following are the criteria kept in mind while doing site visit of fuels suppliers:

- Availability of Fuels
- Specifications of Fuels



- Contents of Fuels like ash content, carbon, sulphur, etc.
- Source of Fuels
- Quality of Fuels
- Storage quality of Fuels
- Customer base of Supplier

We have decided to enter in to agreement for supply of fuels for security of material as and when required.

## **6.0 Conducting the survey-Visit to Manufacturers**

We have visited the major DOC suppliers and had a detailed discussion about their manufacturing facility and their process of Castor De Oil Cake manufacturing.

Following are the main steps involved in the manufacturing of Castor De Oil Cake.

- Unloading of Castor Seeds
- Transfer through Rackling to Cleaning
- Cleaning and Separation of impurities like stones, wooden pieces, etc. of different sizes.
- Crushing or Saylo storage
- Steaming in crushing and Jacket
- De Oil Cake (Intermediate)
- Double Crushing
- Filtration with Filter press and neusch filter
- Oil Storage with stirring
- Utilization
- Bleaching

- Sterring
- Filtration
- Expanders with Jacket Steaming (Extraction of Hexane)
- Drying
- Vertical / Horizontal Extraction Process with Hexane
- Castor De Oil Cake collection and storage

## **6.1 Manufacturing Process of Castor de oil cake:**

### **Unloading:**

The vehicles carrying castor seeds are first weighed on the company weigh bridge. Then they are unloaded directly on the rackles for the transfer to cleaning equipment.

There are two unloading areas in N.K Proteins.. In case of continuous crushing process, the seeds are directly sent to crushers through rackle conveyor. There are cyclone separators installed for solid – solid separation for impurities before the castor seeds reach to crusher. If the process is not continuing, then seeds are stored in to Saylo and then transferred to crusher.

### **Cleaning:**

After weighing, seeds are transferred to the cleaning equipment wherein the impurities are separated out and seeds are made impurity less for better yield of castor oil. The impurities are then collected in and discarded and clear seeds are stored in to the Saylo. The cleared seeds are then transferred to crushers from the junction of all the Saylo.

M/s. N. K. Industries Ltd. has four Saylo each of 2500 M<sup>3</sup> capacity and two Saylo each of 10000 M<sup>3</sup> capacity.

### **Crushing:**

The seeds are crushed in to the crusher. There are twelve nos. of crushers installed at N.K Proteins. Out of twelve, ten crushers run at a time. Industrial steam is provided in to the crushing process to take the temperature up. This reduces the water content in the castor oil and in way in the Castor De Oil Cake. This Castor De Oil Cake is intermediate cake. It contains high ash content, sulphur content, etc. It is not advisable to use the intermediate De Oil Cake because of high contents of ash, sulphur, etc.

The industrial steam is supplied to jacket also. This help the crusher keep the crushed seeds at high temperature for above effects.

### **Double Crushing:**

The crushed castor seeds oil is then transferred to the double crusher area through screw type conveyor. The double crushers are of 33 x 6 type i.e. there 33 crushing plates and 6 cylinders. The outlet of the double crushing is then transferred filter press and neusch filter. The filtered oil is then stored in to the under ground oil storage tanks with stirrer.

### **Utilisers:**

From the oil tanks the crushed castor oil is transferred to the Utilisers with help of pumping system. The purpose of the Utilisers is water content removal from the castor seed oil. This gives much better quality of both the castor oil and De Oil Cake.

The Utilisers are having steaming coil on it and a complete insulation on the vessel for proper steaming process. Due to steaming in this process the water content gets evaporated.

**Bleaching:**

The outlet product of the Utilisers is then passed through bleaching process. There are vacuum pumps installed in this section for the bleaching process. Also, there is a chemical dosing done as per the requirement. During bleaching process there is a stirring process that is carried out so that the oil and cake bean in the oil does not get accumulated.

**Filtration:**

The bleached castor oil including cake of the castor seeds is then passed through the filter press having 36 plates and filter cloths. The cake from the filter press is then collected and stored. This is a final cake, which is having oil content around 0.5 % that is acceptable to use as a fuel of Power Plant. Because of stage wise steaming process, the sulphur content, ash content, etc. are also within an acceptable range.

**Solvent Plant:**

There are two types of extraction, vertical extraction and horizontal extraction. Hexane is sprayed from the bottom and oil is passed from the top. Because of this, the extraction process occurs and it removes moisture content in the oil. The hot hexane is then sent to condenser and condensed which is collected and recycled for the spraying.

## 6.2 Seasonality of Castor:

Castor is a perennial crop but grown as an annual for economic purpose. It is cultivated mostly in the arid and semi- arid regions in the world. The crop duration is 4-5 months. In India, it is sown in July/August and harvesting commences around December /January. The seeds are then dried, de-podded, bagged and brought to the market yards for trading. The arrivals in the market start from December onwards.

	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Gujarat										
Andhra Pradesh										

 Sowing       Growth stage       Harvesting

## 7.0 Surplus Availability of Castor de oil cake:

The main processors of the Castor de oil cake along with other details are as provided:

Sr. NO.	Processors Name	Capacity/day (In tons)	Selling as Organic Manure	Other purpose (Un-organized way)	Rest left (Gets decay / Wastage)
1	N.K. Proteins Ltd	600	360	150	90
2	Gujarat Ambuja Exports Ltd	800	480	200	120
3	Royal castor ltd	450	250	150	50
4	Devika	500	300	120	80

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	Proteins Limited				
5	Kisan Agro Products Ind	100	65	20	15
6	Laxmi Oil Industry	50	33	12	5
<b>Total</b>		<b>2500</b>	<b>1488</b>	<b>652</b>	<b>360</b>

In 2004-2005, Gujarat produced around 7.31 lakh metric tones of castor seeds. According to the feedback given by suppliers, traders and farmers, each castor seed carry around 45-50% of oil by weight. The residue obtained after the oil is extracted is termed as Castor de oil cake which is primarily used by farmers as organic manure. It is estimated that around 3.65 lakh metric tonnes is available as castor de oil cake. The common practice in the areas of our survey revealed that castor de oil cake is mainly used as organic manure. Around 1.82 lakh metric tonne of castor de oil cake is used for organic manure and the rest which is no use is left to decay. Due to the inherent nature of castor de oil cake, it cannot be stored for a period more than 7 days. Effectively around 50 % is used as organic manure which is the primary use of DOC and the rest goes goes as waste.

**Chemical analysis of Castor de oil cake:**

<b>Sr. No.</b>	<b>Test Parameters</b>	<b>D.O.C</b>
1	<i>Proximate analysis</i>	
	Moisture (%)	11.2
	Ash (%)	5.90
	Volatile Matter (%)	60.1
	Fixed carbon %	22.8
2	Gross calorific value (K.cal/Kg.)	4265

## **8.0 Conclusion:**

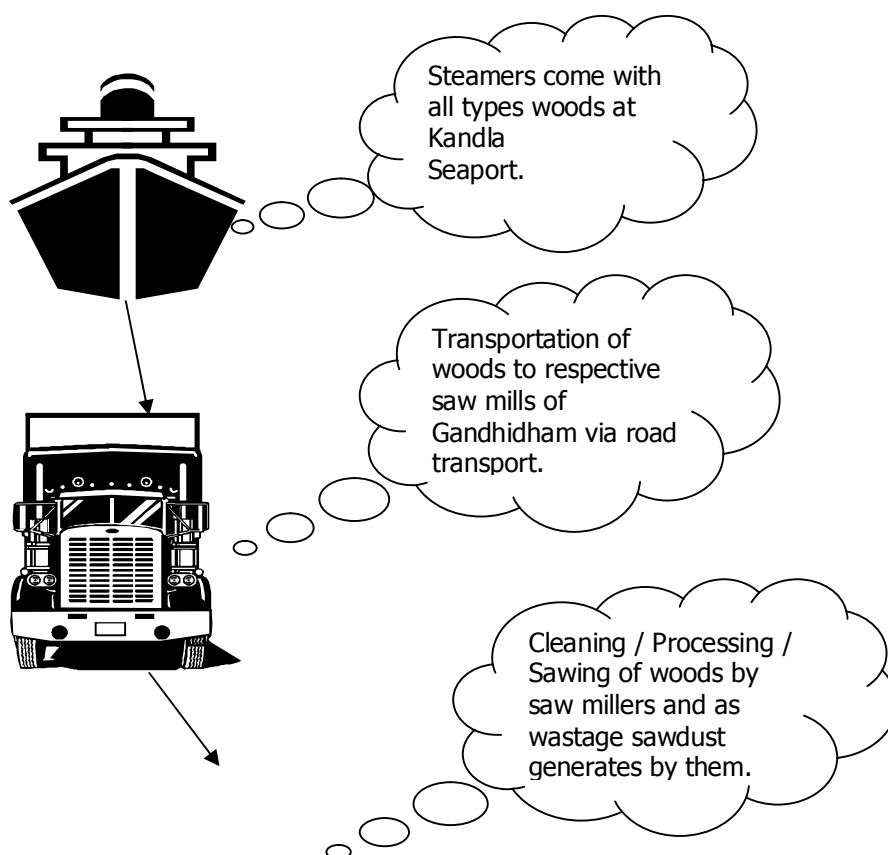
The findings of the study conducted reveals that out of the total castor seeds production in Gujarat, around 3.65 Lakh MT per annum is obtained as Castor de oil cake .Of the total DOC available, around 1.82 Lac MT is used as organic manure and around 1,00,000 Lakh MT goes as waste on a conservative estimate. We have a requirement of around 65-70 MT of Castor de oil cake per day which is around 24,500 MT per annum. From this it follows that DOC is abundantly available in the region and will not be a bottleneck for the operations in our cogeneration facility.

## **9.0 Assessing the availability of Sawdust:**

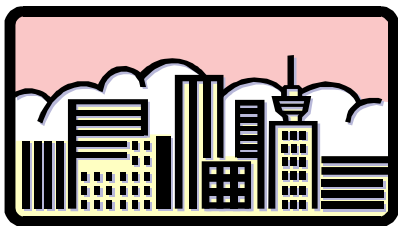
A survey was conducted at Ghandhigham in the Kutch district to assess the availability of sawdust in our nearby region. Ghandhigham is the largest producer of the sawdust since most of the sawmills are located at Ghandhigham city. There are around 500 to 1000 sawmills situated nearby Ghandhigham city.

### **9.1 How does the Sawdust generation take place?**

All kinds of woods first come at Kandla seaport via steamers from across the world. These woods are unloaded to the seaport and then loaded directly to trucks, to dispatch the same to their respective sawmills buyers, which are situated, nearby Ghandhidham city. As per the order given by customers to saw millers, they are sawing the woods accordingly to order and gets sawdust as wastage.







As a part of survey, we approached following sawdust suppliers/traders and saw millers to find out the availability of sawdust in nearby region.

The address and feedback given by them are as under.

### **9.2 Availability of Saw Dust**

The district of Gandhidham in the state of Gujarat accounts for the largest supplier of saw dust. Claris Lifesciences Limited procures its saw dust from Gandhidham owing to its abundant supply in the region. As per our survey conducted in the region, it is estimated that saw dust to the tune of 600-650 tonnes gets generated in the region.

#### **Major Saw Milers in Gandhidham:**

The details of the main saw millers in Gandhidham under the “Kandla Timber Association”, are as given below:

<b>Name of Suppliers</b>	<b>Address</b>
Oswal Timber Ind.	Post box no: 181, Oswal house, Survey no: 262, 263 B/h Pajarapole N.H. No: 8-A, Gandhidham
Sumanglam wood products	294/1, N.H. No: 8-A, Motirohar, Gandhidham
Giriraj Timbers	Survey no: 296/1, Motirohar, Gandhidham
Shipra Veneers pvt. Ltd.	Plot no: 309/1/2, Near Ambica Transport nagar N.H. No: 8-A, P.O.Box no: 140,

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	Gandhidham
Shri balaji timber traders	Survey no: 489/3, Mithi rohar Gandhidham.
A.K.International	Plot no. 34A, Survey No. 29, Meghpar-Borichi Anjar road, Gandhidham.
Aarti wooden industries	Plot No.5, Survey no. 260/3  Patel grup meghpar, Borochi  Gandhidham
Aditya saw mill	Survey no. 558,  Mithi rohar, N.H.,  Gandhidham
Agarwala saw mill	Plot no 10, Sec 10B, GIDC Gandhidham
Ajay associates	Survey no 514/1/C, Modvadar road, N.H., Mithi rohar Gandhidham
Ajeet Enterprise	Main bazaar road, Plot no 281, 12B  Gandhidham
Ajeet Mills	D-13, GIDC Area, Plot no 281-2B, Gandhidham
Ambica trading co.	Shop no 4, Krishna chamber, Plot no 115,  Gandhidham
Anand swarup mittal	489/3, Mithirohar,  Gandhidham

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Anil Enterprise	Survey no: 491 -Mithi rohar, Gandhidham
Anmol woods products pvt ltd.	Plot no. 32, Sec-10/c, GIDC, Gandhidham
Annapurna Timbers	B-193, Apana nagar, Gandhidham
Arihant saw mill	Plot no: 106, Survey No.6 Chudva, Gandhidham
Arihant Timber industry	Shed no.49, GIDC, Gandhidham
Ashapura Saw mill	S. No. 260/2 & 261/1, Mothi rohar, Gandhidham
Ashirvad Impex pvt ltd.	Survey no. 62, Near reliance petrol pump,
Ashita Impex pvt ltd.	B D 128, Golden arcade, Gandhidham
Assam timber store,	Survey no. 262, N.H. 8A Opp. Panjarpole, Gandhidham
Awadha industries	Survey no. 206/1, Chudva, Mithirohar

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	Gandhidham.
B S Patel & co.	Shop no. 7, plot no. 74, Sector 9/c, N.H. 8/A, Gandhidham
B S Sawheny & sons	Plot no. 3, Survey no. 123/1, Mithi rohar, Gandhidham
Bansal enterprise	185/a, Chuduva Gandhidham
Bansal Impex	Plot no. 136, GIDC, Gandhidham
Bansal timber corporation	Oswal plot, N.H. 8A, Gandhidham
Bansal timber store,	S. No. 258, Mithi rohar, Gandhidham
Bhagwati Enterprise	Near usha petrol pump, N.H. 8A, Mithirohar Gandhidham
Bharat saw mill	Plot no. 60, GIDC Gandhidham
Bhavani Sales corporation	
B/O, 11, Ojas complex,	Plot no. 69, Sector 9C, Gandhidham
Bhavesh saw mill	Plot no. 28 Sec 10A, Industrial area, Gandhidham
Bhavin saw mill	Plot no. 73, sector 10/A, Gandhidham
Bholenath saw mill	Plot no. 19, Sector 10/B, GIDC, Gandhidham
Bindal timber industries,	Survey no. 90,

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	Plot no. 28-29-30-31, Padana, Gandhidham
Chadha lumbers pvt ltd,	Plot no. 31/32, Sector –10/C, GIDC, Gandhidham
Chamunda international ltd,	Survey no. 164, N.H. 8A, Padana, Gandhidham.
Chirag industries	Survey no. 89/1, Opp. Krishna petrol pump, N.H. 8A, Village-Padana, Gandhidham
Chopra enterprises	Plot no. 109A, Shastri nagar, N.H. 8A, Chudva, Gandhidham
Chopra timber co.	Plot no. 110, Shastri nagar, N.H. 8A, Chudva, Gandhidham
D K Enterprise	Survey no. 6, Chudva, Gandhidham
D K Patel & co.,	Plot no. 58 GIDC, Gandhidham
D N Enterprise	Plot no. 25, survey no. 29, Meghpar borichi, Gandhidham
Dayal Timber Store	Plot no. 4, S.N. 297/1, Mithi rohar, Gandhidham
Dynasty traders pvt ltd.	231/1, Galpader road, Mithirohar, Gandhidham
Dee Kay pine board pvt ltd.,	Plot no. 4, survey no. 77/78, N.H. 8A, Padana, Gandhidham
Deepak enterprise	297/1, Mithi rohar, Gandhidham
Dembla timber co. pvt. Ltd.	Plot no. 1, S.N. 248/1, Mithi rohar, Gandhidham 235732, 224262
Durga Trading Co.	S.No.565, N.H., Mithi Rohar, Gandhidham
Ellora Exim Pvt.Ltd.	Umiya Bhawan, Sec.7, Plot No 62, Flat No 4, Gandhidham

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Eshmeet Saw Mill	Plot No 1/2/3, Survey No 355/2, Mithi Rohar, Gandhidham
F C & Sons	N H 8A, Near Deepak Petroliam, Mithi Rohar, Gandhidham 233416
Fairdeal Lumbers Pvt.Ltd.	Plot No 31/32, Sec.10/C, G I DC, Gandhidham.
G D International	Survey No 258/1, Mithirohar, Gandhidham
G P Timber	Plot No.40, Survey No.29,
	Meghpar Borichi, Anjar
Gandhidham Saw Mill	N.H.8A, Galpadar Road, Mithrohar, Gandhidham
Garg Lumbers Pvt.Ltd.	PlotNo.13. Sector 10/C, G I D C, Gandhidham
Gayatri Saw Mill	Opp Kandia Way Bridge, N.H., Mithi Rohar, Gandhidham
Gee Cee International	Plot No 62, Sec 9A, Gandhidham
Ghanshyam Saw Mill	Plot No. 34, Sector 10 C, Near Cargo Motors, Gandhidham
Giriraj Timber Pvt. Ltd.	Survey No. 296/1. N.H.8A, Mithirohar, Gandhidham.
Girish Ratilal & Co.	Mithi Rohar, N.H.8A. Gandhidham
Global Wood Products	Survey No 558, Mithi Rohar, Gandhidham
Green Gold Timber Pvt.Ltd	S.NO186/187, Opp V.Arjoon Weigh Brige, Near Maruti Petrol Pump, Mithi Rohar, Gandhidham
Hardik Saw Mill	Plot No 56, Sector No 11, G I DC, Gandhidham
Harekrishna Saw Mill	21, Ojas Complex, 1st Floor, Sector-9-C, Gandhidham
Haria Industires	PlotNo.62, Sector-11,G I DC, Gandhidham.
Harihar Timber Mart	21, Ojas Complex, 1st Floor, Sec-9/C, Gandhidham
International Timber	Survey No. 21/1, Galpadar Meghpar Road, Gandhidham.
Jai Jagadamba Saw Mill	Survey No 231/1, Plot No 4, Mithirohar, Gandhidham

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Jal Jalaram Saw Mill	Plot No 111-112, G I DC, Gandhidham
Jawahar Saw Mill	Near Laxmi Motors N.H. 8A, Gandhidham
Jindal Cement Jali Works	Plot No 297/1, Mithi Rohar, N.H.8, Gandhidham
Jyoti Timbrs	Survey No. 25 B, Mithirohar, Gandhidham
K P Trmber	PlotNo.10/A, Gandhidham
Karan Saw Mills	Plot No 9, Survey No 27, Meghpar Borichi, Gandhidham
Kedia Lumbers	Kamkhya Lumberman Complex, Padana, Gandhidham
Kelco Wood	F/23, GIDC Estate, Gandhidham 234875
Krishna Timber	Plot No 51, Sec.10/C, GIDC, Gandhidham
Krishna Timber Store	Jipson Plot, Plot No 259, Mithirohar, Gandhidham
Krishna Wood	Plot No 4, Sur 260/3, Patel Grup Compound, Meghpar Borichi, Gandhidham
Kusal Timber Pvt.Ltd.	Plot No 31 S.N.29, Meghpar Borichi, Anjar.
Laxman Timbers Pvt.Ltd.	S.No.573, Mithi Rohar, Galpadar Road, Gandhidham
Laxmi Timber Industries	G C Chember, Shop No 21, Plot No 66, Sec 9 N.H. 8, Gandhidham
Laxmi Timber Store	S.N.258/1, Mithi Rohar, Gandhidham
Lord Krishna Timber	Office No 107, 1st Flour Radhe Complex, N H 8A, Mithi Rohar, Gandhidham
M K Wood India	Survey No 489, N H 8A, Mithirohar, Gandhidham
Mahalaxmi Werehousing & Allied Ind.	S.No 210/211, Mithi Rohar, Gandhidham
Mahavir Saw Mill	Plot No 10, Sec 10C, GIDC, Gandhidham
Mahesh Timber Pvt.Ltd.	Survey No. 250/1. Mithirohar, Gandhidham
Maheshwari	Plot No 29, Sec.10/A, Bahind I.T.I., Gandhidham
Mittal Ocean Trade Pvt.Ltd.	Survey No 514/1/C, Modvadar Road, Mithi Rohar, Gandhidham
Mittal Timber Products Pvt.Ltd.	Survey No 206/1 Part (A) Vill. Chudva Gandhidham
Mukesh Kumar & Co.	267/5 Mithi Rohar, Gandhidham
Nandkishore & Sons	Survey No 27,28, Plot No 7, Meghper Borichi Anjar

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National Timber Traders Saw Mill	Plot No 20, Sector 10 B, G I D C, Gandhidham
Naveen Saw Mill	Plot No 68, Sector 10/A, G I D C, Gandhidham
Neelakant Saw Mill	Survey No 245/1, Mithirohar, Gandhidham
Neelkanth Saw Mill	Survey No. 249/5, Mithirohar Gandhidham
Noorani Saw Mill	National Highway 8/A, Near Gaushala, Mithirohar, Gandhidham
Om Prakash Satish Kumar	Survey No 215 Chudwa Mithi Rohar Gandhidham
Oswal Lumber Pvt.Ltd.	S.NO.262, N.H.8A, Mithi Rohar Gandhidham
P M Chopra & Co	Plot No 109, Shastri Nagar, N.H.8A, Chudva Gandhidham
Parasmani Industries	Plot No 83, Sec-10/A, Gandhidham
	Parth Wood Pvt.Ltd. Shop No. 21, G C Chamber, Plot No.66, Sector 9, Gandhidham.
Patel Saw Mill	Plot No 33, Sec.10/C, Gandhidham
Pooja Timber Industry	231/2 Mithi Rohar, Galpader, Gandhidham
Popular Timber	Kamakhya Lumber Men Complex, Plot No. 13, Survey No. 77/78, N.H. 8A, Padana, Gandhidham
Prabhudas Vrajdas	Survey No. 245/1, Plot No. 12, N.H. 8/A, Mittirohar, Gandhidham
Punjab Saw Mill Pvt.Ltd.	S.No.248/1, Mithi Rohar, Gandhidham
Rajdhani Timber Products	S.N.90, Plot No 1 To 10, Padana, Gandhidham
Rajkripal Exim Pvt.Ltd.	Survey No. 295/2, N.H.8A, Mithirohar, Gandhidham.
R C International	250/1 Galpader Road, N.H.8A, MithiRohar, Gandhidham
Radhe Shyam Ravi Prakash	S.N.201 Vill. Dhudava, 350 Mile Stone, N.H.8A, Gandhidham
RDBL Enterprise Pvt.Ltd.	S.No. 31, Plot No. 14-15, Meghpur Borichi, Anjar
Riddhi Saw Mill	SDX S-80, Jhanda Chowk, Gandhidham
Riya Enterprise	Survey No 206/1 Part (A) Vill.Chudva, Gandhidham
Russaka Ply India Ltd.	286/12C, Lilashah Nagar, Gandhidham
S P Kothari	102, Gokulpark, Ward 12/B,



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	Plot No 356, Gandhidham
S P Timber	Survey No.29, Plot No.40, Meghpar Borichi Road, Taluka Anjar,
S S Timber	Plot No 210, N.H.8, Mithirohar, Near Aggrawal Petrol Pump Gandhidham
Sadhuram Jaiprakash	S. No. 506/1 & 508/1, Plot No. 6 & 8, Mithirohar, Gandhidham.
Saloni Wood Products	Survey No. 90, Padana, Gandhidham
Sarda Saw Mill	Plot No 43, Section 10/A.GI DC, Gandhidham
Shanker Timber Store	Survey No 20371, Mithirohar, Chudva, Gandhidham
Sharma Saw Mill	D.B.Z.-N16, Po. Box No.255, Gandhidham
Shree Bhavesh Vijay Saw Mill-2	S.No. 350/A, Plot No. 8, Railway Bridge, Mithi Rohar, Gandhidham
Shree Gopal Krishna Enterprise	Survey No 80, Plot No 17/18, Meghper Borichi, Anjar
Shree Ambika Vijay Saw Mill	Plot No 24, Ward 12/B, Near SRC Godown, Gandhidham.
Shri Balaji Timber Traders	Survey No 489/3, Mithi Rohar, Gandhidham
Shri Bhavesh Vijay Saw Mill	Plot No 13/1-14/1, Mithi Rohar, Gandhidham
Shri Chamunda Saw Mill	Plot No 15, SedOA, GIDC, Gandhidham
Shree Devi Gayatri Saw Mill	S.No.245/1, Mithi Rohar, Gandhidham
Shri Ganga Vijay Saw Mill	Plot No 17, Mithi Rohar, Gandhidham
Shri Radhaswami Timber	S.No 80, Plot No 7, Meghpur Borichi Anjar
Ravi Saw Mill	Plot No 1, Survey No 257/1,2, Mithirohar, P.B. No 243, Gandhidham
Shree Shanker Vijay Saw Mill	Plot No 11, Sec-11,GI DC Gandhidham
Shri Shiv Agency	PlotNo21,S.No.80, Meghpar Borichi, Anjar
Shree Umiya Vijay Saw Mill	PlotNo19S.No.245/1, Mithi Rohar, Gandhidham.
Shriji Saw Mills	Survey No 249/5, Vill Mithi Rohar, Gandhidham
Shyamji Timber Store	Survey No 296/1, Mithirohar, Opp Radhey Complex, N H, Gandhidham
Singla Timber	Survey No 491/1, Mithi Rohar Gandhidham
Sitaram & Company Pvt.Ltd.	Survey No.26/1, Mithirohar, N.H.8-A, Gandhidham.
SLK Trade Link	77-78. N.H.8, Kamakhya Lumber Complex,

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	Padana, Gandhidham.
SS Timber Traders	Survey No 487/1, Mithi Rohar, Gandhidham
Starlite Industries Ltd.	Survey No 231/1, Plot No 3, Mithi Rohar, Gandhidham
Sumanglam Wood Product	Sur 294/1, Mithi Rohar, Gandhidham
Sunder Lumbers Pvt.Ltd.	Plot No 6, Survey No 77/78, N.H.8A, Padana, Gandhidham
The National Saw Mill	PlotNo.136, I.T.I. Road, GIDC, Gandhidham
Tirupati	PlotNo.13-14/A, Survey No. 245, Mithirohar, Gandhidham.
Trishul Saw Mill	Plot No 77, Sec. 10 A, Gandhidham
Umiya Wood Works Pvt.Ltd.	104 Paras Nagar, Ward 12B, Gandhidham
Utkal Lumbers Pvt.Ltd.	Floor No. 1, Annam Commercial Centre, Plot No. 37, Sector 9 A, Gandhidham
V K Timber PvtLtd.	S.No. 24/3, N. H., Mithi Rohar, Gandhidham
Valram Timber Mart	Plot No 34, Sector No 10-C, Light Industries Area, Gandhidham
Vardhman Timber Industries	Shed No I 33/34, 3rd Gali, G I D C, Gandhidham
Variety Lumbers Pvt.Ltd.	80/4, Kamakhya Lumbersmen Complex, Padana, Gandhidham
Vijay Enterprise	Plot No 11,Sec10C, Gandhidham
Vijay Timber Industries	E/17/18/19/20, GIDC, Gandhidham
Vinayak Timber Products	Plot No 32, Sec 10C, G I D C, Gandhiham
Vishwakarma Timber Industry	Plot No.63-64/75-76, GIDC, Gandhidham
Vraj Timber	4 & 5 Mani Chamber, Plot No 67, Sec No 9, N. H., Gandhidham
Wood Art	SRC Plot No. 13, Behind Khanna Market, Gandhidham
Zamindara Timber Traders	Plot No 355/4, Mithi Rohar, Gandhidham

The total capacity of the saw millers under this association is approximately 650 tonnes per day. The primary fuel for the cogeneration Plant at Claris Lifesciences is DOC. Saw dust will be used as a secondary fuel in case of non availability of the same. As per our discussions with some of the saw dust suppliers, at present approximately 400 Tonnes of saw dust is being used for commercial purposes

and the rest 150 tonnes are in surplus. Thus availability of saw dust is not a bottleneck.

## **10.0 Conducting the survey-Visit to Manufacturers**

### **Sawdust Suppliers/Traders:**

To analyze the availability of saw dust, personnel of Claris Lifesciences Limited visited some of the major suppliers in Gandhidham and had a detailed discussion about their manufacturing facility and the quantity of waste (saw dust) generated by them. As per feedback obtained from various saw dust suppliers, around 600 - 650 tonnes of saw dust is obtained on a daily basis.

The following are the main Saw Dust suppliers contacted by Claris Lifesciences Limited for supply of saw dust for their cogeneration unit:

- Agrawal Enterprise  
Mr. Om Prakesh Agrawal (Agent)  
8- Shreeji ware housing estate,  
Nr. Asopalav Hotel, Narol-Sarkhej highway,  
Ahmedabad.  
Mobile No: 98250 62871
- Sunny Enterprise  
Mr. Navneet Gajjar  
Sector no. 11,  
G.I.D.C  
Gandhidham.  
Phone no.-234092.
- Dayal Timber Store  
Plot no. 4, S.N. 297/1,  
Mithi rohar,  
Gandhidham  
Ph-9825251717.
- Ravi Saw Mill Plot No 1, Survey No 257/1,2, Mithirohar,  
P.B. No 243, Gandhidham  
Ph-9825318751

No. of Saw Millers	Avg. Sawdust Generation Capacity (TPD)	Total Generation Capacity (TPD)	Used as Fuel in various Industries	Surplus Saw Dust Quantity (TPD)
200	3.32	664	400 Tons	> 150

### **11.0 Conclusions:**

As per data shown in above table and feedback given by traders, the availability of sawdust in nearby Gandhidham city (within 110 to 300 kms radius) is around 600 to 650 tonnes per day and out of these, around 400 tonnes per day is used for commercial purposes. A substantial part (around 150 tonnes of saw dust) remains unutilized and is an area of concern for saw millers, as it has property to inflame and is difficult to handle. Thus it follows that surplus saw dust is abundantly available in the region and will not become bottleneck for Claris Lifesciences Limited.