S. G. V. C. Vidya Prasarak Trust's,
Matoshri Gangamma Veerappa Chiniwar Arts, Commerce & Science College,
MUDDEBIHAL-586212. Dist. Vijayapur (Karnataka)
(Accredited with CGPA of 3.31 on seven point scale at 'A+' Grade)

✆ : 08356220329
FAX : 08356220329

* email : princmgvc@gmail.com * www.mgvcmbl.in *

Ref. No. : .....

Date : 2023-24

Certificate

This is to certify that following are the list of students undertaking Project Work/ Field Work/ Internship (Data for the latest completed academic year- 2023-24).

Co-ordinator,
Internal Quality Assurance Cell
M.G.V.C. Arts, Commerce & Science College
MUDDEBIHAL-586212. Dist: Vijayapur.

PRINCIPAL,
M.G.V.C. Arts, Commerce & Science College
MUDDEBIHAL-586212. Dist: Vijayapur.

Template - 1.3.2.

1.3.2 Percentage of students undertaking project work/field work/internship (Data for the latest completed academic year-2023-24

Programme name	Program Code	List of students undertaking project work/field work/internship	Title of the Project	Link to the relevant document
Bachelor of Science Chemistry	F030420	Pooja Hugar	Process of Sugar Manufacturing	
		Sangeeta Talawar		
		Priyanka Hosamani		
		Swati Sulpi		
		Shashirekha Lingareddy		
		Akshata Walikar		
		Rakshita Benakatagi		
		Kavya Huded		
		Pooja H Ballolli		
		Netravati Rathod		
		Shahin L Naikodi		
Bachelor of Science Botany	C030340	Shivaleela Kanakal	Types of Placentation	
		Shashikala Awati		
		Shabana Awati		
		Sneha Awati		
		Deepa Wadawadagi		
		Chaitra Nadagouda		
		Akshata Bhovi		
		Nasareen Diddimani		
		Vidyashree Ambiger		
		Soumya Hangaragi		
		Shahinsaba Mulla		
		Zaveriya Momin		
		Aftab Pinjar		
		Prajwal Pathepurmath		
		Ganesh Murodi		
		Zaboor Shivalli		
Bachelor of		Shivaleela Kanakal		
		Ganesh Murodi		
		Soumya Hangaragi		
		Nasareen Diddimani		
		Prajwal Pathepurmath		
		Chaitra Nadagouda		
		Bibiuzma Mudnal		
		Akshata Bhovi		

M.G.V.C. Arts, Commerce & Science College, Muddebihal NAAC A+ GRADE

Co-ordinator,
Internal Quality Assurance Cell
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MUDDEBIHAL - 586212.

		Shahinsaba Mulla		
		Deepa Wadawadagi		
		Sneha Aski		
		Shashikala Awati		
		Javeriya Momin		
		Aftab Pinjar		
		Jahurahemmed Shivalli		
Bachelor of Sceince Zoology	E030340	Kahajabandenawaz Mulawad	Mammals Found in Muddebihal Taluka and Birds found in Muddebihal Taluka	
		Manjula Lakkannavar		
		Pratibha Doddamani		
		Muskan Mujawar		
		Sohel Desai		
		Vinuta Kumbar		
		Rajiya Rudrawadi		
		Bhagyashree K		
Bachelor of Arts Geography	F011490	Sudeep Chalawadi	A Case Study of indian Forests	
		Naveen Rathod		
		Rajeshwari Belagal		
		Revappa Rathod		
		Mutturaj Rathod		
		Sudheer Chavan		
		Suchitra Lamani		
		Rakshita Rathod		
		Sharada Kambar		
		Reshma Biradar		
		Santosh Pawar		
		Shilpa Assampur		
		Gurunath Rathod		
		Basavaraj		
		Parashuram Meti		
		Vishwanath Naik		
		Akashchinna Rathod		
		Vinayak Patil		
		Tirupati Rathod		
		Nirmala Sarangamath		
		Saroja		
		Danamma Biradar		
		Shashank Ingalagi		
		Abuzar Dhamani		

		Shekhar Naikodi		
		Ganesh		
		Arjun		
		Yuvaraj Nayak		
		Rahul Rathod		
		Sunita Melinamani		
		Sunil Lamani		

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Ref. No. : .....

Date : 2023-24

Department of Chemistry

Title of the Project Work: Process of Sugar Manufacturing

B.SC VI Semester- 2023-24

Sl. No	Register Number	Name of the Students
01	U15NU21S0014	Pooja Hugar
02	U15NU21S0016	Sangeeta Talawar
03	U15NU21S0031	Priyanka Hosamani
04	U15NU21S0036	Swati Sulpi
05	U15NU21S0055	Shashirekha Lingareddy
06	U15NU21S0063	Akshata Walikar
07	U15NU21S0067	Rakshita Benakatagi
08	U15NU21S0071	Kavya Huded
09	U15NU21S0082	Pooja H Ballolli
10	U15NU21S0089	Netravati Rathod
11	U15NU21S0092	Shahin L Naikodi

Co-ordinator,
Internal Quality Assurance Cell
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MUDDEBIHAL-586212. Dist: Vijayapur.

M.G.V.C ART'S COMMERCE AND SCIENCE COLLEGE, MUDDEBIHAL-586212
DEPARTMENT OF CHEMISTRY
Project Work

Title: PROCESS OF SUGAR MANUFACTURING

List of students

Sl. No.	Reg. No.	Student Name
1	U15NU21S0014	POOJA I HUGAR
2	U15NU21S0016	SANGEETA AMARAPPA TALAWAR
3	U15NU21S0031	PRIYANKA ISHANNA HOSAMANI
4	U15NU21S0036	SWATI SHIVABAND SULPI
5	U15NU21S0055	SHASHIREKHA R LINGARADDI
6	U15NU21S0063	AKSHATA SHREEKANT WALIKAR
7	U15NU21S0067	RAKSHITA MOHAN BENAKATAGI
8	U15NU21S0071	KAVYA GANGADHAR HUDED
9	U15NU21S0082	POOJA H BALLOLLI
10	U15NU21S0089	NETRAVATI NAGARAJ RATHOD
11	U15NU21S0092	SHAHEEN L NAIKODI

Head, Dept. of Chemistry,
M.G.V.C. Arts, Com. & Science College
MUDDEBIHAL - 586212.

Co-ordinator,
Internal Quality Assurance Cell
M.G.V.C. Arts, Commerce & Science College
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PRINCIPAL,
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MUDDEBIHAL - 586212.

BSc Chemistry-Semester VI
Title of the Course: INT1 (Project work/Industrial visit and report)
Subject code: 21BSC6 INT1L

Course title	**INT1(Project work/Industrial visit and report)**		
Course Code	21BSC6 INT1L	No. of Credits	**02**
Contact hours	**32 Hours or 2 Hours/ week**	Duration of SEA/Exam	**2 hours**
Formative Assessment Marks	**25**	Summative Assessment Marks	**25**

Project work on various topics pertaining the entire B.Sc Chemistry syllabus can be given. A batch of maximum 5 students can be given a single topic for project.

Alternatively the students can be taken to visit different industries/ research institutes and detailed report incorporating the salient features of the visit to be submitted by students. Ideally the visit can be undertaken in between 6^{th} to 8^{th} week of the semester to enable the students to prepare the report before the semester end exam.

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S.G.V.C. V P T'S

M.G.V.C. ARTS, COMMERCE AND SCIENCE COLLEGE MUDDEBIHAL

NAAC A+ GRADE

Department of Chemistry

PROJECT REPORT ON

"PROCESS OF SUGAR MANUFACTURING"

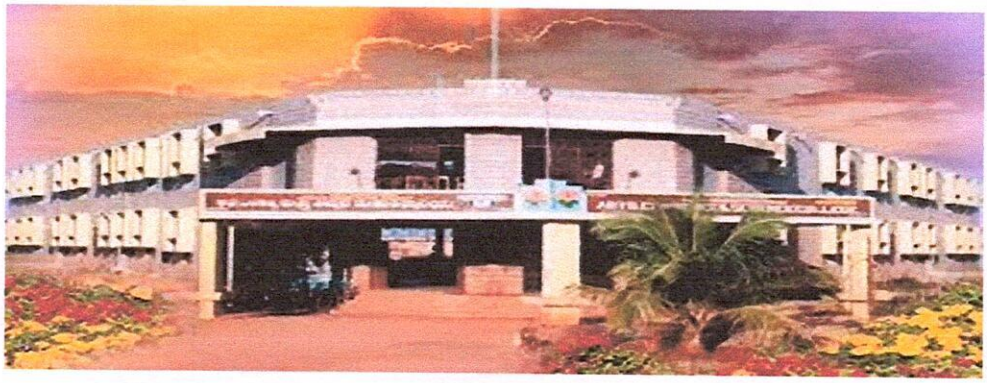
(INDUSTRIAL TRAINING REPORT)

The Shri Balaji Sugars and Chemicals Pvt Ltd, Yargal, Muddebihal, Karnataka

Submitted to

Rani Chennamma University ,Belagavi

In partial fulfillment of the requirement for the award of B.Sc Degree for the year 2023-24



Submitted by: Pooja I. Hugar
Reg No : U15NU21S0014

Guided by:
Prof.A.S.Bagwan
AssociateProfessor

Head, Dept. of Chemistry,
M.G.V.C. Arts, Com. & Science College.
MUDDEBIHAL - 586212.

Co-ordinator,
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MUDDEBIHAL-586212. Dist: Vijayapur.

PRINCIPAL,
M. G. V. C. Arts, Com. & Science College
MUDDEBIHAL - 586212.

CERTIFICATE

This is hereby declare that the project work entitled ***"THE PROCESS OF SUGAR MANUFACTURING"*** submitted by Pooja. I. Hegar to **The Shri Balaji Sugars and Chemicals Pvt Ltd, Yargal, Muddebihal, Karnataka** for the award of industrial training a genuine record is carried out by them during the period of 13 Jul, 2024 to 29 July,2024.

It is further certified that this project is developed by Shri Ainapur (Project Manager), in original and has been result of their personal efforts with little assistance wherever required.

Mr.- Shri Ainapur (Project Manager)
Shri Balaji Sugars and chemicals & Pvt. Ltd

ACKNOWLEDGEMENT

Very special thanks to **Prof. A.S.Bagwan** sir, project in charge for providing us with opportunity to avail the excellent facilities and infrastructure in terms of the faculty, the computer lab, library. The work presented in this dissertation has been carried out under the supervision of Prof.A.S.Bagwan working under them has been a rich and rewarding experience and I consider myself fortunate to have this unique opportunity. I am deeply indebted to them for their unfailing inspiration, guidance and help through the year

My special thanks to **Prof. S.N.Poleshi** Principal. We consider our self lucky enough to get such a good project, this project would add as an asset to our academic profile.

I express gratitude to Prof.C.S.Katageri (HOD), Prof.U.A.Halyal and Shri. M.I.Naik (Lab Assistant). Department of Chemistry for their constant supervision guidance and co-operation throughout the project.

DECLERATION

I here declare that this project work entitled **"THE PROCESS OF SUGAR MANUFACTURING"** embodies the report carried out in the **"The Shri Balaji Sugars and Chemicals Pvt Ltd, Yargal, Muddebihal, Karnataka"** during B.Sc VI Semester for the academic year 2023-24 under the supervision of **Prof.A.S.Bagwan Department of Chemistry M.G.V.C. Arts, Commerce And Science College Muddebihal.** This project report has not been submitted previously for the award of degree or diploma to any institution.

Place: Muddebihal
Date:

Signature of the Student

CHAPTER 1

INTRODUCTION OF FACTORY

The Shri Balaji Sugars And Chemicals Pvt Ltd, Yargal, Muddebihal, Karnataka

Shri Balaji Sugars & Chemicals Pvt. Ltd. (SBSCPL) is a Private Limited Company registered in the State of Karnataka under the Companies Act, 1956. on April 1, 2011 four certificate of incorporation number U15425KA2011PTC057947. SBSCPL had set up an integrated new sugar mill of 3500 TCD, & 18 MW capacity. Cogen power project for decentralized generation of exportable surplus power, mainly from renewable sources of fuel, factory located near Village Yaragal-Madari, Taluk: Muddebihal, Dist.Bijapur, Karnataka. SBSCPL has undertaken 1st trial in March 2015. SBSCPL,now proposes to set up a 60 KLPD capacity distillery to produce ethanol,adjucent to the existing sugar plant located at Village Yaragal-Madari. The proposed distillery project will produce ethanol from molasses as raw material.The steam and power requirement for the proposed plant will be made available from the new slop fired incineration boiler & back pressure turbine. Its authorized share capital is Rs. 670,000,000 and its paid-up capital is Rs. 6566,310,000.

Item	Sugar
No.of days	133
No.of hours	2780
Crushing rate, TCH	160
Annual installed crushing capacity, MT	3500
Annual cane crushing	400586.462
Total sugar production, MT	43525
Total sugar recovery, % sugar	10.87

Company Details

Company Name: Shri Balaji Suagrs and Chemicals Pvt.Ltd.
Establishment: April 1, 2011
Location: Shri Balaji Sugars and Chemicals Pvt. Ltd Yargal,
Taluk: Muddebihal ,
District: Vijayapur
Founder: Mr. Hanamanthgouda S Patil
Chairman: Mr. Rahul V Patil

CIN: U15425KA2011PTC057947

RoC: RoC-Banglore Registration Number: 57947
Company Category: Non-Govt company
Plant Capacity: 3500 TCD cane crushing
Electricity: 18 MW
By-Products: Sugar, Cogen-power, Alcohol, Ethanol
Working hours: General shift: 9am - 5.30pm
Morning shift: 4am – 12pm
Afternoon shift: 12pm – 8pm
Night shift: 8pm- 4am

Website: https://balajisugars.com/day_of_balaji.aspx#

Vision and Mission of Industry

Vision:

The Balaji Group will continue to expand its operations by expanding production into new markets and applications. Growth will also come from value diversification derived from the group's strengths in production and processes.

The Balaji Group has always and will continue to use renewable resources in its products. It is an important need for sustainability. The company has been and always is aware of its social commitment to the community that it serves. It believes that we have a responsibility and obligation to return to society what we earn from it.

Mission:

- To be a world-class global organization.
- To be an integrated Biorefinery.
- To be a leading integrated producer of sugar and downstream products.
- To continuously add value to every part of sugarcane that the company processes to make new products and enter new markets, to derive maximum value from feedstock.
- To understand and exceed customer's expectations.

CHAPTER 2

SUGAR INDUSTRY

2.1 INTRODUCTION

Fig 1: Sugar Manufacturing Industry

The sugar industry works on the production, processing, and marketing globally, most sugar is extracted from sugarcane and sugar beet. 37 countries in the world produce sugar from the beet and 72 countries produce sugar from sugarcane. Out of 109 countries, 12 countries manufacture sugar from sugarcane as well as sugar beet. Around 460 million tons of sugar is produced every year. The largest producers are Brazil (72%), India (15%) and the European Union (10%). The sugar industry in India has steady growth and is the second largest producer of sugar in the world. The sugar industry plays a pivotal role in the Indian economy by contributing a major share to the national income and helping in the development of rural areas by being an agro-based industry and is the second largest industry after textile industries. The sugar factories have a presence in 19 states in which Uttar Pradesh, Maharashtra, Karnataka, Gujarat, Tamil Nadu, and Andhra Pradesh are having highest number of sugar factories. These states account for approximately 85% of the total sugar production in India. The sugar industry is one of the important agro-based industries in Karnataka and is the fifth largest producer of sugarcane in India contributing about 10 percent of the entire production.

Consumption of sugar and related sweeteners in India has increased in the last few years. One of the major reasons for the increasing demand for sugar is the growing population of India as well as improving economic conditions. The majority consumption of the sugar that is produced directly by mills is used in bakeries, and local sweets and candy manufacturers. Biscuit manufacturers, food products companies, pharmaceutical setups, hotels, and restaurants also consume fair quantities of sugar.

2.2 Sugar Manufacturing Process

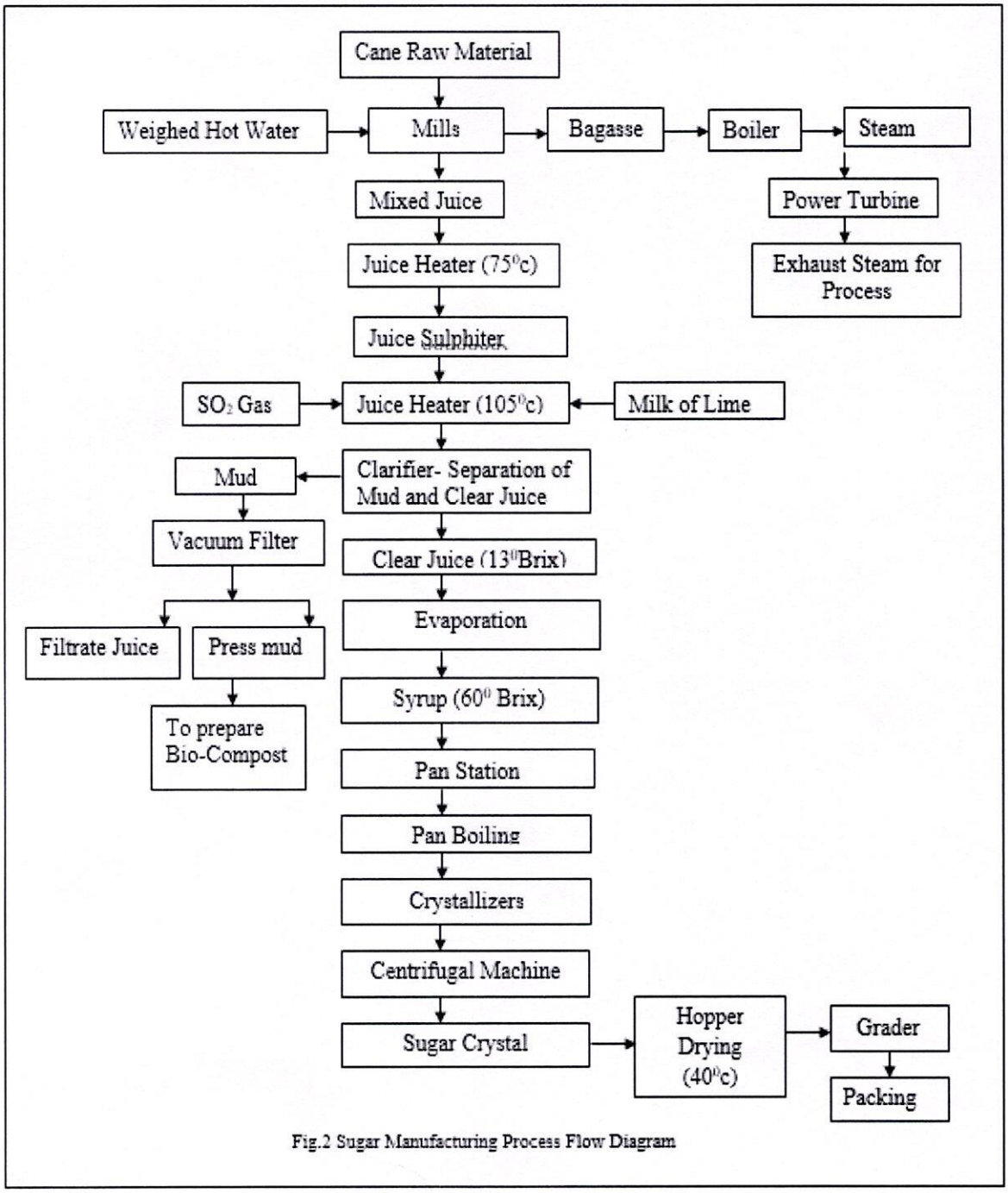

Fig.2 Sugar Manufacturing Process Flow Diagram

The sugar manufacturing process is a process of extraction of juice from sugar cane and it is most commonly adopted throughout the world. The manufacturing process is explained below:

1 Weighing and Unloading of Sugarcane:

The tractors loaded with sugarcane will stand on the weighing machine, where weight of the sugarcane including the vehicles weight will be indicated. Unloading of sugarcane in industry is done by using crane and a teethed tool at end of the cane. This crane helps in moving sugarcane from container to feeder table.

2 Feeder Table:

The weighed sugarcane is fed to the feeder table consisting of tooted roller and a belt. The feeder table is slightly bent over the surface and sugarcane in the table moves slowly as belt moves. This will feed to cane carrier.

3 Cane Carrier

Sugarcanes are dropped over a continuous belt (metallic belt) called cane carrier, which moves the sugarcane to cane kicker and choppers continuously.

4 Cane Kicker and Choppers:

From the cane-carrier, sugarcane is carried to cane Kicker, which doesn't cut the cane but helps to maintain the uniform level. It increases the crushing without affecting milling efficiency. Then sugarcane moves choppers, where cane preparation is done by cutting or slicing the sugarcane into small pieces with a set of rotating knives. In a chopper, there will be nearly 24 knives each knife will be around 15.5kg weight and has swinging arrangement.

5 Juice Extraction:

The small pieces of sugarcanes are made to pass through two roller crusher and five sets of mills combinations in which the cane is crushed. After major quantity of juice has been extracted by crushers and the first two mills, hot water is sprinkled over the bagasse whereby residual juice gets diluted and can be easily extracted by further milling.

About 90-95% of the juice is usually extracted. The extracted juice is weighed or measured as desired and sent for clarification process. The bagasse is used later as fuel source for the boilers to generate steam.

6 Clarification of Juice:

The dark-green raw juice from the mills is acidic and turbid. The juice also contains small quantities of glucose, fructose, vegetable proteins, mineral salts, organic acids, gums and fine particles of bagasse suspended in it. If the juice allowed remaining untreated, it begins to ferment and sucrose present changes to mixture of glucose and fructose. In order to avoid it, juice is not allowed to stand untreated for a long time.

In the clarification process, it is designed to remove both soluble and insoluble impurities that are not being removed by preliminary screening. Milk of lime neutralizes the natural acidity of juice forming insoluble salts. Juice is treated with sulfur dioxide (sulphitation) to bleach and produce a juice with much lighter color with neutral pH. In some cases, 'Sulphitation' follows 'carbonation'. Heating the lime juice to boiling point coagulates the albumin and some of the fats, waxes and gums, which entraps suspended solids and minute particles. The mud particles separate from clear juice through sedimentation. The Mud is again filtered on Rotary drum vacuum filter, the filtered juice returns to the process, and the press cake is discarded or send to the fields for composting process to make good quality fertilizer. The non-sugar impurities are removed by continuous filtration.

7 **Evaporation and Crystallization:**

The clarified juice contains about 85% of water is concentrated in multiple effect steam-heated evaporators until it reaches a concentration of 50-65%. In the evaporators, water in the juice is boiled under vacuum. Juice in the first pan is heated by exhaust steam from the engines of the factory. The concentrated juice from the first pan is taken to the second pan and heated there at a lower pressure, by steam from the first evaporator. The concentrated solution from the second pan is taken to third pan and heated there at a still low pressure by exhaust steam from second evaporators.The clear syrupy juice is just boiled in a vacuum pan till formation of sugar crystals, which are formed through a process called seeding.

The syrup (massecuite) is taken into crystallizing tank and allowed to cool under vacuum slowly when the tiny crystals of sugar grow in size. The rate of cooling must be closely controlled. This leaves a mixture of sugar crystals and molasses called massecuite.

8 Centrifugation:

The crystals along with the mother liquor (molasses) are whirled at high speed in the centrifugal machines to separate sugar crystals and molasses. The centrifuge, which rotates at 1000 to 2000 RPM, contains a perforated metal cylindrical basket. A little molasses adhering to the crystals is removed by spraying cold water and whirling in the centrifuge again. The molasses is sent to storage tanks, where it can be further processed for ethanol production. After centrifugation is finished, the raw sugar is washed with spring water and sent to the refinery.

9 Drying and Packing:

After centrifugation sugar is sent to the drying where the damp sugar crystals are dried in large by hot air dryer, moisture content is lowered from 1.0-1.5% to 0.04-0.02% and its temperature is reduced up to 37-40°C. Next, sugar is gently tumbled through heated air in a granulator. The dried sugar crystals are then separated into different sizes through vibrating screens and placed into storage bins. Finally, the sugar is packed in 50 to 100kgs bags for industrial customers and 1 to 2 kg bags for household customers.

The sugar is manufactured in following grades:

L: Large size sugar (1.7-2.36 mm).

M: Medium size sugar (1.18-1.7 mm).

S1: Small size sugar (700micron- 1.7 mm).

S2: Very small size sugar (212-700 micron).

Fig 3: Sugarcane Unloading

Fig 4: Sugarcane Feeder Table

Fig 5: Sugarcane Kicker

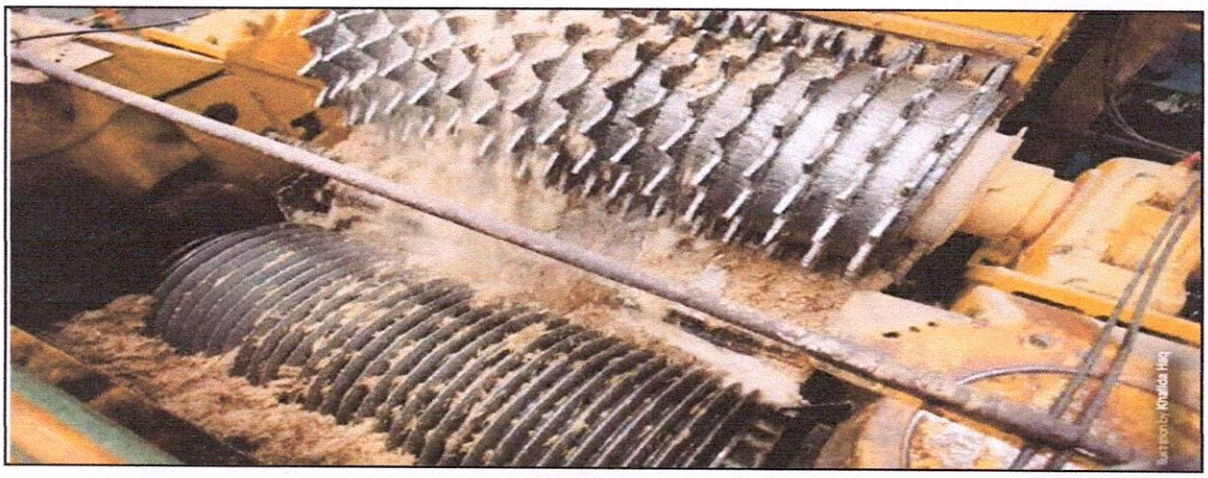

Fig 6: Sugarcane Crusher

Fig 7: Mill House

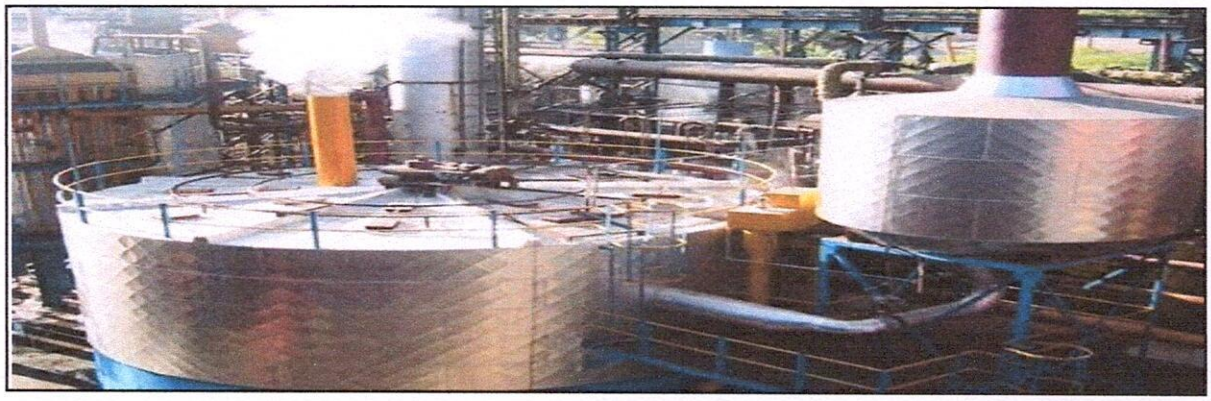

Fig 8: Sugarcane Juice Clarifier

2.3 Sugar Industry By-Products:

1) **Bagasse:**

Bagasse is residual material left after the extraction of juice from sugar cane. In Balaji Sugars and Chemicals Pvt Ltd, it is actively used as fuel for power generation by which the industry is self-sufficient for its fuel requirement. For one ton of sugarcane 300 kg of bagasse will produce.

2) **Molasses:**

It is a highly viscous left-over material containing sugar/reducing sugar and also organic/inorganic impurities. It is a raw material for distilleries in this organization. For one ton of sugarcane 40-45kg of molasses will be produced.

3) **Filter Cake (Press Mud):**

Filter cake commonly known as Press mud is the suspended impurities separated during the process of cane juice clarification by the sulphuration process. The materials are used for production of manure and the factory manages to sell the filter cake to the cane growers at concessional rates & achieves recycling of the matter back to fields. The press mud is obtained at the rate of 40-45 kg/ton of sugarcane.

4) **Power:**

The Shri Balaji Sugars and Chemicals Pvt Ltd has set up a 18 MW cogeneration-based power plant using renewable sources of energy (i.e., bagasse), 15.74 MW for home consumption and is used for sugar plant.

2.4 Sources of Raw Water

The raw water for the industry is taken from river sources as well as from bore wells. From these sources, water will be stored in the water storage tanks. Before being used, water will be demineralized in a water treatment plant (WTP), and demineralized water will be used in all the processes involved in the industry.

2.4 Sources of Effluents:

The wastewater generated from different sub-streams can be classified as follows;

1. **Mill House:** The effluent consists of water used for cleaning the mill house floor which is liable to be converted by spills and pleased sugar juice (This cleaning-up operation will prevent the growth of bacteria on the juice-covered floor). Water used for cooling mills also forms part of the wastewater from this source. This water contains organic matter like sucrose, oil, and grease from the bearings fitted into the mills.
2. **Boiling House:** The wastewater from the boiling house results from leakages through pumps, pipelines, and the washing of various sections such as evaporators, juice heaters, clarification, pans crystals centrifugation, etc. The cooling water from various pumps also forms part of the water.
3. **Boiler Blow-Down:** The water used in the boiler contains suspended solids and dissolved solids like calcium salts, magnesium salts, sodium salts, fatty salts, etc. These salts get concentrated after generation stream from the original water volume. These solids must be expelled in time to save the boiler from being covered by scales.
4. **Excess Condensate:** The excess condensate does not normally contain any pollutant and is used as boiler feed water and washing operations. Sometimes it gets contaminated with juice due to the entertainment of carry-over of solids with vapors being condensed in that case if goes into the wastewater drain. The treatment requirement, in this case, is almost negligible and can replace freshwater or let out directly as irrigation water after cooling it to ambient temperature.

CHAPTER 3

EFFLUENT TREATMENT PLANT

The industry will discharge 1000 m3/day of effluent from different sources of sugar manufacturing.

- Quality of treated water maintained as per standard parameters of treated effluent.
- Under any circumstances stringent regulatory norms for discharge are met.
- As far as possible it keeps the environment clean and free from contamination.

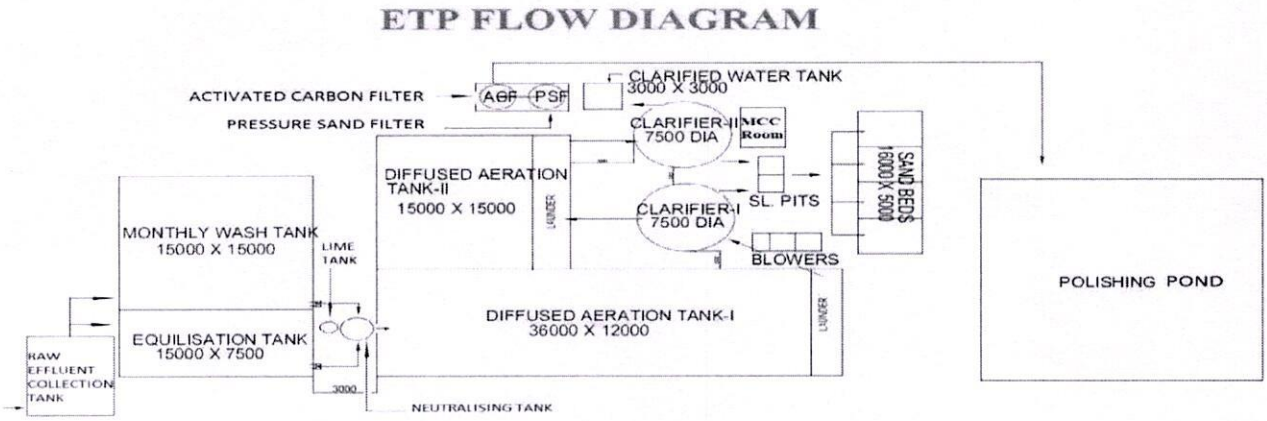

Fig 9: ETP Flow Diagram

DATA

The wastewater treatment plant is designed based on the following considerations

- Characteristics of wastewater
- Quantity of wastewater.
- Prescribed standards for discharge of wastewater.

The effluent treatment plant is designed for a higher quantity of effluent keeping a provision For future expansion (5000 TCD&30 MW).

CHARACTERISTICS OF SUGAR INDUSTRY EFFLUENT

Sl. No	Parameter	Units	Untreated Effluent Values	Treated Effluent Values	Standard Norms	Inland Surface Water	Land For Irrigation
1	Flow	m3/day	1000				
2	pH		5.5	7.2	6.5-8.5	5.5-9.0	5.5-9.0
3	Temperature	°C	40	30	25-30	-	-
4	Total Dissolved Solids (TDS)	mg/L	1850	1368	<2000	-	-
5	Total Suspended Solids (TSS)	mg/L	180	30.56	<300	<100	<100
6	Biochemical Oxygen Demand (BOD)	mg/L	1560	17.27	30-100	<30	<100
7	Chemical Oxygen Demand (COD)	mg/L	1850	52.33	150-250	<250	-
8	Oil and Grease	mg/L	30	10	<10	10	<10

TREATMENT PROCEDURE

The mill plant effluent contains oil and fiber in large concentrations.

This effluent is therefore subjected to de-skimming operation in the mill plant itself to free it from oil and fiber, and then mixed with other factory effluents. The combined effluents are treated in preliminary and secondary treatment as described below. The flow diagram of the effluent treatment plant is given in the figure. The excess vapor condensate which is let to form the plant is collected separately in a storage tank. This is of relatively good quality and is suitable for irrigation. It is tested for quality and reused and excess is then let out for gardening in factory premises or to agricultural land for irrigation.

Preliminary treatment

Combined effluent through a common drainage leads to the effluent treatment plant. It is passed through a bar screen, grit chamber, and oil separator and then received in a neutralizer cum equalization tank of about 30 min hold-up capacity. Alkali is added into the neutralizer to raise the effluent pH to about 7.5 to about 7.5-8.0 and also to precipitate some of the dissolved solids. The neutralized effluent is passed through the primary clarifier of a 2.5 to 3.0 hr detention period. The sludge collected at the bottom is pumped to the sludge drying bed for dewatering.

Secondary Treatment:

This consists of a stage-activated sludge process. Each stage consists of the aeration tank with a feed surface aerator and secondary clarifies. The effluent containing suspended biomass is clarified in respective secondary clarifiers. Biomass settled in the clarifiers is recycled to the aeration process to maintain the concentration of mixed liquor suspended solids (MLSS) in the aeration tank at the desired level. The excess biomass (sludge) from the secondary clarifier is passed to sludge drying beds. The clear effluent from the last clarifier is collected in a polishing pond of about 4 hours capacity and then let out to agricultural land for irrigation.

Neutralizer/sump:

The sump is constructed of stone/brick masonry. It is provided with a mechanical agitator. The neutralized effluent is pumped into the aeration tank. The tank is all so used as an equalizer tank to take care of shock loads in the plant.

Lime preparation tank:

It is a R.C.C. rectangular tank with a hopper bottom. The tank is provided with a mechanical Agitator. An additional tank of 800 liters capacity is also provided to the solution for subsequent feed to the neutralizer.Pumps are of C.I., non-clogging type with self-priming arrangement.

Flow water

Weir and float type of flow measuring device with dial type flow indicator is provided to indicate the flow rate of treated effluent in the gutter

Polishing Pond

The tank is rectangular in section and constructed of SSM work. The tank interior is plastered and smooth-finished. The tank is provided with inlet and outlet chambers. The effluent after the treatment will be stored in the polishing tank and from here treated water is pumped into fields for the irrigation purpose. It is also called an online monitor tank, from here parameters such as BOD, COD, pH, and temperature values will be sent to KSPCB after every 15 minutes.

CHAPTER 4

SUMMARY

Shree Balaji Sugars and Chemicals Pvt Ltd started sugar crushing in year 2011 with capacity of 5000 TCD. Now it is the one of the producer of Alcohol , manufactures sugar and alcohol based chemicals. The distillery uses sugarcane juice, syrup and molasses to produces different products like rectified spirit, ethanol and ENA. The company also utilizes by-products to produce Biogas, manure and electricity.

In sugar plant, the wastewaters like condensate water and cooling tower blow down are treated in Water Treatment Plant (WTP). The wastewater from mill house and sugar manufacturing is treated in Effluent Treatment plant along with domestic sewage. This treated water reduces fresh water consumption by recycling the 90-95% of wastewater. The bagasse a residual from sugarcane is used for production of useful power or electricity by burning it in as fuel boiler. The fly ash collected from burning bagasse in boiler is used in manufacturing of bricks. The press mud also used for bio-composting.

The Balaji Sugars has adopted "Zero Liquid Discharge (ZLD)" system to reduce waste generation economically and produce suitable products for reuse. This is also helps saving money and being beneficial to the environment.

Observations:

- Balaji sugars and chemicals is bio-refining company that uses byproducts from industry processes and produces new products which are environment friendly.
- Balaji sugars and chemicals has adopted "Zero Liquid Discharge (ZLD)" to reduce wastewater economically and produce clean water that is suitable for reuse, there by saving money and being beneficial to the environment.
- During internship I observed that safety of employees is the first preference in this industry.
- Employees in the industry get better facilities like quarters, school, hospital and canteen.

EXPERIENCE

The Balaji Sugars and Chemicals Pvt Ltd is one of the bio-refining industries in India. It is my pleasure to say that I had internship training in such esteemed industry for period of 8 weeks. During my internship training I got an opportunity to work and get hands on experience of industry processes. The factory has been pioneer in sugarcane growing, processing

I am very thankful to the concern and co-operation extended by officers, staff and employees of Balaji sugars and chemicals pvt ltd. I hope Balaji sugars and chemicals will accomplice all of its objectives and flourish in future and grow as one of the biggest sugar manufacturing company in the India

Inauguration of The Sugar Manufacturing Process by Guests of Shri Balaji Sugars & Chemicals Pvt.Ltd Yaragal

Figure 1 Welcome to Guests by Priyanaka Hosamani

Figure 2 Explaining about Factory and their services

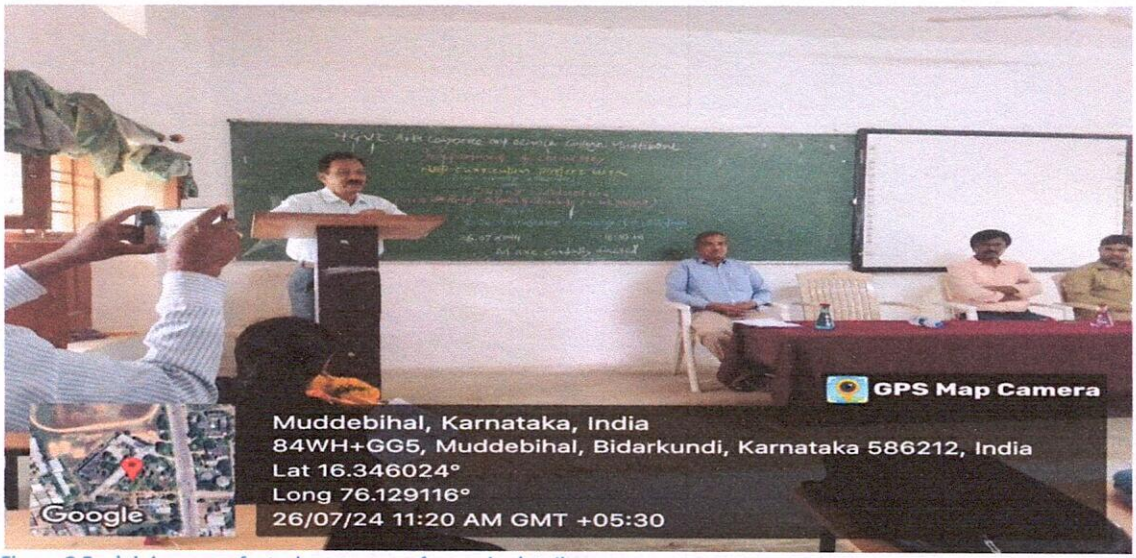

Figure 3 Explaining manufacturing process of sugar in detail

Figure 4 Project group members, faculty with the guests

PHOTO GALLERY

Figure 5 students at various sites in the sugar industry

Figure 6 Students at various sites at the sugar industry