ISSN NO : 2230-7850 IMPACT FACTOR : 5.1651 (UIF) VOLUME :8, ISSUE : 6, JULY- 2018

INDIAN STREMS RESEARCH JOURNAL

INNOVATIVE TECHNOLOGIES USED IN A SUGAR COMPLEX

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ABSTRACT

The world's second-largest sugar producer is India.The largest agribusiness in rural India is the sugar industry. Since sugarcane is a cash crop, growing it contributes significantly to the socioeconomic development of the farmer community by generating income and jobs.

KEYWORDS: *sugar industry , cash crop , sugarcane.*

INTRODUCTION

It goes without saying that the sugar industry serves as the foundation of the rural economy in at least a dozen states.We are utilizing the most recent technology to reduce production costs and increase productivity.Nowadays, we are moving toward the idea of integrated industrial complexes that include fuel-ethanol distilleries, sugar plants, and cogeneration (power) plants.The majority of the most recent technologies utilized at various stages are as follows (though this is not an exhaustive list):

BAGGASE DRIER UNIT

The sugar industry sells the excess power it generates to the national grid for internal use.An important industrial strategy for increasing the sugar industry's earnings is to improve the boiler's use of fuel, such as bagasse.Due to the reduction in bagasse moisture, boiler efficiency can be significantly improved with the use of bagasse driers.

Few Indian businesses have developed their own Bagasse Drier units to reduce bagasse's moisture as much as possible before feeding it to boilers.As a waste heat recovery strategy, the system uses flue gases as the heating medium for bagasse drying.

The last Milling tandem's bagasse usually has a moisture content of 49 to 50 percent.According to reports, factories have seen a

drop in bagasse moisture of between 8 and 10 percent following the installation of a bagasse dryer. This means that the final bagasse moisture level after drying is between 40 and 42 percent.The steam-to-fuel ratio is significantly improved as a result of an increase in boiler efficiency of approximately 4%.

2. MOISTURE CONTROL UNIT (MCU)

In terms of milling and plant efficiency, the percentage of moisture in bagasse is very important.

In this field, a lot of work has been done.MCU, in contrast to Bagasse Drier units, is a system designed to reduce bagasse's moisture content to some extent.

The Moisture Control Unit is producing encouraging results, suggesting that it could be utilized to boost the plant's overall profitability.

"Dampness Control Unit" is intended to lessen dampness of bagasse emerging from release nip of each plant which brings about extra waste ofjuice and lessens last bagasse dampness.In the end, this makes the tandem as a whole perform better in terms of mill extraction and bagasse moisture percentage.

PERFORMANCE / RESULTS ACHIEVED/REPORTED

1.The peak reduction was 2.5-3.5%, with an average reduction of 1.5-2 units in the moisture percentage of final bagasse.
2.RME will rise.
3.The ratio of steam to bagasse is said to have increased by about 3%.

ADVANTAGES OF MOISTURE CONTROL UNIT ARE:

1.reduction in the percentage of moisture in the finished bagasse.
2.Expansion in Juice waste at release nip, especially at heel clearanceof rubbish plate.
3.Allow for an increase in fiber consumption.This contributes to the reduction of bagasse pol, and the moisture percentage of bagasse can continue to be maintained even after an increase in imbibition.
4.Controlling juice resorption in mills.
5.RME, mill extraction as a whole, up.
6.Even when the cane is uncompressed, juice can be extracted at the discharge nip in the event of a lower crush rate.
7.Juice spitting from the mill's discharge nip is eliminated.
8.Bagasse's GCV will rise as a result of a lower moisture content, which will result in significant improvements to boiler efficiency and the steam to bagasse ratio.
9.More commodity of force.
10.There is no need for additional external electrical drive.

3. HIGH PRESSURE BOILERS

The way that expansion in heater pressure expands the steam fuel proportion is anestablished one.This rise in the ratio of steam to fuel is primarily attributable to the higher boiler efficiency and the

higher feed water temperature achieved through regenerative heating (the Regenerative Cycle Efficiency is greater than the cycle efficiency without regeneration).In general, while other system routes remain unchanged, high pressure cogeneration has a higher system efficiency or power plant efficiency than low pressure.

According to the observations, the boiler pressure at 125 ata produces nearly three times as much power as the boiler pressure at 45 ata.

4. AUTOMATION

A Distributed Control System, or DCS, can be used to control and automate the sugar manufacturing process.The following are some common types of automation utilized in the sugar industry:

a) Control of the speed of the bagasse belt conveyor;
b) Control of the speed of the mill drive;
c) Control of the operation of the boiler;
d) Control of the operation of the turbines;
e) Control of the raw juice flow;
f) Control of the juice flow stabilization system;
g) Control of the process temperature;
h) Control of the juice pH;
i) Control of the chemical dosing system;
j) Control of the feed into the vacuum pans

5. STEAM ECONOMY DEVICES

System for Central Flashing:Through the Central Flashing Device, condensate is flashed from one effect to another to effectively recover the additional heat and reduce vapor consumption.

Condensate Warmers: Overabundance heat in condensate was to be recovered which in any case is squandered in climate at kettle station.

Heaters for direct contact juice:utilizing Direct Contact Juice Heaters for their low temperature approach and simple maintenance.

Molasses Conditioners for perfect crystal dissolution by heating molasses in direct contact under vacuum.

System for Highly Heated Wash Water:For Batch Centrifugal Machines, a hot water spray shot was heated by live steam and replaced by PTHE with second body condensate, which was heated by first body condensate and reached temperatures of 110 to 1120 C.B and C sugar is typically melted using steam and hot water.

Sugar Melter, on the other hand, was made to melt the sugar with hot water or superheated wash water to save steam.

Pan Cleaning: To prevent massecuite circulation and the formation of secondary grain, washing is essential for effective Batch Pan Operations.The majority of the time, exhaust steam is used for washing.Instead, vapors of Effect 1 have become increasingly popular for this purpose.

SCADA (Supervisory Control and Data Acquisition) is a system for automatically controlling process parameters to save energy.

6. ENERGY CONSERVATION:

A.C. motors that are operated by VFDs have been chosen because they have the following advantages:

i. The best (99 percent)
ii.Saving the most energy
iii.From a slow speed to a high speed, torque will remain constant

iv.The power factor will be close to unity in
v and less harmonic in
vi.Due to a lower harmonic vii and a higher power factor, power quality will improve. Lower costs for upkeep

Other Energy Efficient Measures employed:

- Mills, boiler, TG Set, and the refinery section are all fully automated.
- VFDs at the boiler ID fan, truck tipper, and cane carrier. P Planetary drives all crystallizers, Magma Mixers, Pugmills, and other equipment in the boiling house.
- Cane unloaders with hydraulics.
- H.T. motors changed the drive for the fibrizor.
- Construction of an energy-efficient super gravity plant for the production of raw sugar.
- a falling film pressure evaporator with three effects.
- The vertical continuous pans of the cascade type for massecuite boiling in A, B, and C Crystallization with constant cooling in a vacuum.
- optimizing after measuring all of the hot water added to the plant.
- Condensate flash heat recovery system, including clarifier flash.
- All molasses is heated and conditioned by gases that cannot condense.
- Utilization of condensate heat by means of tubular or PHE heaters.
- Heaters with direct contact for heating syrup, melting molasses, and conditioning molasses.
- Melt Concentrator to raise the melt brix to at least 74 and Evaporator Bleeding to raise the syrup brix to at least 70. When possible, replace the water addition with juice or molasses.
- At the second and third effects, Robert bodies were replaced with falling film evaporators.
- Seed magma for An and B massecuite.
- Reduced use of auxiliary steam at the power plant

7. SHORT RETENTION CLARIFIERS

The following are the clarifier's primary operational features:

- The juice only stays in the clarifier for 45 to 50 minutes.
- Requires a Continuous Feed of Sulfited Juice at Temperatures Between 103 and 104 °C Flash Tank — The function of the flash tank is crucial for setting the mud because it requires the complete flashing of the vapour through its chimney.
- With juice flow, flocculent dosage must be automated.

ADVANTAGES:

- Clear juice has better transmittancy, less turbidity, and a shorter retention time for good clarification.
- As a result, there is less of a chance of sucrose inversion loss.
- Because there is less heat exposed and less juice holding volume, there is less temperature drop.
- Formation of compact mud for improved filter/decanter performance.

- Less formation of coloring matter as a result of a decreased danger of heat exposure.
- Can be used to clarify cane juice, secondary juice, filtered juice, sweet sorghum juice, and beet juice in a variety of ways.
- Can be used at a higher level with minor adjustments

8.DECANTER SYSTEM FOR MUDDY JUICE TREATMENT

Construction The solid bowl decanter technology is widely used in oil, dairy, chemical, water, and sewage treatment, among other industries.and has been around for more than a century worldwide.

In point of fact, the growing awareness of the importance of power for the sustainable growth of the sugar industry has prompted the search for alternative technologies that use less power and divert more than 1% of the cane of bagasse for additional electric power generation.

Technology

The decanter, despite being a centrifugal machine, does not have any perforations over the rotating basket. This is in contrast to the conventional centrifugal machine, which is used to separate sugar crystals from mother liquor in either a batch or continuous process. In this machine, mother liquor is separated by applying centrifugal force through the screen openings.The fundamental idea behind using centrifugal force to separate liquids from solids is the same everywhere.The only difference is that when insoluble solids are subjected to centrifugal force, they separate from the liquid and move toward the inside of the bowl, where they are continuously pushed by a rotating helical scroll toward the discharge end.Through tungsten carbide bushing-equipped discharge ports, the cake is continuously discharged.Through a concentric opening, the juice that has been decanted is continuously removed.

9. FALLING FILM EVAPORATORS

Due to their short retention time, high temperature operation, improved heat transfer coefficient, and low energy consumption, these relatively new evaporators have gained popularity in the sugar industry.Falling film evaporation is one of the most energy- and cost-effective evaporation techniques.It is particularly suitable for providing low energy consumption.A falling film evaporator may have one or more sequential liquid stages.The concentration of dry solids will rise throughout the plant if multiple stages are used.When compared to a single liquid stage plant, this results in a lower average concentration and a lower need for heating the surface.The utilization of a perforated plate positioned above the calandria's top tube plate is typically the basis for falling film distribution.

At this point, flash vapor is produced, which sometimes speeds up the process of spreading the liquid to each tube.The film is "going with gravity" rather than "against it" in the falling film evaporator, which is a benefit.This results in thinner, more rapid-moving film and a product contact time that is even shorter.The external heating of the tubes causes the liquid film to boil and partially evaporate.In the lower part of the calandria and in the centrifugal dropletseparator downstream, liquid and vapour from the residual film are separated.It is fundamental that the whole film warming surface, particularly in

thelower areas, be uniformly and adequately wetted with fluid.If this isn't the case, dry spots will form, which will cause deposits to form and incrustation.A suitable and well-designed juice distribution system is essential for complete wetting.

The primary advantage of falling-film evaporators are:

• Good heat transfer coefficients at reasonable temperatures
• Large heating surface in a single body
• Low product hold-up
• Small floor space requirement The primary drawbacks are as follows:
• Recirculation is typically required
• A high headroom requirement

10.FALLING FILM PLATE TYPE EVAPORATORS

The coil, typically made of copper oraluminum, is embedded in the plate of plate-type evaporators to create a flat surface.The plate-type evaporator looks like a single plate from the outside, but the metal tubing that the fluids pass through has multiple turns inside.

The external plate provides a great deal of safety, making the plate-type evaporators more rigid.Additionally, the external plate enhances heat transfer from the substance to be treated to the metal tubing.Further, the plate kind of evaporators are not difficult to clean and can be produced efficiently.Frame plate (Head), pressure plate (Follower), carrying bar, lower bar, and column make up the heat exchanger.The plates are pressed together with tightening bolts.This varies from application to application and is dependent on the kind of heat exchanger.The plates in the plate package have grooves all around the ports and along the rim of the plates.The required thermal output determines the number, size, and dimension of the platesis.Plates made of titanium or stainless steel may be used, depending on the situation.The unique gasket is held in place by the plate groove.This gasket prevents the media from mixing together and leaking to the outside.

OUTSTANDING FEATURES

• Warming surface of up to 1,200 m² per unit, 3m² per tape
• Conservative plan, straightforward activity
• Short home season of the item in the unit
• Adaptable execution transformation ability by shifting the number ofcassettes
• Sponsor arrangement doesn't need a different snare

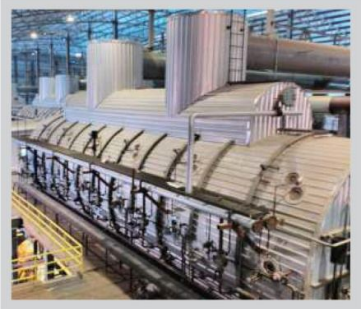
ADVANTAGES

- No pan vapors are lost.
- Using vapours at a low temperature and pressure.
- Low energy and water prerequisites.
- Outstanding values for the overall heat transfer coefficient.
- Differences in low temperatures across the heating surface.
- Reduce scaling caused by evaporation at low temperatures.
- The juice's brief residence time in each effect.
- A lack of juice coloration.
- Compared to conventional evaporators, they are lightweight.
- Minimal piping and pumping of vapour.
- Simple to maintain.

11. HYDROJET CLEANING OF EVAPORATORS TUBES:

In most cases, evaporator bodies used to concentrate juice need to be cleaned frequently to keep their heat transfer coefficient the same.Chemical cleaning (using alkali or acid boiling) is the most common method of cleaning evaporator tubes, followed by mechanical cleaning with a cutter and brushes.The heavy load of effluents on the ETP and the shorter equipment usable life are both advantages of this method.Sugar factories can use the hydrojet cleaning technique to clean their tubes if it works well for them.The hydrojet cleaning method's viability and comparative advantages over conventional methods must be investigated.

12.CONTINUOUS VACUUM PANS



In the sugar industry, continuous vacuum pans have now established themselves.They offer significant advantages, such as reduced supervision, improved exhaustion, crystal uniformity, and benefits to steam economy.Production of even crystal sizes, the absence or avoidance of encrustation, lump formation, and energy consumption are the most important criteria for a successful Continuous Vacuum Pan.The main benefits are:

Product and crystal quality have been improved, as have energy efficiency, exhaustion, operator and space savings, and control simplicity.

13. SUGAR REFINERY (DEFECO – MELT PHOSPHATATION FOLLOWED BY ION EXCHANGE RESIN)

India primarily produces Plantation White Sugar (PWS), but in recent years, in response to rising demand, the majority of factories have switched to producing refined sugar through the Defeco Melt Phosphatation and Ion Exchange Process.The entire procedure can be pictured as follows:

a) Juice extraction
b) Clarification of raw juice by defecation using heat and lime
c) Concentrating syrup to 68-70 Brix
d) Production of washed raw with 99-99.3 percent Pol and 400-600 ICUMSA
e) Melting washed raw to 60-65 Brix
f) Clarifying by phosphorization as primary decolorization
g) Filtration through a multi-bed filter to capture 5 micron particles
h) Normal B and C boiling to maximize sugar recovery

14.EMERGING TECHNOLOGIES: (HIGH PRESSURE ABSORBENT)

(HPA) High performance absorbent and powered activated carbonas are similar in that their color removal mechanism is adsorption.However, HPA has numerous additional advantages, including a larger surface area (> 1500 m2/gm) and improved pore configuration, which enables more effective adsorption in a sugar solution.HPA has integrated specific chemical groups onto its surface, enhancing its capacity to remove the impurities that PAC has difficulty removing. This is another significant distinction between normal PAC and HPA.Because of these characteristics, HPA performs better and removes the same amount of impurities at lower doses, making it the most cost-effective and least hazardous to dispose of.

The benefits of HPA are as follows:

1.When compared to other filters, which operate at 55-60 brix, the Membrane Filter operates at higher liquor brixes, reaching 64-65.
2.Single unit which does the coarse, fine filtration, de-improving, Squeezing,Drying and Cake releasing.
3.One unit that removes solid cakeIn auto mode, all operations are completed.
4.Due to strict filtration, the color of sparkling sugar.

15.WATER MANAGEMENT

Because the raw material, sugarcane, contains more fuel and water than is needed for sugar processing, the sugar production process is one of a kind.About 70% of the sugar cane crop is water. This water is used in our processes to reduce our reliance on river water, which is recognized as a resource.In addition to producing sufficient steam and power for sugar processing and molasses distillation, sugar cane's excess fuel in the form of fiber exports excess power to state grids.Sugar cane's water content is sufficient for sugar processing, and excess water can be used to partially satisfy the needs of distillery and cogeneration units.

There are a number of methods for conserving water, such as:

Utilizing high-quality condensate to meet a variety of process requirements and, if necessary, cooling and treating high-quality vapour condensates in order to use them in place of raw or fresh water are all examples of closed-loop recirculation.

Utilizing dry cleaning for floors and providing UGRs and lagoons with adequate capacity for the storage of various types of water are just a few of the measures that can be taken to reduce waste.

16.FINAL MOLASSES COOLING SYSTEM

Final molasses is the mother liquor from the final stage of crystallization, where sugar cannot be economically recovered.

Since molasses storage is so important from a business standpoint because of its potential to generate revenue, our goal should be to ensure that the right conditions are maintained both before and during its storage. This means avoiding both qualitative and quantitative losses.

DRAWBACKS OF HIGHER FINAL MOLASSES TEMPERATURE

Even though the total sugar in molasses is sufficient, the distillery's recovery of alcohol frequently remains low.This could be because there are a lot of reducing sugars that aren't fermentable.These are the condensation products of amino acids and their amides with reducing sugars, which result in the formation of non-fermentable reducing sugars even at a pH below 7.0.

They are formed by the action of lime and heat, and they reduce Fehling solution, resulting in positive rotation and a high pol and high purity reading for molasses. On a dry basis, 4.67 percent of pol is caused by reducing sugars, which contributes 3.3%.As storage temperature rises, this fermentable reducing sugar transforms into non-fermentable reducing sugars (NFRS).This loss of fermentable reducing sugar rises only marginally between 35 and 40 degrees Celsius.According to reports, the decomposition was quadrupled

by a rise of 10 0C.With an increase in juice's nitrogen content, such as an increase in amino acids and amides, the most rapid decomposition occurs above 450 degrees Celsius.

Additionally, the chemical transformation of reducing sugars and amino acids is an exothermic reaction that results in the production of CO2 and the release of heat.The surrounding molasses heats up as a result of the heat, and as the temperature rises, so does the rate of the reaction.Consequently, the temperature continues expanding and eventually brings about molasses transforming into dark strong mass.Maillard Reaction is the name of this reaction.

Therefore, Molasses should be properly cooled prior to storage to prevent such transformations, which could result in significant losses.

By maintaining optimal conditions during molasses storage and a lower storage temperature, it is anticipated that we can achieve a gain of 1.5 to 2% TRS, or a recovery gain of 0.9 to 1.0% in the distillery.

17.DISTILLERY SECTION – MULTI PRESSURE DISTILLATION TECHNOLOGY

Multi-Pressure (MPR) Distillation, which employs a variety of heat integration techniques to ensure the plant's optimal economic operation, is the most recent distillation technology.

Multi-Tension Refining framework has seven refining sections operatingat different tension circumstances.In order to optimize the operation for energy consumption, heat energy from columns operating at high pressure is applied to columns operating at low pressure.

Benefits of Most recent Multi-pressure Refining Innovation

- Energy proficient Multi-pressure Refining framework with a steamconsumption of 2.2 to 3.2 kg/lit of all out soul (contingent upon mode ofoperation and finished result)
- Ideal intensity reconciliation to preserve energy
- Vacuum activity almost takes out scaling issue in Wash columnand guarantees better division of pollutants, which results into betterquality item

18.FERMENTATION EFFICIENCY

DESIGN OPTIONS FOR FERMENTATION

In distilleries, there are primarily three types of fermentation processes used:

Batch fermentation: In batch fermentation, the sugar concentration of the feed material is adjusted by diluting it.This diluted substrate is inoculated with yeast, and fermentation is permitted.

Continuous fermentation: In continuous fermentation, equal volumes of fermented mash flow continuously out of fermentors and into distillation for alcohol recovery.Only at the beginning of the fermentation process is yeast inoculated.

Fed batch fermentation: Prior to inoculation, a small amount of liquid (water or substrate) is added to the fermentation tank.Until the tank reaches its working volume, the substrate is added in a controlled manner. Profits and fermentation efficacy will rise as a result of effective yeast management and strategy.Although yeast is a relatively insignificant expense (less than 1%), it has the potential to significantly impact overall production costs.

19.MOLECULAR SIEVE DEHYDRATION TECHNOLOGY

Absolute alcohol is a crucial product that the industry requires.It is almost entirely pure alcohol and does not contain any water, as specified by IS.The rectified spirit that is used to make alcohol is 94.68% alcohol, and the rest is water.Straight distillation cannot be used to remove any remaining water from rectified spirit because, at this concentration, ethyl alcohol and water form an azeotrope, a constant boiling mixture.Thusly, exceptional interaction for evacuation of water is expected for assembling of outright liquor.

The following is the most recent method for dehydrating alcohol using molecular sieves:

MOLECULAR SIEVE DEHYDRATION:

The salient features of the process are given herewith:

I) Dehydration with Molecular Sieve Process

In the feed superheater, steam is used to superheat the rectified spirit that comes from the rectifier.One of the two molecular sieve beds receives superheated rectified spirit from the feed superheater for several minutes.The flow of superheated rectified spirit vapor is switched to the other bed of the pair on a timed basis.The loaded bed is regenerated with a portion of the anhydrous ethanol vapor that leaves the fresh adsorption bed.After the ethanol-water mixture that was regenerated has condensed, a vacuum pump that is operating applies a moderate vacuum.The recycle pump moves this condensate from the recycle drum to the Rectified Column in the hydrous distillation plant.Product storage receives the condensed net make of anhydrous Absolute alcohol draw from the product condenser.

The molecular sieve may last between five and seven years.However, compared to azeotropic distillation, the operating cost is significantly lower.

MOLECULAR SIEVE ETHANOL DEHYDRATION TECHNOLOGY FOR FUEL ETHANOL

Azeotropic distillation is the foundation of the majority of ethanol dehydration plants used to produce absolute alcohol.It is a mature, dependable technology that can produce a product that is extremely dry.However, the use of azeotropic distillation in contemporary ethanol plants is practically nonexistent due to its high capital cost, energy consumption, reliance on hazardous chemicals like benzene, and sensitivity to feedstock impurities.Benzene used to be the preferred entrainer for ethanol dehydration, but it is now known to be a potent carcinogen.

Advantages of MOLECULAR SIEVE technology for ethanol dehydration are as follows:-

1.Because the fundamental procedure is so straightforward, it is simple to automate, which reduces the need for labor and training.

2.The process never moves.Since no chemicals are used, there are no issues with material handling or liability that could put workers in danger.

3.Ethanol-containing contaminants, which would immediately disrupt an azeotropic distillation system, are easily processed by molecular sieves.A well-designed sieve can dehydrate a wide range of other chemicals in addition to ethanol, offering more options for future operations.

4.The desiccant material for the molecular sieve has a very long service life and can only fail if the media gets dirty or is destroyed mechanically.Desiccant service life should exceed 5 years in a well-designed system.

5.It tends to be designed to work as an independent framework or to be coordinated with the refining framework.This allows the customer to choose between maximum energy efficiency and maximum operating flexibility.

6.The steam consumption rate can be slightly higher than the absolute theoretical minimum for the separation if it is fully integrated with the distillation system.

7.A well-designed molecular sieve can reliably dehydrate ethanol with a proof of 160 to 190+, eliminating the need for strict quality control over rectifier overhead products.

20.SPENT WASH INCINERATION TECHNOLOGY

- The rapid reduction of polluting organic material to a small volume of sterile ash by incineration is one definition.
- Power export generates more revenue than biocomposting.
- In the past, incinerator boilers were connected to back pressure turbines; today, however, these boilers are connected to a condensing cum extraction turbine in order to maintain power export during changes in steam or slope.

21. COMMERCIAL PRODUCTION OF CARBON DIOXIDE IN DISTILLERIES

Mono saccharides are transformed into ethanol and carbon dioxide during the fermentation of sacchariferous (sugar-containing) or hydrolysed amylaceous (starch-containing) materials.The majority of distilleries routinely release CO2 into the atmosphere.This is a wasteful way to get rid of this valuable fermentation industry byproduct.

To recover CO2 from a mixture of CO2 and air, a number of methods have been developed and adopted on a commercial scale.These are the main ones:

i. The Process of Sodium Carbonate ii.The iii Potassium Carbonate ProcessThe advantages of recovering CO2 in a distillery are as follows:

ii. Wealth generated from a distillery's waste product ii.Recovering CO2 and converting it into solid carbon dioxide (dry ice) or compressing it into cylinders in the form of liquid CO2 will stop the environmental imbalance that could occur as a result of too much CO2 entering the atmosphere iii.The distillery may see an increase in profits as a result of using CO2 in various industrial processes and products.

22.TREATMENT OF SPRAY POND OVERFLOW FOR REMOVAL OF SULPHATE:

Shower lake flood adds to significant piece of a sugar plant profluent.Because of the stringent CPCB standards, it is now necessary to treat spray pond overflow water to remove sulfate.The available technologies have yet to demonstrate their long-term effectiveness and cost-effectiveness.The available technologies must be studied and a suitable, cost-effective technology developed.

23.REPLACEMENT OF CONVENTIONAL CONDENSERS BY AIR COOLED CONDENSERS:

Air-cooled condensers may be able to take the place of conventional condensers, according to global technological advancements.The use of air-cooled condensers in this technology eliminates the need for a spray pond and water to create vacuum in the evaporator and pan.Not only will it solve the issue of spray pond overflow, which directly reduces the quantity of effluent, but it will also reduce water consumption.The sugar industry's suitability for such a system, its power consumption parameters, installation and operational costs, etc., require investigation.

CONCLUSION :

India's sugar industry is the foundation of the rural economy in at least a dozen states. We are utilizing the most recent technology to reduce production costs and increase productivity. Integrated industrial complexes include fuel-ethanol distilleries, sugar plants, and cogeneration (power) plants. Moisture Control Unit (MCU) is producing encouraging results suggesting that it could be utilized to boost the plant's overall profitability. System reduces dampness of bagasse emerging from release nip of each plant which brings about extra waste ofjuice and lessens last bagasse dampness.

REFERENCES :

1. *"Global Sugar, Sweeteners Market to Hit $97 Billion by 2017". Natural Products Insider. 18 April 2013.*
2. Solomon, Molly (17 December 2016). "The final days of Hawaiian sugar". US National Public Radio – Hawaii.
3. "IEA Energy Technology Essentials: Biofuel Production" (PDF). International Energy Agency. 2007. Archived from the original (PDF) on 15 June 2010. Retrieved 1 February 2012.