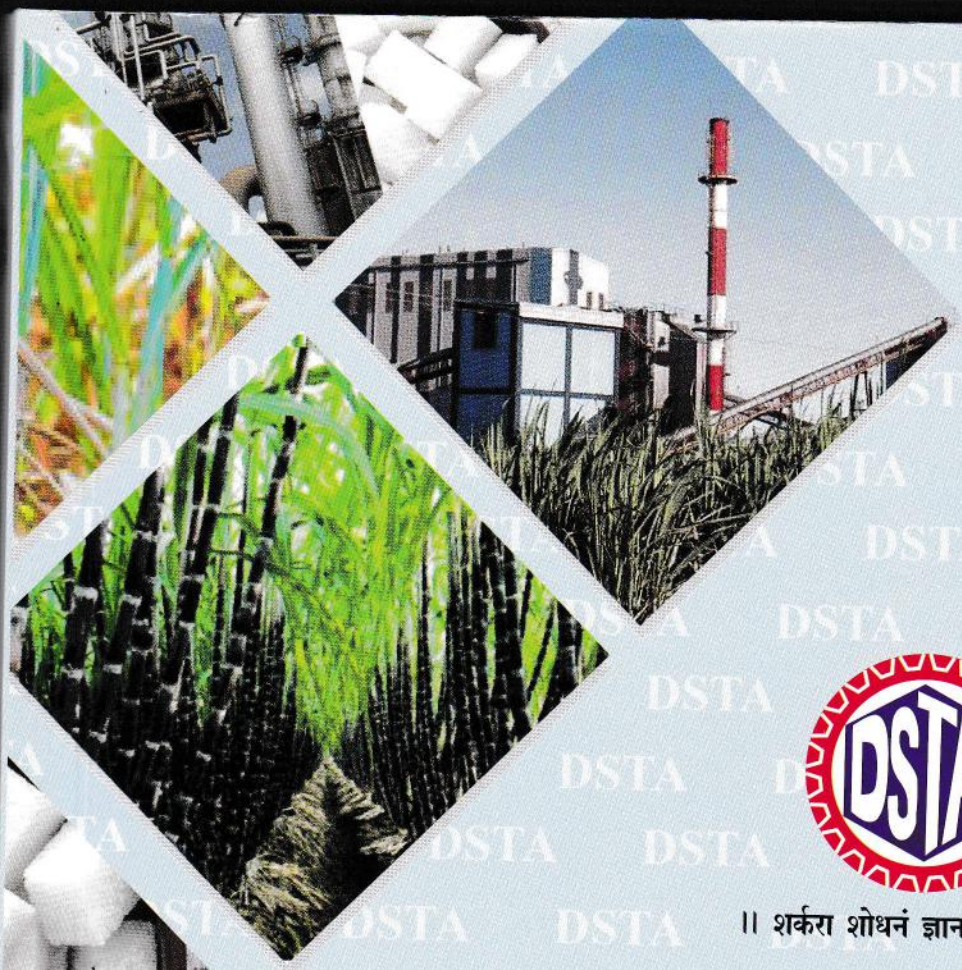

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Deccan Sugar Technologists' Association (India) Pune

66th Annual Convention on 30th & 31st October 2021

Yashwantrao Chavan Academy Of Development Administration (YASHADA)

Proceedings

DSTA HOUSE

17/1&2, Shivajinagar, Opp Old ST Stand, Pune 411005 E-Mail: info@dstaindia.com

The Deccan Sugar Technologists' Association (India)

AGRICULTURE & TECHNICAL PAPERS

submitted for discussion at the

66th ANNUAL CONVENTION - 2021

Published by

Mrs. Arati Deshpande
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THE DECCAN SUGAR TECHNOLOGISTS' ASSOCIATION (INDIA)
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Pune 411 005 (Maharashtra) INDIA
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Edited by
Shri C.G. Mane
Chief Editor

❖

Printed by
Vijay Design's
Shop No-40, Chintamani DSK Complex, A.B.C Chowk, Shaniwar Peth,
Pune, Maharashtra-411030
Mob. No.: 9850610316

BUSINESS OPPORTUNITIES IN SUGAR AND ITS CO PRODUCTS PROCESSING

V. R. Kaledhonkar, Prof. R. M. Pawar

Abstract:

Maharashtra Sugar Industry is one of the most notable and large-scale sugar manufacturing sectors in the country. Industry has been contributing nearly 35 – 40 % of India's total sugar production. The Sugar industry in Maharashtra is highly popular in the cooperative and private sector and now looking to new concept- integrated cane processing project (ICPP) which envisages simultaneously generation of electricity by excess Bagasse and ethanol directly from different feed stock besides the production of plantation white sugar.

However, the industry has been frequently facing economic crisis due to fluctuations in sugar prices and the rising demand from farmers for fair and remunerative prices. It is high time for the sugar factory to adopt production process of sugar factory inventory and to start processing of value added products like various Branded sugar and sweetener for the sustainability of the factory. Some of the business opportunities are discussed in this paper.

Introduction

Indian Sugar Industry : A Brief Overview :

Over the last 75 years, the sugar industry has steadily grown and become the backbone of the agricultural and rural economy in India. Today, sugar is the second largest agro processing industry, next to the textile industry. India is one of the largest producers of sugar in the world, with a production of over 30 million tons.

There are 682 installed sugar factories in the country with sufficient crushing capacity to produce around 30 million tons of sugar. The capacity is roughly distributed equally between private sector and co-operative sector unit. More than 4.50 cr. farmers are engaged in sugarcane cultivation and about 5 lacks rural people have got direct - indirect employment in the industry.

State Sugar Industry: A Brief Overview

Maharashtra Sugar Industry is one of the most notable and large-scale sugar manufacturing sectors in the country. Industry has been contributing nearly 35 – 40 % of India's total sugar production. The Sugar industry in Maharashtra is highly popular in the cooperative and private sector and now looking to new concept- integrated cane processing project (ICPP) which envisages simultaneously generation of electricity by excess Bagasse and ethanol directly from different feed stock besides the production

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of plantation white sugar

However, the industry has been frequently facing economic crisis due to fluctuations in sugar prices and the rising demand from farmers for fair and remunerative prices. It is high time for the sugar factory to adopt production business related sugar factory inventory and to start processing of value added products like various branded sugar & sweetener for the sustainability of the factory. Some of business opportunities related to above are discussed in this paper.

25 Top Small scale business opportunities in sugar industry.

Looking at store inventory of sugar factory (That is inventory required for maintenance, repair, overhaul or consumption during production process). It is observed that most of required material is received either by small/ medium scale industry or through traders. The inventory required for sugar industry can be classified as light engineering products & consumable chemical. The production of these inventory can be done in factory premises to reduce the inventory cost.

Light Engineering Products :

1) **Knives Manufacturing**:

Various type of knives are required for cane harvesting, cane chopping, cane leveling and & cane cutting. These knives shall be manufactured with special shock resisting steel having hard faced cutting edge of hardness 45 to 48 HRC.

2) **Chain & Chain Spare Manufacturing**:

Various types of chain are required for cane carrier, rack carrier,bagasse carrier the chain can be manufactured by steel as per IS specification. The breaking strength of the chains shall be minimum 40,000 kg for cane carrier chain, 60000 kg for rack carrier chain and 40000 kg for bagasse carrier. Chain spare like pin & bush etc.

3) **Slat Manufacturing:**

Different slats used for cane carrier, bagasse carrier & feeder table. All these slats are of 6 mm thick and shall be manufactured as per IS: 8236 and fastened to chain by bolts and Nylon nuts or by bolts and check nuts.

4) **Trash Plate & Scraper Plate**:

Trash plates and scraper plates are accessories of grinding mill and they can be manufactured as per IS specification and drawing given by factory in cast steel.

5) **Valve Manufacturing**:

Commonly Valves are used for starting or stopping flow, regulating or throttling flow, preventing back flow or relieving. Common valve types include: Ball, Butterfly, Check, Diaphragm, Gate, Globe, Knife Gate, Parallel Slide, Pinch, Piston, Plug, Sluice, etc. All these can be manufactured by small scale industry.

6) **Pumps & Pumps Spare Manufacturing:**

Pumps are used in the sugar industry for a wide range of applications like juice, syrup, molasses and water lifting pumps. Pumps are required to handle magma/ massecuite which are viscous material. Pumps are also used in sugarcane farms for irrigation. The common spares are impellers, pump shaft, shaft sleeves, O-ring and mechanical seal these can be manufactured in small scale industry and provided as per demand.

7) **Nut bolt making**:

Basically nuts and bolts are type of industrial fastener used in various types of machine and structure. Nuts and bolts consist of major link in the family of industrial fastener. It comes under light engineering products.

8) **Screen & Wire Netting Manufacturing:**

Stainless steel screen of various aperture required for rotary screen, DSM screen & vacuum filter and Nickel screen /brass screen of various opening are required for centrifugal machine. SS wire netting of various mesh as per IS standard is required for grading sugar. All these can be manufactured in small scale industries.

9) **Rubber Parts Manufacturing**:

Rubber belt of various fan & compressor, rubber gasket & rubber cord for various heat exchange unit, Rubber sheet of discharge valve & man holes, "O"ring &oil seal of pumps, star and tyre coupling of pumps, tyre wheel of hand cart etc..

10) **Conveyor belt manufacturing:**

Rubber conveyor belt is essential item for any continuous production process. In sugar factory it is used for bagasse handling, filter cake handling and sugar bag handling.For loose sugar handling food grade belts are required.

Chemical Products:

1) **Quick Lime Manufacturing :**

Lime is main clarifing regent for juice clarification is required either in the form of quick lime or hydrated lime for process. Quick lime can be manufactured by burning lime stone & coke in lime kiln at elevated temp. Hydrated Lime is powder form of quick lime after purification.

2) **Phosphoric Acid Manufacturing:**

It is used to maintain phosphate level in normal. Drought and flood affect cane juice & it can be produced from fluorapatite known as phosphate rock, $3Ca_3(PO_4)_2$, CaF_2, and concentrated (93%) Sulphuric Acid in a series of well stirred reactors. This results in production of phosphoric acid and calcium sulphate (gypsum).

3) **Mill Sanitation Chemical Quaternary Base:**

This chemical is used to kill mesophillic and thermophillic bacteria, leuconostoc, fungi and enzymes. All micro-organisms consume sugar and increase the sugar loss during milling operation. Quaternary ammonium compounds mill sanitation chemical is prepared by mixing Quaternary ammonium compound 40% with nonyl phenol and acids mixture in reactor with proper proportion.

4) **Mill Sanitation Chemical Acid Base (Per Acetic Acid):**

This is prepared by mixing acetic acid glacial, hydrogen peroxide, Sulphuric acid technical grade and DM water in reactor.

5) **pH booster making:**

It is used to raise the pH of spray or cooling tower water, it can be manufactured by homogeneous mixing of caustic soda, tri-sodium phosphate, sodium meta silicate and BKT 50%, mixing can be done in either reactor or manually.

6) **Viscosity Reducer:**

It is used to reduce viscosity of massecuite and molasses during crystallization process it can be prepared by homogenous mixing of caustic soda, acid slurry, urea and iso propyl alcohol by mixing in reactor or manually.

7) **Descalent :**

It is used to remove scale of heat exchanger like semi –kestner falling film evaporator. It is prepared by mixing hydrochloric acid, Rodin, nonyl phenol, octal phenol &acid slurry.

8) **Scale Softener**:

It can be used to soften hard scale and it can be prepared by mixing Washing Soda, Common Salt, Tri-Sodium Phosphate, Ammonium Bifluoride & Acid Slurry.

9) **Manufacturing of Dry Lead 'Sub-Acetate**:

This reagent is used for the clarification of sugar products for sucrose analysis. This is prepared as per DR Horne method i.e. treating lead (II) oxide with acetic *acid*. The consumption is about 500 kg per annum per factory.

10) **Sugar Slurry:**

This is mixture of sugar nucleus with alcohol.This can be prepared by sugar grinding mill or ball mill with alcohol. The consumption is about 500kg per annum per factory.

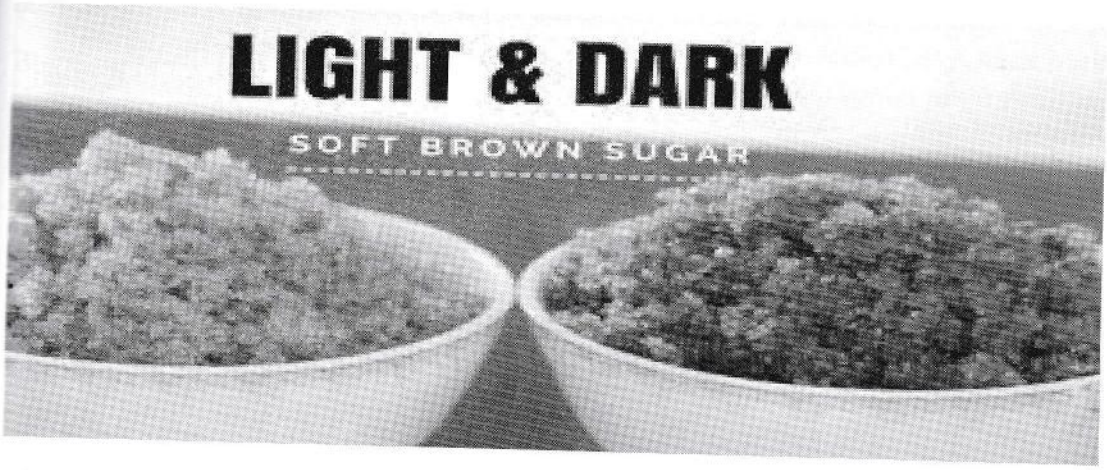
Production of Branded Sugar:

Different kitchen brand sugar can be produced by varying size, shape, color and flavor of white sugar. The branded sugar has good demand in super market. This is value added specialized product,the branded sugar is produced either from raw or white sugar. For production required very less investment in lack of rupees. But market is

very typical. Quality becomes buzz word to sell branded sugar.

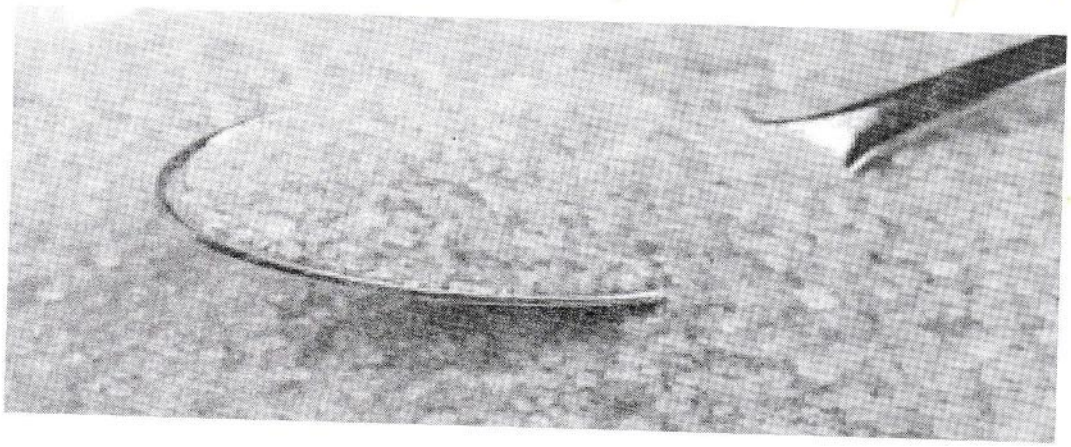
Kind of branded sugar and its use :

1) **Brown sugar(light & dark) –**



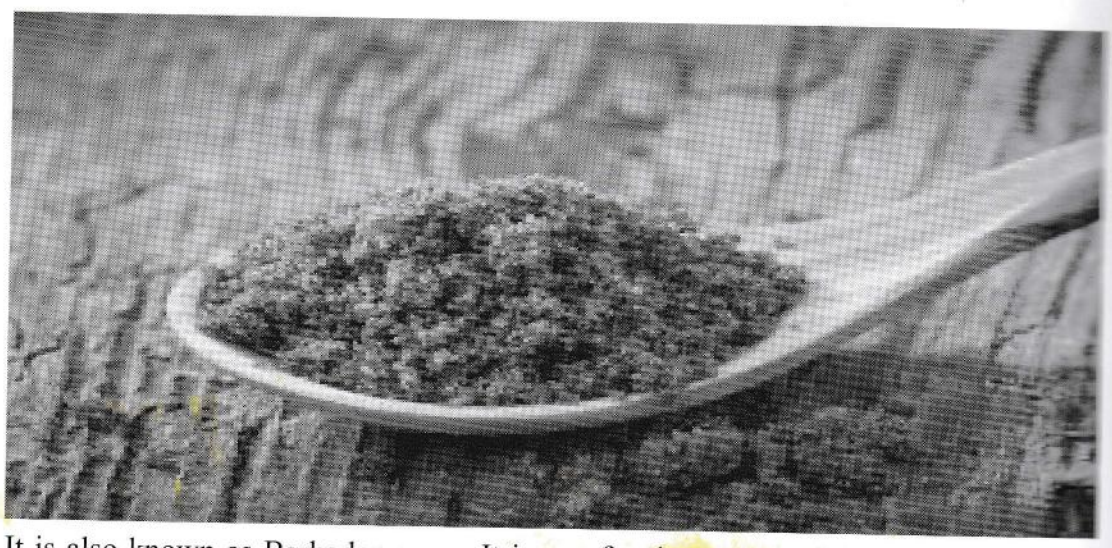
There are two types of brown sugar, light color and dark color ,light brown contains 95 % sucrose and 5 % molasses while dark brown contains 90 % sucrose and 10 % molasses. Molasses adds lovely toffee flavor and moisture. Sometimes light brown sugar is called as natural brown sugar & dark brown sugar is called as commercial brown sugar. Both brown sugars contain higher minerals due to presence of molasses. Brown sugar is used very similarly to granulated white sugar but it provides a touch of extra flavor. Common uses of brown sugar include sweetening bakery goods, beverages, sauces, and marinades. Some varieties of natural brown sugar are also used to make alcoholic beverages like Rum.

2)Damerara/Turbinado Sugar:



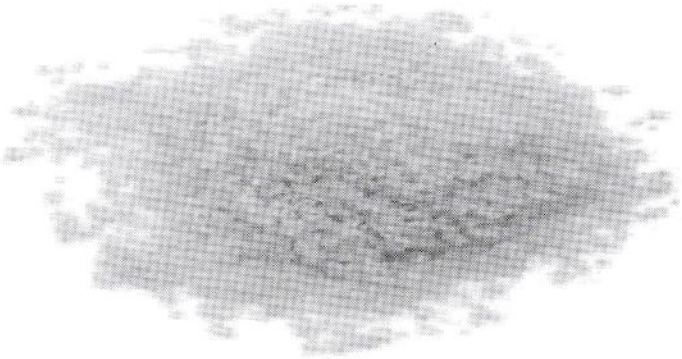
Damerara sugar is produced by mixing raw sugar and molasses. It has 93 % sucrose and 7 % molasses. Unlike light brown sugar, it has added molasses flavor, Damerara sugar is larger in size than brown sugar. It has large sparkling golden crystals and a crunchy texture Demerara sugar is also referred as Turbinad Sugar in many markets, it is low calories sweetner. Damerara is used in cooking and baking Traditionally used to sweeten coffee, it's perfect for sprinkling but can also be used for baking, particularly in things that needs extra crunchiness such as crumbles, cheesecake and biscuits.

3) Muscovado Sugar:



It is also known as Barbados sugar. It is unrefined cane sugar from which molasses is not removed it is dark brown and strong molasses flavor. It has moist texture and toffee-like taste. It is bolder in size and stickier than brown sugar. It's commonly used to give confections like cookies, cakes and candies a deeper flavor but can also be added to savory dishes.

4) Free Flowing Brown Sugar:



It is produced by boiling method or by blending method

Boiling method is traditional boiling strike in vacuum pan with low purity material of 88 purity and then removing partly molasses in the batch centrifugal and then drying and packing. While blending method is mixing white or raw sugar with molasses and then drying and packing.

Blending method reduces cost of clarification crystallization process and this method also reduces cost of centrifugal. It provides more flexible scheduling for both the process and packing departments, based on crew availability as opposed to pan availability .It allows for tighten tolerances in product quality control.

In general, blending offers a lower capital-cost than boiling method Maintenance costs associated with the blending equipment can also be expected to be less than that associated with vacuum pans, mixers, and batch centrifugal. Blending also offers the potential to make limited runs of special or custom-coated products, either by color or by panic size. At least 5 brand of brown can be produced. In international market there are 16 brands of brown sugar among them above 5brand are most popular.

5) Candy & Confectionery Manufacturing:

Candy is made by dissolving sugar in water or milk to form syrup, which is boiled until it reaches the desired concentration or starts to caramelize. The type of candy depends on the ingredients and how long the mixture is boiled. Candy comes in a wide variety of textures, from soft and chewy to hard and brittle.Machinery to make candy and hardboiled sugar confectionery is readily available and can be easily set up at any small premise. Furthermore, basic in manufacturers technology are readily available anywhere

6) Bottling Of Sugar Cane Juice:

Sugarcane juice is used as delicious drink in both urban and rural area. The fresh juice spoil within 4 hr hence addition of preservative and bottling is required. The manufacturing process consists following steps.

a) Harvesting of matured cane.
b) Cleaning of cane.
c) Submerging whole cane for five minutes in water trough at 85^0c temp
d) Soaking and cooling of cane.
e) Crushing of cane in three roller mill in which contact part of juice is stainless steel.
f) Filtration of juice, coarse and fine.

g) Mixing with extract of lemon /ginger/chilies as per requirement of batch.
h) Homogenization
i) Addition of Sodium Benzoate @125ppm as preservative.
j) Bottling & storing

The market is at bakeries, Drink Shops, Cinema theaters, Ice cream Shops, Tiffin Centers, Medium and large hotels, shopping malls, school/college/hospital canteens, super markets and etc.

Conclusion:

From above discussion it conclude that,It is high time for the sugar factory to adopt production process of sugar factory inventory and to start processing of value added products like various Branded sugar and sweetener for the sustainability of the factory.

Acknowledgement :

Author is thankful for organization & management committee of RCST who allowed us to publish this paper.

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NEED FOR TRAINING SUGAR INDUSTRY STAFF FOR EFFICIENT MANAGEMENT OF SUGAR FACTORY.

1) Magdum, A.V. 2) Tamboli, T.G.

Abstract

This paper is focused on the effect of training programmes and the scope of improvement of efficiency of the employees of the sugar industry. Rajarambapu College of Sugar Technology (RCST) has taken many initiatives to develop among the employees of sugar factories a strong sense of commitment and involvement with their organizations and their values by conducting a variety of training courses. The main objective of this paper is to identify the level of satisfaction received from the previous training programmes and the scope or area where more technical training is needed. The data for the research is collected through a questionnaire as the primary source. The core of the study is the analysis and interpretation of the data. It is found that staff training provided in RCST, Islampur improves the quality of work and efficiency of the system.

Introduction:

India has the second-largest hectarage under cane cultivation in the world and produces 300 million tons of cane sugar. In India sugar cane has become an industrial crop because it provides sugar, biofuel, fibre, fertilizer, and many by-products/co-products while maintaining ecological sustainability. Sugarcane juice is used for making white sugar, brown sugar (Khandsari), Jaggery (Gur), and ethanol. The main by-products of the sugar industry are bagasse, molasses, and press mud. Molasses is a by-product that is the main raw material for alcohol production and, thus, for downstream alcohol-based industries. Excess bagasse is now used as fuel in the co-generation plants for power generation. Press mud is commonly used for the production of compost fertilizer.

As such, the sugar industry comprises integrated cane processing units that produce sugar, alcohol, allied products, and energy. Therefore, the industry needs qualified scientists and technologists. At present, two institutes provide technical education related to the sugar industry. But these institutes are unable to meet the sugar industry's demand for trained personnel. Therefore, the need for an organization that that would satisfy all the scientific and technical needs of the sugar industry was felt. Hence the Government of Maharashtra and Shivaji University, Kolhapur took the initiative and permitted RCST Islampur to start such courses related to sugar industries.

Instituting effective training programmes as subsystems of an organization is the core

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function of human resource management. It ensures continuous skill development of employees working in the organization and habituates them to the process of learning for developing knowledge to work better. Training and development are the foundation for obtaining quality output from employees. A training programme is a structured programme in which various methods are designed by professionals for performing particular tasks. It has become the most common and continuous task for organizations for updating the skills and knowledge of employees to meet the demands of a changing environment. Optimization of cost of production with the available resources has become a pressing need for every organization and this will be possible only by improving the efficiency and productivity of its employees, which, in turn, can be achieved only by providing the employees proper training for their professional development. Therefore, it is essential that the training should be provided by professionals. Such a training facility is available at the Sugar Technology Institute at Islampur.

The development of the workforce is a key element in the successful operation of a company. The sugar industry in many countries is currently suffering from a skills gap as young graduates move away from agriculture and processing into the service industry. Therefore, companies must retain employees and create strong internal development plans to maximize the utility of the existing resources and attract new recourses.

Training and development within the industry should adopt a holistic approach that incorporates the development of industry and personal skills to lead to optimum productivity and achievements. The utilization of external expert resources for the industry and skills-specific training, such as agriculture training packages, operated by the related industry will significantly supplement internal training programmes by providing them a strong foundation. Training programmes should be industry-specific and combine theoretical with field training. Employees should be presented clear career development plan and targeted and rewarding skill enhancement that would maximise their commitment to the organisation.

Training is an investment in the means for attracting and retaining human capital as well as getting better returns from those investments. These returns are expected to improve performance, productivity, capacity, and innovation, which should result in the improvement of the skill base and increasing levels of knowledge and competence of employees.

The Hierarchy of the Skill Levels in the Markets Is:

i) **Unskilled:**
An unskilled employee is one who does operations that involve the performance of simple duties, which require little or no independent judgment or previous

experience although familiarity with the occupational environment is necessary. Such an employee's work may thus require, in addition to physical exertion, familiarity with a variety of articles or goods.

(ii) Semi-skilled:

A semi-skilled worker does work generally of a defined, routine nature wherein the major requirement is not so much of the judgmental skill but the proper discharge of assigned duties or relatively narrow job and where important decisions are made by others. Semi-skilled worker's work is thus limited to the performance of routine operations of limited scope.

(iii) Skilled:

A skilled employee is capable of working efficiently and exercising considerable independent judgment and discharging the assigned duties with responsibility. A skilled employee must possess a thorough and comprehensive knowledge of the trade, craft or the industry in which he is employed.

(iv) Highly Skilled:

A highly skilled worker is capable of working efficiently and supervises efficiently the work of skilled employees.

Objectives of this Study:

1. To know the need for technical training programmes in the Sugar industry.
2. To improve the efficiency of the staff by providing technical training.
3. Non-technical persons are motivated to upgrade the skill by completing a specific technical course.
4. To analyse individuals' and organizational development.

Case Study:

Sugar companies in Kenya face rapidly increasing and stiff competition due to the ever-rapid changing market environment. The general objective of the study was to establish the influence of technical training on the overall organizational performance of the sugar industry in the South Nyanza Zone of Kenya. This study used a descriptive survey design. The population of the study was the management staff in the respective industries, which constituted 278 management and technical staff at Sony Sugar Company Limited, 104 management and technical staff at Transmara Sugar Company, and 115 management staff and technical staff of Sukari Sugar Company, which totalled to 597 management staff and technical staff. The sample size comprised of 80 management staff and technical staff from Sony, 54 management staff and technical staff from Transmara, and 57 management staff and technical staff from Sukari Sugar Kenya Limited, adding up to 191 respondents.

This study employed stratified random sampling in which the population was first divided into three different industries, namely, Sony, Transmara, and Sukari Sugar Company. Thereafter, the respondents were drawn, using a simple random sampling technique, in proportion to their original numbers, into a sample to which questionnaires were administered as the main data collection instruments. Quantitative data were analysed using descriptive statistics, which include the mean, median, standard deviation, and percentages, and inferential statistics, such as multiple regressions. The study revealed that there was a positive linear relationship between technical training and organizational performance. Based on the findings of this study, it was recommended that a sound training philosophy should be established to encompass technical training.

Recommendations :

Based on the findings of the above study, the following recommendations are made: A sound training philosophy should therefore be established. It was also found that the need for technical training was inadequately addressed in sugar industries. Given that these are manufacturing and processing industries, technical training should be enhanced to give the companies the full benefit of their human and other resources. The management should set aside sufficient funds for this type of training and also institutions of higher learning should intensify research in it.

Such Training Programmes Are Offered by RCST Islampur:

This institute provides a wide range of UG and PG courses such as B.Sc. (Sugar Technology), M.Sc. (Sugar Technology), and M.Sc. (Alcohol Technology) and also one-year short-term certificate courses like DCS operator, Distillery Plant Operator, Sugar Engineering, Lab Analysis Courses, two-year courses like in Boiler Attendant's Diploma, Electrician's Diploma and one-year certificate courses in Instrumentation, Diesel Mechanics, Pan Boiling, Construction supervisor and an advanced diploma in Industrial Safety.

The main functions of the Institute are as follows:

(i) To provide technical education and training in all branches of sugar chemistry, sugar technology, sugar engineering, and allied fields;

(ii) To undertake research on (a)problems in sugar technology, sugar and sugarcane chemistry, and sugar engineering in general and that of sugar factories in particular, (b)utilization of by-products of the sugar industry.

(iii) To give technical advice and assistance to sugar factories to improve their efficiency and to assist and guide them in solving their day-to-day problems.

Conclusion :

To conclude, training today has become an integral part of any company's operations.

Since competition and technological changes are accelerating day by day, there is an ever-increasing shortage of adequately educated and trained human resources. It means that companies must organize a total training system to utilize all the available human resources to their maximum capacities. The employees trained through such programmes can be promoted to take up challenging assignments. It is always essential for an organization, whether big or small, to have a comprehensive training policy. Training enables the employees to adopt organisational culture. Effective training helps to improve the self-confidence of employees and also enables them to approach and perform their jobs with enthusiasm. It can also help employees to use various safety devices and handle machines safely so that accidents are avoided. Training develops new knowledge and skills among employees. The new skills are a valuable asset of an employee and remain permanently with him. In sum, a trained employee performs better and helps in increasing productivity of the organisation.

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Deccan Sugar Technologists' Association
(India) Pune

Proceedings

65th ANNUAL CONVENTION
ON 1st & 2nd OCTOBER 2019

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AGRICULTURE & TECHNICAL PAPERS

submitted for discussion at the

65th ANNUAL CONVENTION - 2019

Published by

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❖

Edited by
Shri C.G. Mane
Chief Editor

❖

Printed by
Vijay Design's
Sr. 135 Navbharat Society,
Yashodeep Chowk Warje Malwadi, Pune 411 058,
Mob. No.: 9850610316

CURRENT CHALLENGES AND FUTURE PERSPECTIVES FOR SUGARBEET CULTIVATION IN MAHARASHTRA A CASE STUDY OF PILOT SCALE EXPERIMENTAL PROJECT COORDINATED AT SARVODAYA SAHAKARI SAKHAR KARKHANA, KARANDWADI, DIST. SANGLI

Patil S. G.[1], Magdum A. V.[2], and Pawar B.D.[3]

ABSTRACT

In Maharashtra total saline soil is estimated to be 606759 ha. Sangli dist alone has approximately 80473 hectare saline land (13-15% of total land u cultivation). Based on perusal of previous studies, sugarbeet might be a option to overcome the constraints created due to continuous cultivation of sug cane. It can be boon for saline soil affected areas as it can grow in saline soil. validate this, an experimental project for sugarbeet cultivation and processing set up at Sarvodaya Sahakari Sakhar Karkhana, Karandwadi, Dist. Sangli.

Keywords: *Sugarbeet, Agronomy of sugarbeet, Saline soil, Products of sugarbeet*

INTRODUCTION

Sugar and ethanol are the two substances whose demand will be continuou increased. Both the essential commodities are used in daily life as well as for v chemical and biochemical transformations. Sugar is mainly produced from sugar (*Saccharum officinarum*) and sugarbeet (*Beta vulgaris*). In India sugarcane is w established cash crop. Assured market by various sugar factories near to cane fie has led to continuous sugarcane cultivation resulting in many negative impact on conditions and consequent limitations on farming. Over irrigation, extensive use chemical fertilizers in sugarcane fields affected the fertility status of soils (Harte 2008; Sharma and Chaudhari, 2012, Chi *et al.*, 2017). Increasing saline/sodic soil area is a major threat to agricultural progress in the developing country like In The saline/sodic soils have very high concentration of natural soluble salts, mainly of chlorides, sulphates and carbonates of calcium, magnesium and sodium. Such sodic soils are with poor structure, low infiltration rate, poorly aerated and difficult cultivate (Sharma and Chaudhari, 2012; Pal, 2017).

In India, about 6.75 Mega hectare (ha x 10^6) lands are either sodic or saline in nature and 6.41 Mega hectare land is degraded due to water lodging. In Maharashtra total saline soil is approx. 606759 ha. In Sangli district alone near about 80473 hectare land (13-15% of total land under cultivation) is converted into saline belt (Suryawanshi 2018). These are major challenges associated with sugarcane farming and, which mak

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ETHANOL PRODUCTION FROM SYRUP AT SHREE TK WARANA S.S.K. LTD

Kaledhonkar V.R.[1], Mane N.B.[2], Patil P.P.[3], Jadhav V.B.[4] and Kulkarni R.V.[5]

ABSTRACT

Govt. of India has announced three policies

1) *The national policy on bio –fuels where blending target of 20% ethanol with petrol has to be achieved by 2030.*

2) *Fixed the Sale price for Sugar Rs 29/kg, ethanol from Final molasses(FM) Rs 43.46/lit, ethanol from B Heavy molasses (BH) Rs 52.43/lit, Ethanol from cane juice (CJ) Rs 59.13./lit .*

3) *Make available subsidized loans of Rs 4,440 cored to sugar mills to create additional ethanol capacity*

All these policies are favorable for ethanol production and further to boost production Indian Govt. make the policy similar to Brazil and allow to use different feed stock like B-Hy molasses obtained from two stage massecuite boiling, whole /partial cane juice obtained from crushing cane, evaporator supply juice (syrup) obtained after clarification and concentration of cane juice at sugar factory end and C-Heavy molasses obtained from three stage massecuite boiling.

On account of economical and environmental findings Warana decided to use syrup as feed stock for ethanol production

INTRODUCTION

There are three group of raw material from which ethanol is produced

1) Sweet plant as beet, sugar cane, sweet sorghum and fruits.

2) Starchy crop as corn, Milo, wheat. Rice, potatoes& sweet potatoes.

3) Cellulose material as wood waste, Bagasse, used paper and crop residue etc.

First two groups are familiar and mostly used for ethanol production. But third group is entering in new phase of development. In India it is produced from molasses which is co- products of sugar industries.

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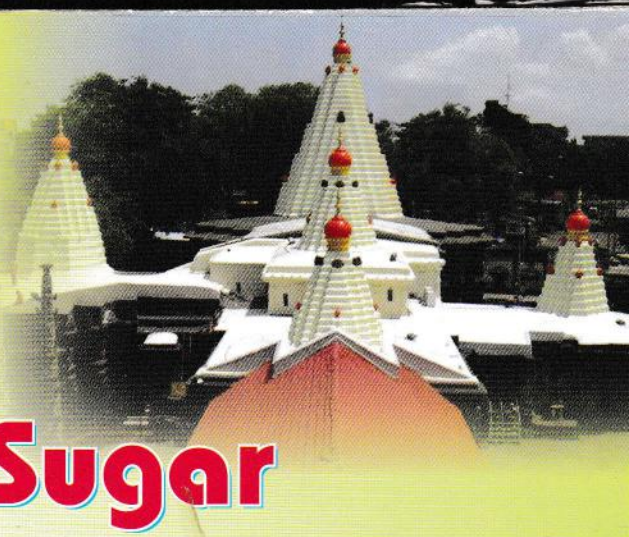

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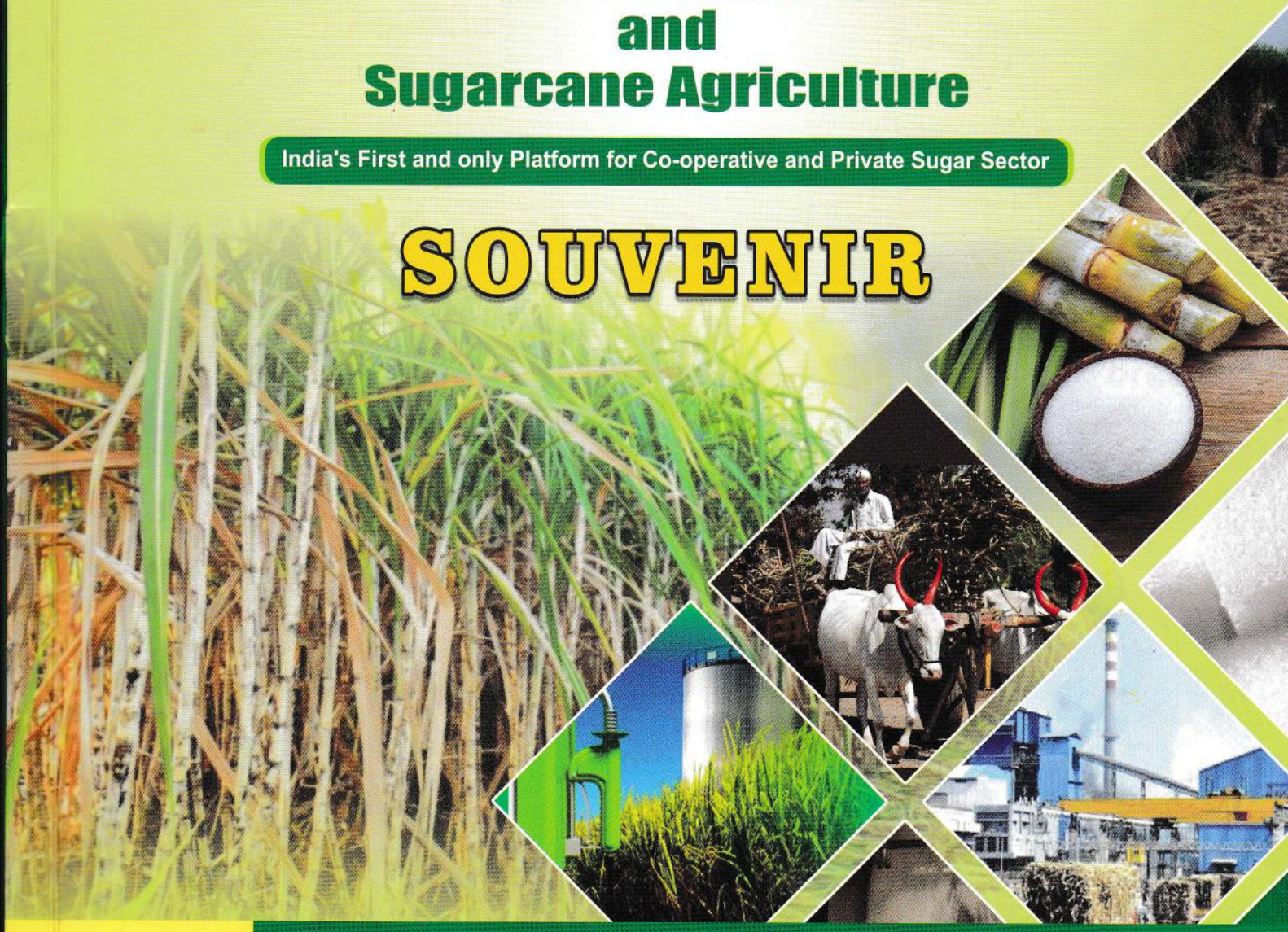

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21st September 2019 : Award Night 2019

Estd: 1975

Bharatiya Sugar

7th Annual Symposium 2019

ON
SUGAR TECHNOLOGY AND
SUGARCANE AGRICULTURE

SOUVENIR

Published by
SHRI. VIKRAMSINGH P. SHINDE
Chief Editor, Bharatiya Sugar
Sr. No. 11/19, Vishwavimal Complex, Flat No. 5, Opp. Hyundai Showroom,
Chandannagar Mundwa Bypass, Kharadi, Pune 411 014

CONTENT

CHEMISTRY AND TECHNOLOGY OF CANE JUICE CLARIFICATI

V. R. Kaledhonkar & S.V Kulkarni
Rajarambapu College of Sugar Technology Islampur.

Abstract

Technology is manifestation of science and particularly sugar technology is manifestation of sugar sci is sugar chemistry. To understand the technology of cane juice clarification in best manner it is n understand the chemistry of cane juice. Technology and chemistry are the twin sides of coin. Scier Foundation knowledge to understanding technology while technology gives recipe of production wit concepts. Thus both are important for cane juice clarification.

Introduction

The sugar cane juice which is received from Millis is acidic in nature &sweet in test, it is light gray to dark green in color & on standing it ferments. The Chemical composition of cane juice is as under

Sr. no. Constituents Percentage

1Water70-882Sucrose10-163Reducing sugar 0.5-24Organic substance 0,5-15Inorganic substance 0.2-0.66Nitrogen body0.5-1 The above substance has different nature or different state of division.

Suspended state:

Fine particles of bagasse, sand, clay from soil, cane wax and chlophyalls etc

Colloidal state:

Some organic and inorganic substance like gum, protein, coloring matter, compounds of silica, iron, aluminums and clay

Molecular state (dissolved state):

Sucrose ,Reducing sugar, Na, K, Ca, Mg, Al, Fe .and H cations occur in molecular solution in electrolytic equilibrium with anion such as organic and inorganic acids like phosphoric, sulphuric silica, hydro-choric, oxalic, citric, and aconites Considering composition juice and nature of substance the primary objectives of clarification are

1) Removal of suspended and colloidal impurities by basic concepts of chemical technology of purification process. For removal of suspended and colloidal impurities we should adopt process like screening, straining, settling, sedimentation, floatation, filtration as and when required in process
2) Precipitation and removal of dissolved impurities by process technology. For removal of dissolved impurities we should follow technolog like defecation, carbonation, sulphitation
3) Imparting clarity and transparency i optimizing and controlling the clarificati with understanding of chemistr technology. For Imparting clarity and tra in juice is not easy task, needing careful quantity and quality of regent used in c process. It is obvious that different impurities will gate precipitate at di valve as such accurate pH control over c process is must.

Removal of suspended impurities

Main suspended impurity is fine bagacill which is insoluble in juice. Higher quantity increases the color of clear juice as tea brew increase the mud volume and suffered station. It also blocks juice heater tubes an clear juice and further find its way in sugar quality becomes dull. Thus removal of b must. These fibrous materials mainly cellulose, semi- cellulose lignin which form after heating.

Hence as process parameter there shoul fibrous material in juice to avoid color form

Single stage rotary screens are now installed in most of sugar factories during l using 0.50 mm opening. Each sugar factory efficiency of the unit is more than + 90% and about 75%, but the quantity of bagacillo is 1.8-2.0 gram /lit of juice (0.18-0.20% on can against zero parameter.

It is further advocated for screening of clear