

An overview for Emerging Technology in Sugar Processing

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Abstract

The new emerging technology related to operations of the sugar factory was analysed by the concept of potential impact of new factory and its new technology. Rather than controversy of factory output the increased in sugarcane productivity is the major key roll and one of the major issues. The factors include more efficient use of resources like equipment design, energy its reliability and optimum performance. The system of new technology is being divided into two panels that is primary technology which includes the new equipments where on the other hand secondary technology which includes data base system and its knowledge like design, performance, automation, proper optimization and evaluation. This research paper shows the overview potential of the technology and its application for each stage of production of sugar and its processing.

Keywords: Innovations, Invention, Technology.

Introduction

These research papers do not discuss only the new technology but it also describe the emerging technology in which sugar industry and how much it have potential for the improvement of the sugarcane productivity. The annual production capacity of sugar industry is more than 25 million tons and also the one of the largest agro based industries of India. It was found that most of the strict government control with its rules, regulations and intervention. There are various committees like Mahajan Committee in 1998, Tuteja committee in 2004, and the Rangrajan committee in 2002. These committees were made to di- license and to deregulate the sugar based industries in India. With the help of recommendation based the industry was de-licensed in the year 1998 and it was partially de-regulated. After the recommendation it was found that sugar factories were free to sell the sugar in the open market without any obligation and restrictions to supply at the maximum subsidized rate for public distribution system. But after the legislation of the policy the sugar industry still faces the large number of rules and its regulation including the fixed control over the demand and especially the supply and its prices of the sugarcane and sugar. It has been observed that too much regulation and its control, along with the higher order of the politicalization also contributed large scale of inefficiency in the sugar factories. As we observed that Total Factor Productivity that is TFP known as driving factor for improvement in the competitiveness. This study includes the performance improvement of the sugar based industries.

Review of Literature

George T. Surface (2017): This research article shows the study of "The Sugarcane Industry". In which the study mainly focused on the experimental stage, the spread of sugarcane from field to sugar factory; cost of production, improvement and cane factory fluctuations. The study does not focus on innovation and inventions.

N. Sathiya and P.Jayashri (2015): The title of the research paper is "A study on Human Resource Practice in co-operative Sugar Mill Ltd. PALACODE". The study includes conceptual perspective of human resource and its development in general co-operative sugar mill palacode, the background of the employees and their attitudes and opinions on human resource development practices in the co-operative sugar mill Palacode. This study also focuses on the satisfaction level of employees about the human resource development in the organizations.

Aim of the study

The aim of the study mainly focused on the technology being used to generate the sugar from sugarcane.

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Objective of the study

1. To study the new technology while making the sugar.
2. To study the problems related new technology and its innovations.

Research methodology

The study was conducted on the basis of secondary data collection which includes books, research papers, journals, departmental magazines, some departmental reports etc.

Hypothesis

H₀: there is no use of new technology introduced in making of sugar.

H₁: there is use of new technology introduced in making of sugar.

An overview of the Technology

The study includes the internal and external technology which means primary technology and secondary technology. The unit operations of sugar production which called as primary technology. And on the other hand, to support and have optimum utilization to be known as secondary technology. The production of the sugarcane in the sugar industry is increased due to the dependency of the secondary technology which is being used. The improvement of the sugar productivity is the cost effective to maximize the optimum system which it especially control all the aspects in spite of investment in all new equipment. That is why a limit of possibility of the rescoring of the all old equipments. The aspects of design and its simulation process of the new secondary technology were also guide in these choices. The all short term efficiency to increase the productivity is achieved with the help of using optimum utilization of the current operations which emphasis the maintenances, the quality control and proper manufacturing training and its practices. This is the perfect decision with relatively for the low capital investment requirement and also it is very difficult aspects as it changes the mindset which it requires. The strategic plan for the new primary technology helps in improvement. These very tough decisions to involved with huge capital loss.

Invention and Innovation of New Technology

After the solid judgment the innovation must be properly based Research and Development through the deeply study and knowledge of the sugar industries and its requirement. Any innovation of new technology should be sufficiently matched with other variations in sugar quality, especially which was adverse effected by climatic conditions and its mechanical harvesting. The productivity which has improved also requires and it is minimum. This include like the process of purification which relays on physical rather the treatments of chemical was being performed.

Sources of New Technology and its innovation

The source of new technology and its innovation was inclined due to distinct and the special and for development of isolation. The increment in the sugarcane productivity would be achieved by the utilization for the development which has been taking place by the other major industries processing like chemical processing industries, this leads to increment in the optimum productivity which also

include return of capital, also it requires the attention for the details at energy step.

Primary Technology and its development

1. Juice extraction system
2. Purification system
3. Crystallization Process and sugar handling.

System of Extraction of Juice

The rate of milling were continuously increased and up gradation of milling is too costly but it is mandatory to maximize the productivity of equipment existing. The objective of the milling model was to predict the changes and its effectiveness in the milling parameters and also to assist in the financial decisions. The use of MILSIM the mode which was given by the Australian engineers was given by the Australian engineers was to improve the application of the Juice extraction. The MILSIM was used to generate the better performance of the mill and for the overall development for prediction of the different conditions performance. As the Australian study represent the useful reviewed for taking decisions and choosing the expansion as per the requirement of the sugar factory. As per the diffusion the number of advantages and the installer of the installation of the diffuser would also required equipment relocation. The maintainace of the long term would be more than the addition of the sugar mill with diffuser within two mills as per the many spares and training would be reduced with only a single used of technology.

Purification system

The most important thing for the new primary technology of the sugarcane operations was membrane purification. The research study of the sugar industry was intense and also optimum was high. The best expectation of this new technology was to replace the standard clarification techniques but it was not achieved due to certain reasons. The major problems were:

1. Due to high cost.
2. Complexity and issues of maintain.
3. Sophisticating and its automation.
4. The overall handling of the Renate or the rejection of the stream.
5. Ruggedness of the system.
6. Life time member and cleaning system.

The technology which is also to be known as fundamental for the softening the technology and its benefits:

1. The prevention of the precipitation of insoluble calcium salts.
2. The suitability of the softened process material for the subsequent process of the ion-exclusion process for the sucrose recovery.

Crystallization Process and Sugar Handling

The batch existence became the much larger and energy efficient but the development has the importance for the continuous of the high grade sugar. Thus this technology leads to applied in the several location and there remaining, some design and its operations problems to be again solved. The proper combined process of the purification and crystallization and its handling will result in the much high quality of sugar that is that it cannot be bulking

handling of the sugar as the raw sugar especially in the raw sugar production.

Secondary Technology

The secondary technology defines the process of manufacturing information technology. The goal was to achieve the information and its target available in the optimum manner with all other aspects of the process from the design through the training of the operations to the all its decisions.

1. Design and its equipments.
2. Modeling and its simulation.
3. Operations, control, Maintenance and its quality.

Design and Its Equipments

The new technology was used to design the equipment and its reliability which was critically important for the productivity of the sugarcane industry. The old method was involved for the empirical safety and its factors which was essential when it was control by the operations and was as manual and the process was poorly understood by the industries. The new and the modern technology allows for the "virtual factory" in the computer before the factory was developed. This leads for the involvement of all the controls, piping and the diagrammatic instruments, flow chart schemes and even the "virtual reality" which can be walked. The two design technology was considered

1. CFD which is conceptual fluid dynamics.
2. FEM which was finite element methods.
- a. The CFD is system software which was used to solve the complex equation which was related to fluid and its heat with the massive change transfer.
- b. FEM techniques were based in requiring the non-standards and its shapes for the entire complex situation were being loaded. This FEM was the equipment by giving confidence which repair the modification and are safe reliable.
3. The high capital cost was making it difficult for the sugar factories of the justification the purchase of the equipment to match the increase in the rate of grinding. The major cost effective expands may be to maximize the throughput and to accept some decline in the factory performance.

Modeling and Its Simulation

The full detailing of the engineering was critical to identify the design of the plant and also the key to determine that how the sugar factory runs. The

total process for the flow sheet and its common engineering defines just before the details of the plant design up to 30% of the cost of capital and it also reduce the operating cost.

Operations, Control, Maintenance and Its Quality

The everyday application for the secondary technology leads to increase the improvement of the sugar factory and its performance from the starting point from its introduction to the personnel operations. The maintain ace and the reliability were also essential to target for the improved productivity and the new technology application in these areas were also data intensive. The benefits were increased equipment utilization and delay of the capital investment for the replacement of the factors.

Conclusions

The study shows the innovation and invention of the technology which was being used for the significant. It gained the short-term benefits and long term benefits from the primary and the secondary technology which was designed to optimize the new technology for the production and which was also applicable for the sugar factory. The membrane filtration and chromatographic separation was the major potential as it depends too much on the local circumstances.

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