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AUTOMATED SCUM REMOVAL MACHINE IN JAGGERY PRODUCTION

Mayur Krishna[1], Mithin T R[2], Manu G T[3], Nischay M M[4]

[1-4]Final year student of Department of Mechanical Engineering, ATME College of Engineering, Mysuru, Karnataka, India.

Abstract— Automated Scum Removal Machine is used to remove Scum produced during the production of Jaggery. The Scum Removal is done by manual method in our country. The aim of this project is to develop Automated Scum Removal Machine. The Scum removal machine can be adopted in medium and large- sized jaggery production industry. This machine makes the process simple, easy and fast. It eases human effort and no requirement of skilled workers to operate the machine. The Automated Scum removal machine consists of the following parts Base, stand, motor and Collector. The stand is mounted on the base and bevel gear. The rotation of the arm is controlled by the Bluetooth device and rotates up to 180^0. Rising and lowering movement of the arm is controlled by Bluetooth device. Low speed motor is mounted on another end of the arm, which is used to rotate the scum collector and is controlled by wireless control equipment. Scum which is collected in the collector is lifted by raising the arm. Hence, the pure form of juice can be obtained from the above process. There is no availability of Automated Scum removal machine.

Keywords- Automated Scum Removal, Bevel gear, arm, Motor, collector, wireless control equipment.

1. INTRODUCTION

In earlier times, sugarcane cultivators utilized smashers controlled by bulls, however all new smashers are power-driven. These smashers are normally set near the sugarcane fields. The cut and cleaned sugarcane is squashed and the juice separated is gathered in a giant vessel. A specific amount of the cane juice is placed into a compact vessel for boiling in a chamber.

The vessel is warmed for about 60 minutes. Dried mash of the squashed sugarcane is utilized as fuel for the chamber. During the boiling of cane juice, lime is included so that all the scum (wood particles) ascend to the highest point of the juice, which is skimmed off utilizing Automated Scum Removal machine. The juice is free from wood particles and is thickened. Finally, the volume of the thick cane juice is around 33% of the initial volume.

This hot juice is generally golden. It is blended unceasingly and raised with a spatula to observe whether a string or threads are formed while falling. If the thread or strings are formed, Juice is completely thickened. It is filled to a shallow level bottomed skillet to chill and harden. The container is uncommonly giant to allow exclusively a thin layer of this hot fluid to make at its base, along these lines expanding the degree for quick cooling. Meanwhile, the jaggery turns into a creamy solid which is moulded to form into the required or wanted shape.

Jaggery's colour indicates its quality; dark colored recommends that it is highly adulterated and yellowish gold infers it's relatively unadulterated.

The Automated Scum removal machine is one of the most flexible machines, permitting the user to get rid of the scum developed throughout the jaggery production. This machine makes the removal easy, safe and economical. This machine doesn't involve any human efforts in removing of the scum. This machine decreases the human risk involved. This machine helps the jaggery producers to get huge returns in much more faster time compared to the traditional technique.

2. Experimental details

A. Work flow

Steps Involved

- Problem Identification.
- Need for Scum removal machine.
- Study on related research.

- Literature review.
- Development of drawing.
- Creating a model using software.
- To gather the required materials.
- Manufacture and assembling of parts.
- Developing the prototype.
- Testing and experimenting of the model.
- Final inference.

B. Objectives

The main objectives of this project are listed below:

- To remove the scum particles effectively, which are present in the top layer of cane juice.
- To reduce the production time.
- To increase the production rate.
- Ease of handling the scum.
- Reduced human efforts and risk during operation.
- Operate between multiple pans.

C. Working of the Model

Automated Scum removal machine consists of the following main parts Base, stand, motor. The stand is mounted on the base and bevel gear. The rotation of the arm is controlled by the Bluetooth device and rotates up to 180^0. Rising and lowering movement of the arm is controlled by Bluetooth device. Low speed motor is mounted on another end of the arm, which is used to rotate the scum collector. During the jaggery production, cane juice is heated in a vessel. Once the Cane juice is heated, the lighter particle such as wood (Scum) content will float at the top layer of the juice. Scum particle which is deposited at the top layer is collected in the Scum collector and lifted by raising the arm. Hence, the pure form of juice can be obtained from the above process.

D. Design

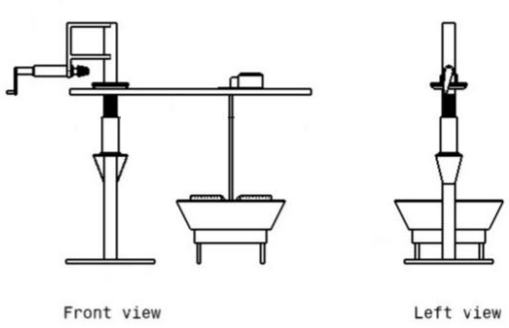

Figure. 1 Schematic Diagram of the Working model

E. Merits

- Purest form of sugar cane juice can be obtained by implementing scum removal technique for producing jaggery.
- Human effort can be reduced.
- Production time can also be reduced which results in faster production of jaggery.
- Scum can be removed at a faster rate.

- Highly efficient than manual technique.
- Skilled workers are not required for the operation.

F. De-merits

- It cannot work without power supply.
- High speed rpm motors cannot be used.
- It requires proper maintenance at regular interval of time.

3. CONCLUSION

Since the Indian jaggery industry is the biggest composed part which has been one of the most antiquated and significant village based cottage industry in the nation. Most of the sugarcane cultivators are producing jaggery with least capital speculation which gives occupations to the un-utilized country individuals. Jaggery makers are generally little and minimal ranchers depending on quick and huge returns from jaggery. The present strategy of filtration utilizing the channels in "AALEMANES", to eliminate scum completely isn't successful. By installing the automated scum removal machine in all the "AALEMANES", the scum can be removed at the better rate compared to present method of filtration.

By implementing this technique,

- Scum can be removed at faster rate and effectively.
- Results in good quality of jaggery.
- Production time will be reduced, results in high production rate.
- Human efforts can be minimized.
- This machine can be installed in "AALEMANES" or jaggery production unit throughout the country.

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