

DESIGN AND FABRICATION OF MILLET LADDU MAKING MACHINE

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ABSTRACT

The millet laddu aims to bring nutrition to people. It contains different varieties of millet. This project is mainly customized for small scale industry. There are a variety of millet like foxtail millet, barnyard millet, little millet, Kodo millet. India is also known as a festival country. Particularly small-scale business point of view. Laddu making machine is most widely used for small scale and cottage industry. It consists of several components such as a feed hopper, screw conveyor, roller, motor, collecting tray. People often place a large order of sweets to the vendor and expect the delivery of the sweets to be as soon as possible. To complete the order within the required time, the vendor has to put in additional manpower. At the same time maintaining the quality of the product. To cope up with demands to be fulfilled in a shorter time span, automation can come in handy. The project aims to reduce manpower and increase profit by increasing the production rate and quality. It also aims to reduce material wastage due to manual handling, adhering to safety regarding the material used for constructing the machine. The material used is food grade material to keep the machine hygienic and corrosion-free. The purpose of this machine is to make proper and highly nutrients content laddu in proper round shape.

INTRODUCTION

Millet is a whole grain that is packed with protein, antioxidants, and nutrients. Millets are nutritious, non-glutinous(non-sticky),and are not acid-forming foods, thus making them very easy to digest. Compared to white rice or wheat, millets are high on fiber and control blood sugar and cholesterol levels. Millet grains, before consumption and for preparing food, are usually processed by commonly used different processing techniques. The purpose of grinding to improve their edible, nutritional, and sensory properties. Millet flour is flour made by grinding millet into powder. Millet flour can be done by feeding millet seed into a blender or mill. Millet flour has a light mild flavor making it perfect for sweet. Wheat and rice may be amongst the most popular grains, but millets such as sorghum, rye, foxtail millet, finger millet, barnyard millet, and little millet are amongst the healthiest millet grains available. Millet is a good source of Thiamin, Niacin, Phosphorous, Iron.

Millet is rich in minerals like calcium, copper, iron, magnesium, phosphorus, potassium, and selenium as well as essential vitamins like folate, pantothenic acid, niacin, riboflavin, and vitamins B6, C, E, and K.

Many of the most powerful health benefits millet has to offer are related to its fiber content. Example: Raw millet contains 9% Water, 73% Carbohydrates, 4% Fat and 11% Protein.

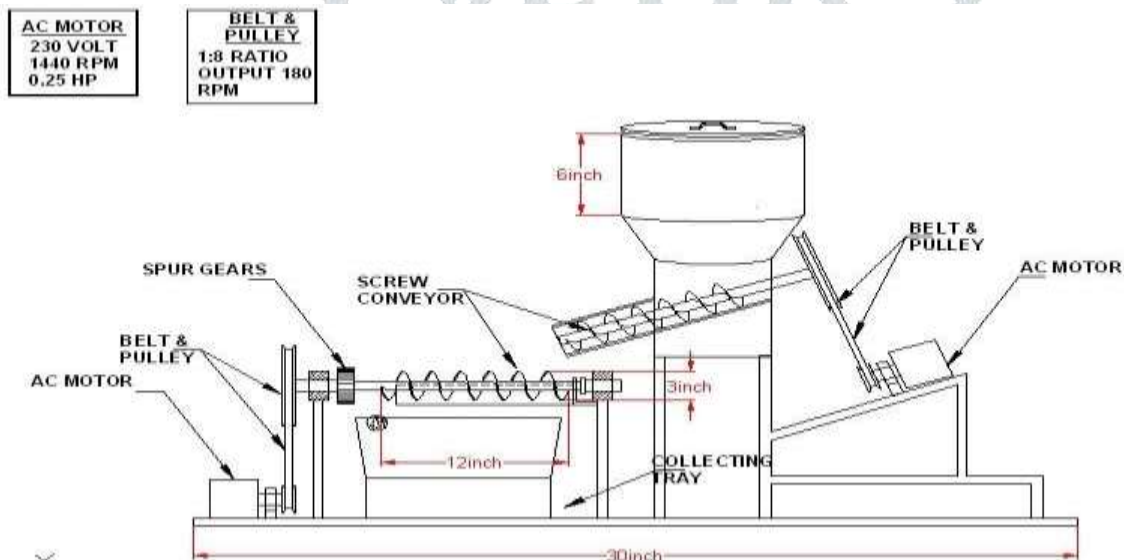
Process of millet laddu first step is Dry roast the flour until light golden. Then add enough water to jaggery and place it over medium flame. Stir regularly until jaggery has fully dissolved. Strain to remove impurities. Place it over the flame and simmer until it starts to thicken. In the pan, add jaggery, ghee and ginger powder and stir well until you see a dough like consistency. Take out the mixture and pinch out balls from it to make laddus.

OBJECTIVES:

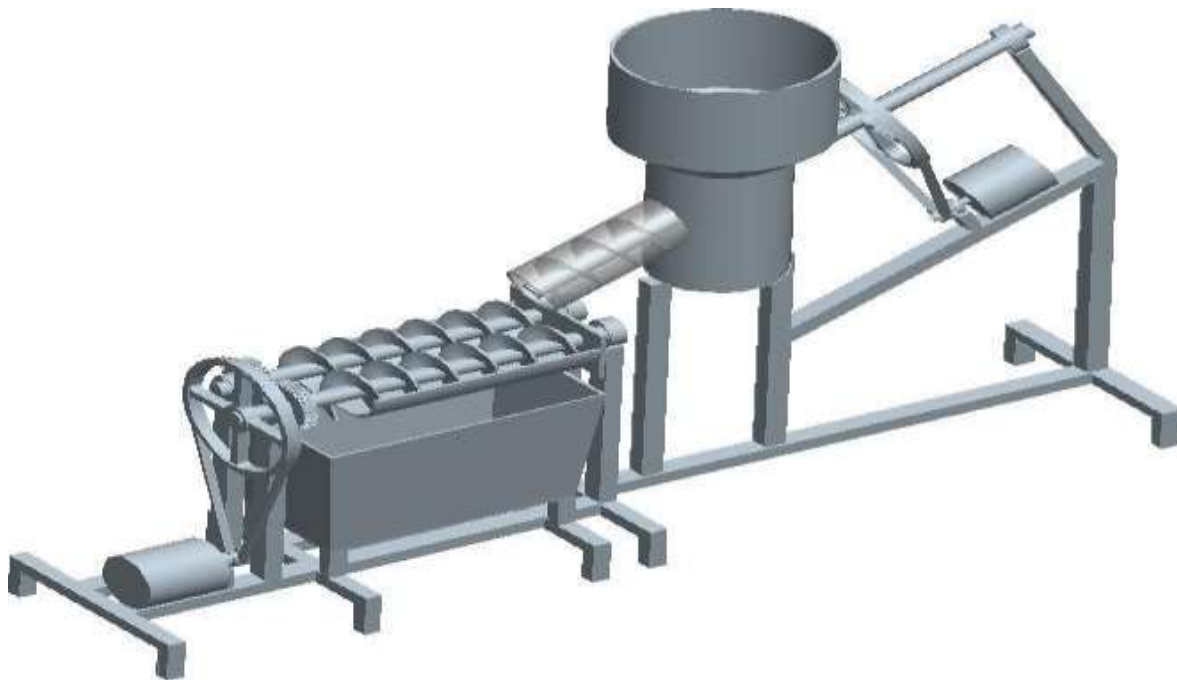
- To develop a Millet Laddu Making Machine
- To test the machine

EXPERIMENTAL WORK:

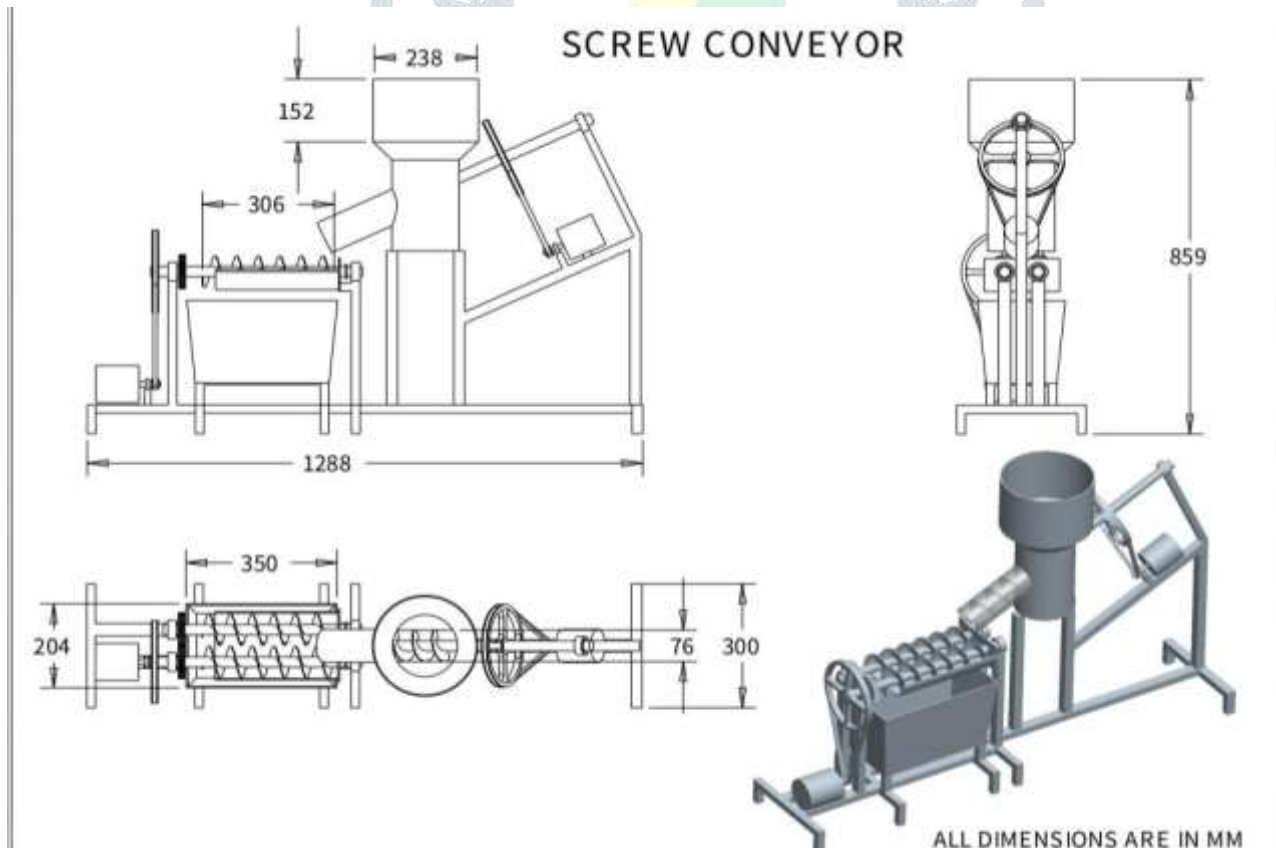
2D View of Laddu Making Machine



3D View of Millet Laddu Making Machine



Front and side View of Millet Laddu Making Machine



MATERIALS AND METHOD:

AIM

The primary aim of this project is to design a semi-automated millet laddu making machine. The materials are the essential component in making a product. Materials that are required are selected and filtered. Conceptualization and design with their line diagram are dealt with in this,



The methodology is the way of steps followed from starting to ending; the steps which are followed are displayed on the above flow chart. The flow chart helps to do the process clearly.

DESCRIPTION OF THE EQUIPMENT

FEED HOPPER

The mixture is feeded at intervals and from which it is regularly fed to a machine. In this project feeding material is flour with a mixture of sugar solution, nuts, and ghee.

SCREW CONVEYOR

A screw conveyor is a mechanical conveyer that uses a rotating helical screw blade. Which helps to move liquid or granular material. It can be operated with the flow of material inclined upward with the help of a motor. When space allows, this is very economical of elevating and conveying. As an angle of inclination increases, the capacity of a given unit rapidly decreases. The rotating part of the conveyor is sometimes called simply an auger. In this machine screw conveyor is used to convey dough from the feeder to the processing section.

BELT AND PULLEY

The device helps in power transmission using a cable or belt. In a belt and pulley system, a belt runs along a pulley's groove so that the power can be transferred either from one pulley to another or from the pulley directly to the application that requires power. In this machine belt and pulley is used to supply power from the motor to the conveying and rotating unit.

SPUR GEAR

Spur gears are cylindrical-shaped toothed components used to transfer mechanical motion as well as control speed, power, and torque. In this machine, the spur gear is used for rotating the rollers to give the proper shape of the laddoo.

AC MOTOR

An AC motor is an electric motor driven by an alternating current (AC). The AC motor commonly consists of two basic parts, an outside stator having coils supplied with alternating current to produce a rotating magnetic field, and an inside rotor attached to the output shaft producing a second rotating magnetic field.

How Does an AC Motor Work?

Prior to Tesla's inventions, direct current motors were the presiding type of motor. An AC motor works by applying an alternating current to stator windings, which produce a rotating magnetic field. Because the magnetic field rotates in this way, an AC motor does not need power or mechanical aid to be applied to the rotor. The rotor will rotate via the magnetic field and create torque on the drive shaft of the motor. The speed of rotation varies based on the number of magnetic poles in a stator. This speed is called synchronous speed. AC induction motors, however, operate with a lag or slip to allow the flow of rotor current.

SUMMARY:

In the conventional process of millet laddu preparation, the Labour and the time consumption are high, but this project approaches to increase the efficiency by reducing the Labour, time, and increase the hygiene of the laddu produced. Another main advantage of the machine is, the laddu can be produced to the required quantity at the time of the demanded quantity in a very efficient period of time.

CONCLUSION:

The semi-automated millet laddu making machine was tested and evaluated. This machine shows greater efficiency in the production for small scale industry. The machine also saves time, less Labour and gives hygiene to the produced laddu.

DISCUSSION:

The critical parameter in the production of millet laddu is time consumption and the quantity of production which is required at the time of demand. The wear and tear of nylon rollers due to continuous use may vary as the use of the machine will be high when there is demand of the millet laddu, and the nylon rollers are also replaceable.

FUTURE MODIFICATION:

- The material of the machine will be converted Mild Steel into Stainless Steel.
- The machine will be made Fully Automated.
- The length of nylon roller will increase means the shape of the laddu should be perfect.