

Theory and Optimization of Turmeric Polishing Machine

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Abstract:- The post processing of turmeric rhizome is done many days after the harvesting. In post processing maintaining the curcumin content in turmeric is important and which is depends upon the methods used for processing the turmeric .this process deals with machine which work efficiently to clean the turmeric rhizomes without boiling and steaming as the process of boiling and steaming lots of important chemical get lost which decrease the quality of the turmeric.

Keywords:- Hopper, Turmeric Rhizome, Belt Conveyor, Water Sprayer, Rotary Brushes.

I. INTRODUCTION

Turmeric is mostly use our daily life. It is used in various sector like cosmetics, cooking, food processing, medical etc. A fresh raw turmeric rhizome is dug out from the field. Before dispatching the turmeric to market, it is processed through some processes which involves boiling of rhizome, drying of rhizome, grinding and polishing of rhizome. Therefore, this study was undertaken to design and develop a low-cost and labor-saving turmeric polisher for turmeric growers and small entrepreneurs, and to evaluate its technical and economic performance. Performance of the polisher was tested in laboratory as well as in the field.

II. THEORY AND OPTIMIZATION

Firstly the rhizomes is add to the hopper. The capacity of hopper is 4 kg. Then the rhizomes will be transfer to the belt conveyor that can be rotated with the help of rollers .The rollers are driven by the gear motor. The length of the conveyor belt is 8 feet and it will carry 4 kg turmeric rhizomes at one time. Turmeric rhizomes will wash on the conveyor, their is an water sprayer arrangement is provided that can shower water on the turmeric rhizomes. Because of that the dirty rhizomes will be cleaned. The water that came out after doing the cleaning will be transfer to the reservoir or a storage water tank . This water is also used for future cleaning. In the water tank the filter is attached to clean the water that are transfer to the water pump. After going from the washing chamber the turmeric rhizomes will be go to the another operation i.e Brush cleaning. In this operation we use a Servomotor that can be rotated at some RPM, on the what of the Servomotor the big brush are arranged. So, if the Servomotor starts rotating the brush also start rotating. This operation is done inside the casing. So, from the belt conveyor the turmeric rhizomes are directly thrown down to this rotary brush casing arrangement. After passing through

this operation we will get the Polished turmeric rhizomes at the collector bucket . Turmeric is a unique ingredient which can be used as a spice, colorant, and flavor rant. It is most majorly used in south east part of Asia. This study deals with machine which work efficiently to clean the turmeric without boiling and steaming as the process of boiling and steaming, lots of important chemical get lost which decrease the quality of the turmeric. Turmeric has various vital essential oils and nutrients which get removed during the process of boiling and steaming. That was not beneficial for the farmers. Hence we Search a type of mechanism that can be operated using belt conveyor.

In our project the construction parameters are-

- 1) Hopper
- 2) Roller
- 3) Coupling
- 4) Gear motor
- 5) Belt Conveyor
- 6) Chassis for the arrangement
- 7) Water tank
- 8) Filter
- 9) Pump
- 10) PVC pipes
- 11) PVC shower
- 12) Rotating Brush
- 13) Servomotor
- 14) Rotating Brush Casing
- 15) Material collector

1) Hopper



A hopper is a large, pyramidal or cone shaped container used in industrial processes to hold particulate matter or flow-able material of any sort, like dust, gravel, nuts, seeds etc. and can then dispense these from the bottom when needed.

2) Roller = The roller support to used for belt conveyor. It can effectively reduce the frictional relations of the conveyor. it is use to suitable for long distance or large load transportation. The primary function of a conveyor roller is to transfer. Object to and from various parts of an industrial complex and is usually set up in continuous flow setting.



3) Gear motor = A geared motor is a component whose mechanism is at just the speed of the motor, leading them to operate at a certain speed. Geared motor have the ability to deliver high torque at low speeds as the gear head function. As a torque multiplier. And can allow small motor to generate higher speed.



4) Belt Conveyor = Belt Conveyor can be used to transport product in a straight line or through changes in elevation or direction. For conveying Bulk material like Grains, ore, Coal, Sand etc. Over gentle slopes or gentle curvature, a tougher belt conveyor is used.



5) Water Tank

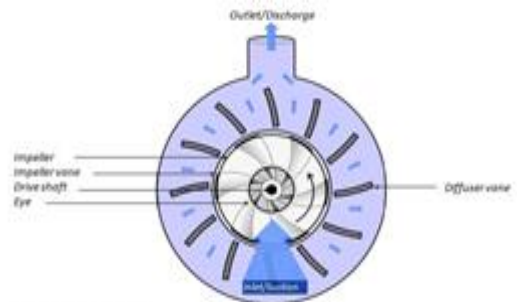
All water tank is a container for storing water. Water tanks are used to provide storage of water for use in many applications. Drinking water, irrigation, agriculture, fire suppression, agriculture, farming, both of plants and livestock’s chemical manufacturing food preparation as well as many other uses.



6) Filter= Water filtration is the process of removing or reducing the concentration of particulate matter, including suspended particles, parasites, bacteria, algae, viruses and fungi, as well as other undesirable chemical and biological contaminants from contaminated water to produce. Safe and clean water for a specific purpose.



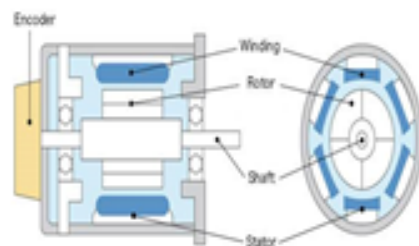
7) Water pump =A water pump can drain water from a basement or shallow flooded areas. Drain and fill a swimming pool or damn. It can also be utilized in the irrigation needed for agriculture. Water pump are employed for getting rid of excess water to reduce the downtime. From large rain events.



8) PVC pipes = PVC pipes are commonly used for manufacturing sewage pipes, water mains, an irrigation possessing very long lasting properties. PVC pipes are easy to install. Lightweight, strong, durable and easily recyclable. Making them cost efficient and sustainable.



9) Servomotor = Servo motor or servos As they are known, are electronic devices and Rotary. Or linear actuators that rotate and push parts. Of a machine with precision servos are mainly used on angular or linear position and for specific velocity an acceleration



10) Rotating Brushes= Brushes perform a magnitude of cleaning tasks. For example, brushes lightly, dust detainees figure in. They helps corrupt stains out of clothing and shoes they remove grind from tires. And they remove the dirt and debris found on floor with the help of a dust pan.



III. CONCLUSIONS

The turmeric polishing machine is simple in operation and easily accessible for the farmer because of its simple design. water which results less retention of curcumin content and essential oil. Also there is no engineering and thermal background in designing of conventional turmeric boiling system due to this system was very bulky and there is large amount of heat losses. Processing time of turmeric rhizome is also very large in conventional system and it give high service to the farmer to do their work more easy this machine is very useful for them.

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