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Design and Development of Turmeric Polishing Machine

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ABSTRACT :-The cultivated turmeric rhizomes are generally dirty and dry. That why it needed to remove all dirty clay and other impurities like soil and roots, to create dirty turmeric rhizomes in smooth and yellowish and bright it required to polish them. In most of the farm level turmeric polishing used as a manually. The manually polishing take more time and effort to polish turmeric rhizomes. This process cannot fulfil the quality of product and it directly impact on the customer. It is a biggest issues in India for turmeric production. Always customer demand to a high quality product in time for making turmeric powder. That why we need some changes in this field. This research paper represent the design and development of turmeric polishing machine. With the help of machine dirt and unwanted impurities are fall down on the base easily. The design of polishing machine helps to good quality control and increasing in production rate.

KEYWORDS: - Turmeric Polishing Machine

I. INTRODUCTION

As we all know turmeric is a very popular for spices as well as in Ayurveda's for medicine. The India is a big market country of turmeric in Asia. Turmeric is widely use in South Asia for making a yummy and colourful dishes. It also use as a Drug, colorant, and cosmetic which is useful for a number of diseases.

A mechanical polisher was developed at Nagpur University Maharashtra, India. Manually we can also operate a polishing machine. It operated by a 1hp motor. Without polishing machine it is carried out by manually polishing in which labourers has to beat turmeric rhizomes on hard surface, after turmeric finger is filling in drum is rotated , friction of the surface of turmeric against the collapse in drum affects the polishing. For the producing greater quality of turmeric polishing machine is responsible. It also avoids wastage of turmeric.

The harvested turmeric rhizomes is generally dirty and surrounded by mud and other impurities like root and soil. It is need to remove all dirt and polish the turmeric rhizomes fastly and rapidly. For that idea come for making such a polishing machine which would meet such requirement.

II. REVIEW

1. Anne Plotto :-In between 1995-2000 by the helping of post management aspect explained the term of polishing, with the help of polishing machine we remove all dirt's and rootlets from the dried fingers rhizomes for this purpose a metallic mesh in rotating drum lined with which collapse the rhizomes surface. It gives an attractive bright colour. This paper can show the polishing machine.
2. V.A. Parthasara. In this paper with India is a biggest producer and exporter of turmeric product in the world India has made 837199 tonnes of turmeric from an area of 18601 ha. In year between 2006-2007. This paper said about the condition of turmeric in soil and climate, cultivation, verities, harvesting , and the plant protection process which include polishing, drying, boiling, and curling. Dried turmeric has a poor appearance and a rough dull surface with the dirt and root. They said the yield of polished turmeric fingers from raw material differ from 15 to 25 %.
3. J.P. Modak In this paper, A human powered bricks making machine has been designed and developed. The

machine uses the human flywheel motor as an energy source and they said that this concept can be adopted for human powered process units needing more than 2 KW short term power and which could have intermittent operation without affecting the end product. Essentially machine consist of three sub system i.e.

1. Energy Unit, 2. Appropriate transmission, 3. Process Unit. From schematic arrangement of the machine and specification of the major part of the machine.

III. PROBLEM IDENTIFICATION

In the farm level the turmeric rhizomes put in bag about 3-4kg and beat on the tough surface by hand. It take more time and effort as well as more manpower to fulfil this process. After harvesting turmeric it need to be polish and clean before 48hrs. it effect on nutrient value. So it is not possible to provide much manpower to hand polishing So that polishing machine is required. The polishing machine is compare with traditional method there are two method.

1. Put 2-4 kg of turmeric fingers in a bag and beat on the hard surface by hand; this is mostly used on a plain surface.
2. Put 6-7 kg of turmeric fingers in a sack and beaten by a simple paddle operated device.

Polishing machine capacity is greater and it furnished quality of turmeric which not possible in hand polishing.



Fig 1. : Manual Method of Polishing

IV. DESIGN AND DEVELOPMENT OF MACHINE

As per physical properties of turmeric rhizomes A polisher was designed. The sketch of a turmeric polisher as below.

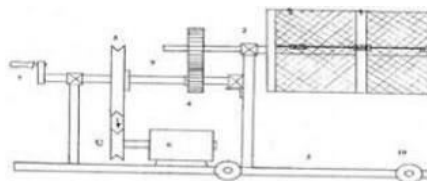


Fig. 2 :- Diagram of Turmeric polishing machine



Before

After

Fig. 3: Comparison of Turmeric rhizomes

- There are some material of different part of machine used for fabrication
- Most of the material are Mild steel such as Angle bar, Flat bar, Rod, Ms sheet, Shaft, rubber sheet, ball-bearing and small spares parts all of which are easily available.
- The main machine parts is power transmission, power source, rotating drum, collection tray and Mainframe.

Colour parameters of unpolished and polished turmeric

1. The polisher took 25 min. To polish a batch of 30kg turmeric
2. After polishing each batch, it required 5min. To discharge and refill in the polishing drum.
3. During laboratory test, the capacity of the polisher was found to be 63.53kg/h
4. Capacity of the manual polishing by hand beating was 8kg/h, while it was 12kg/h by paddle operated beater using 4kg and 6kg in each batch, respectively.
5. Thus, the use of the polisher saved 81 % polishing time compared to the paddle operated manual beating method.

V. SPECIFICATION OF TURMERIC POLISHER :-

- Overall Dimension = 1040mm* 850mm* 1450mm
- Number of Rotating Drum = 01 NOS
- Length of Rotating drum = 610 mm
- Outer diameter of rotating drum = 690mm
- Inner diameter of rotating drum = 590mm
- Length of the main shaft = 1040mm
- Capacity of polisher = 25 to 30KG
- Critical speed of polisher = 30 rpm
- Operating speed of polisher = 27 rpm
- Weight of the polishing machine = 90 KG
- Type of bearing = Pillow block bearing, Bearing No. UPC 205,
- Weight = 790 gm.
- Dimension ID = 23mm
- Main shaft = Mild steel shaft 25mm diameter and long 1040mm used in hexagonal drum.
- Power source = A 0.37 KW single phase induction electric motor is used for the source of power for operating the machine.

Methodology:-

1. Motor shaft (1400 rpm)
2. Pulley with V-belt drive
3. Main shaft of reducing gear box (583 rpm)
4. Output shaft of gear box (14.5 rpm) Chain & sprocket Rotating shaft (27 rpm)

VI. COST ESTIMATION

Miscellaneous Cost :-

Labour cost = 700Rs
Fabrication charges = 2000 Rs
Oil paint charges = 1300 Rs.

Total Cost =
Material cost + Miscellaneous cost
Total cost = 25410 + 4000
= 29410 Rs

VII. CONCLUSION

With the help of turmeric polishing machine the quality and the production rate is increases. This machine is simple in structure and operation and easily handle to farmer because of its simple design. All parts are easily available in the market. The machine is easy to operate and maintain and requires only one operator to operate. It reduces the polishing time and increases the production of the turmeric. As compares to the hand beating and paddle operated devices turmeric polishing machine saves 78.20% and 71.60% cost of polishing. The farmer can be satisfied with the performing of the polishing machine. Turmeric polishing machines are easily movable from one place to another place.

- Quickly Install
- Reduce man power in this process.

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