

Utility of Technology for Rural Area- An Amla Punching Machine

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ABSTRACT

An economical manufacturing solution is necessary for making the product affordable to the small industries and rural area where people work at home for earning. The purpose of this study is to investigate and overcome the problems arising during the manual process of punching the Amla while manufacturing Murabba and provide a machine that is both economical and also yield better results to the operator. Also the ergonomics (health) of the operator is a big issue as it can cause harm to the workers wrist and hand. A Pro E model of the machine is prepared so as to modify it as per the need of process. There is no machine or equipment available for punching of Amla. The model is expected to provide in increase the productivity and laboring work can be minimized. Research presents step by step designing and manufacturing of a machine which is affordable and requires little or no training for operation and maintenance. Production rate can be improved and fatigue to the worker can be reduced.

Keywords

Economical manufacturing, Rural Area, Amla Punching machine, Design.

1. INTRODUCTION

In India, amlas are produced on a large scale which is used for various purposes such as making murraba, pickles, etc. But the method of making murabba by manual method is less efficient and not suitable to maker. This paper is on the design and analysis of amla punching machine. In rural areas, such type of machine is very useful and demanded. The making of amla's murabba by manual method consumes more time. This machine is not yet manufactured or invented, so we are going to design and analyze this machine which will reduce the time and increase the efficiency.

2. LITERATURE

Amla has been in use for pickle and preserve since ages in India and the methods employed were based on traditional knowledge of grandmothers. Besides, amla has been an important ingredient for Chavanprash, Ayurvedic health tonic. The methods used previously were unhygienic in nature and time consuming. The nutrient loss in these methods was higher. We also use the amla for making murabba. We use the manual method to punch the amla for making murabba. But, the problem is that minor accidents have also been reported during manual punching, pricking and shredding. The life of the manually prepared products was also less and the quality not up to the mark.

In 1995, BAIF implemented the "Jannothan Project." The project supported the plantation of Amla and Mango to uplift ("utthan") economically families from tribal communities.

Under the project, the Aonla Utpadak Samiti (committee) was formed and process unit developed to produce various products (i.e. candy, Ladoo juice, Squash, powder, pickle, etc). This initiative is now helping in revival of wastelands and also providing livelihood opportunities for tribal communities. [1] The rural communities can benefit a lot by marketing amla through collective marketing i.e. by forming producer organizations of local farmers/women's groups. It is important that the rights of farming communities and women have access to natural, productive and renewable resources like land, plant genetic resource, seeds, water and forest. [2] Khadi Gramudyog has been promoting Amla candies having a rich Vitamin C composition and a variation of Honey mixed with Amla (dark colored homogenous mixture) under the trade name "Honey n Amla" that serves as a good drink for diabetics when taken in with lukewarm water. [3] After being considered a minor forest produce for several years, commercial cultivation of amla has picked up greatly mainly due to rising demand for ayurvedic and nutraceutical products made from amla in India. About 122,614 acres are under amla cultivation in India with an output of 150,500 tonnes. Amla possesses the highest level of heat and storage stable vitamin C known to man. Its daily intake as fresh or processed form decreases serum cholesterol, prevents indigestion, controls acidity, liver disorders, premature graying and hair loss, improves eyesight and purifies blood. In India, various types of products are being made by Amla, such as: Amla murabba (preserve), Amla pickle, Amla ladoo, Amla burfi, Amla candies, Amla jam, Amla chutney, Amla powder, Amla juice, Amla squash.

3. REQUIREMENT OF THE MACHINE

We have decided to prepare the amla punching machine because mainly in rural areas people work under Khadi gramaudyog and they manufacture various products at home to sale. In this machine, the cylindrical needle platform punches the amlas on its whole circumference. A single amla is punched more than ten times on its whole surface. The depths of the punches are 10-15 mm. After getting punched, the amlas are discharged from the machine and can be collected on plastic carats. The machine is complete with electric motor, starter, etc.

The same process when done by hand as the people in rural areas who run Khadi Gramodyog at their home feels it difficult to punch the Amla so deeply because it needs so much effort to punch it. Therefore there is need to mechanize this process which will reduce the effort and the process easy and increase the productivity and economical. We are designing an AMLA PUNCHING MACHINE to make it affordable for small scale industry. Till now most of the small scale industries used to punch amlas manually which can prove harmful to the workers. This process is much more time consuming, less productivity. Especially in rural areas most

of the people do household business or many organizations in rural areas such as Mahila Bachat Gat do this business of punching the amlas and all the operations done there are manual which result in less production and thus less earning. Our machine has the capability to overcome these problems and to make life better for the people doing this business in rural areas.

3.1 Objective

The machine will be having low cost and will give high productivity. It will be less harmful and less power consuming machine and it will need less supervision and less man power required. With little or no training anyone can easily operate the machine and due its low cost it will be feasible to people of rural area to easily buy it.

4. CONSTRUCTION AND WORKING OF AMLA PUNCHING MACHINE

First select the suitable numbers of amla for punching. Selected amlas are poured in to the hopper. Through the hopper, suitable numbers of amla are dropped below in between the pair of cylindrical drum. Amla are then punched with the help of punching needles which are mounted on the circumference of the drum. After passing through the first pair of drum, then the amlas are dropped on the second pair of cylindrical drum so that the amlas are punched again. In this way the numbers of holes are made on the amlas. If the amlas are hanged in the punching needles, a special purpose amla removal tool is used to remove the hanged amlas. At last the punched amlas are collected in the collector and then it is used to prepare the morraba.

Amla punching machine is a rigid structure consist of following parts

- Frame
- Hooper
- Cylindrical Drum
- Punching Needles

- Shaft
- Bearings
- Flat Belt
- Pulley
- Amla Removal Tool
- Safety Guard
- Amla Collector

5. NEED FOR DEVELOPMENT

In manual punching process, the amlas are held in hand continuously to give grip to punch. This process is continuous and it may cause the wrist disease to the workers who are in this profession from long duration. When you grip, grasp, clench, pinch or wring anything in your hand, you use two major tendons in your wrist and lower thumb. These tendons run side-by-side from your forearm through the thumb side of your wrist. They normally glide unhampered through the small tunnel that connects them to the base of the thumb. In De Quervain's tendonitis (the term *tenosynovitis* is also used), the tendons' slippery covering becomes inflamed, restricting movement of the tendons. It is the inflammation of the tendon sheath that must be treated. So it is necessary to mechanize these types of manual processes so as to reduce the fatigue to the worker and to increase the productivity.

6. DESIGN BY USING PRO-E

Figure 1 and Figure 2 shows the Pro E model of proposed amla punching machine. If there will be any change in the machine than that can be made and modified easily as per the requirement of the procedure. The machine is actually about to fabricated and it will cost 15000/- approximately so that it can be feasible for anyone to buy. Before actually fabricating the machine will be analyzed using ANSYS to find out the areas of failure while working and needed changes can be made before actual fabrication. There are chances of stress over the needle shaft. So it will need more consideration while designing.

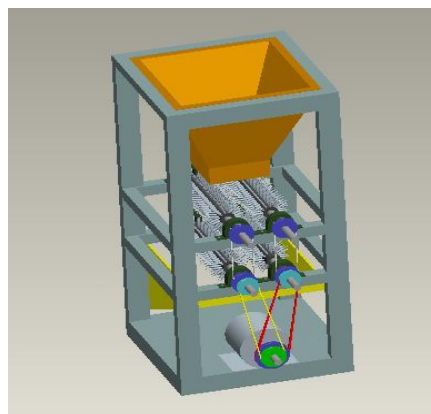


Fig 1 Assembly view of Amla Punching Machine

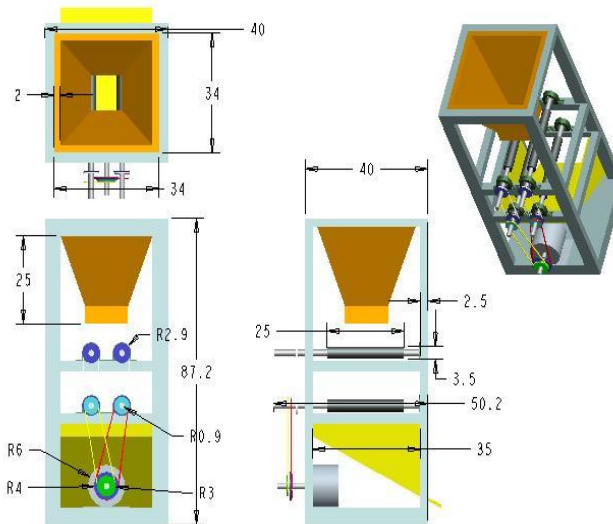


Fig 2 All views with Dimensions of Amla Punching Machine

7. CONCLUSION

Amla punching machine is efficient to punch the amlas which is used for preparing the murraba. This is the modern technology mentioned in the study for preparation of amla's murabba is hygienic, consume lesser time and provide maximum retention of nutrients. As the people in rural areas do household work under khadi gramudyog this machine will be beneficial for them as it is designed to make with material which is approved for food manufacturing.

8. REFERENCES

- [1] Amla Plantations Help in Livelihood Opportunities, Bhagpura (Udaipur) and Ghatol (Banswara), Rajasthan (from Raj Ganguly, Food and Agriculture Organization of the United Nations (FAO), New Delhi*)
- [2] A. Thimmaiah Sudhir, Netherlands Development Organization, Thimphu
- [3] cftri :<http://www.cftri.com/aboutus/index.html>
- [4] www.solomonsseal.net.
- [5] S. J. Ojolo and B. S. Ogunsina. "Development of a Cashew Nut Cracking Device". Agricultural Engineering International: The CIGR Ejournal. Manuscript PM 06 030. Vol. IX. June, 2007. pp 2-4
- [6] Gupta, G.K. and Bopaiah, M.G. (1986). An easy way to prepare aonla murabba with vitamin C content. *Ind. Hort.*, 31:15.
- [7] A thesis report on "Studies on Post-Harvest Technology of Aonla (*Embllica officinalis* Gaertn.) Fruits", Department of Horticulture, Sam Higginbottom Institute of Agriculture, Science and Technology, Allahabad during the year 2007 – 2009.
- [8] Theory of Machines (By S. S. RATAN)
- [9] Design of Machine Elements (By B. D. Shiwalkar)
- [10] Product Design (By Kevin Wood)
- [11] agrosaw <http://www.agrosaw.com/others.html>
- [12] M.G.I.R.I. Wardha