

Economic Garlic Peeling Machine

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Abstract— In this paper We have considered an economic machine for peeling garlic in large quantity. This technology gives a great value consideration for the food industries, which manufacture garlic based pickles and other food processing industries. The food industry in India is mainly dominated by small time manufacturers mostly in the unorganized sector. The food industry is also plagued with a big problem of inefficiency in its operations due to low degree of atomization for example cutting , peeling of garlic is done manually. The second big problem industry faces is short-supply of labour during peak seasons, which limits the capacity. In case of garlic peeling the garlic has to be filled in gunny bags and hit on the floor so that it separates into individual cloves and peels are loosened. This is a highly labour intensive process. More number of labours increases the cost of the peeling. Existing garlic peeling machines available in the today’s market are of high cost and also have complicated mechanism. So we have developed garlic peeling machine of low cost.

Key words: Garlic, Cost , Speed Variator

and again delivered into enclosure. This whole structure is mounted on stand as shown in following figure (a).

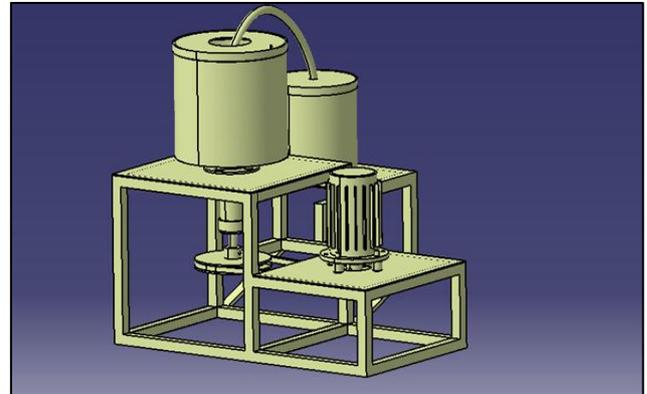


Fig 1: (a) Garlic Peeling Machine Model

I. INTRODUCTION

In India there are more than 700 Pickle manufacturers. To satisfy the needs of peeling garlic in an easier manner the Garlic Peeling Machine was developed. The conventional method of garlic peeling has caused various problems like high labour cost, burning in hands, production delay etc. It is a specialized machine to be used in the pickle industries related to continuous peeling of large quantities of garlic economically without damage. The cost of existing models of garlic peeling machine is high (\$900-\$1500). These high cost garlic peeling machines are not affordable to small scale food industries. So we have developed a economical garlic peeling machine at lowest possible cost, which enhance the use of garlic peeling machine in small scale food industries as well as in restaurants. For minimizing cost of the machine, simple components are used.

II. CONSTRUCTION

Electric motor of capacity 1/4 hp is fixed to the stand and it is coupled to the vertical shaft through belt drive. The shaft is mounted with the help of two ball bearings. Disc is mounted on vertical shaft and Deflector rods of trapezoidal cross section are mounted on disc to create required disturbance. Speed of motor is varied by speed variator. Around the disc, Enclosure of diameter 260 mm is fitted. Baffle plate is attached to top cover of Enclosure. Enclosure is closed by flat cover, which is hinged to allow access for feeding garlic cloves. Top cover is provided with an opening through which water is admitted in enclosure with the help of pump set. Oil seal is provided at the bottom of enclosure to avoid water leakage. Discharge pipe is furnished at bottom of enclosure which removes waste water and waste skin of garlic. This water is filtered at opening of reservoir

III. WORKING

Garlic to be peeled is fed into the enclosure which contain spider disc. Disc starts rotating with the help of motor and shaft assembly. Flow of water is started from reservoir to enclosure.

Due to the Deflector rod garlic is thrown upward in the enclosure. Water and baffle creates disturbance which makes garlic to strike at the surface of enclosure. Speed of disc can be varied by using motor speed variator according to the state of garlic. Due to these parameters, the outer covering of garlic gets loosen and get easily removed. The garlic waste can be easily drained out with the help of water from the enclosure outlet.

A. Machine Specification:

| Features | Garlic Peeling Machine |
|-------------------------|----------------------------------|
| Weight | 42 Kg. |
| Voltage | 230 V |
| Production Capacity | 50-60 Kg/Hr |
| Material | Interior made of stainless steel |
| Yield capacity | 100% |
| Price | Rs. 16,112 (\$260) |
| Shafting rotating speed | Variable |

Table 1: (a) specifications of garlic peeling machine

IV. COST ESTIMATION

Our main aim is to develop an economical garlic peeling machine, to satisfy this purpose we have used simple components and effective machining processes.

Total manufacturing cost can be calculated as
 Total cost= (raw material cost + machining cost +standard cost+5% overhead against)
 =2715+6180+6450+767
 = Rs. 16112 (\$260)

A. Comparison of Developed Garlic Peeling Machine with Manual Garlic Peeling Machine:

| | Manual Garlic Peeling | Garlic Peeling Machine |
|---|-----------------------|--|
| Objective: To peel garlic | 120 kg | 120 kg |
| Peeling Speed (In kg/hr) | 1 kg/hr | 50 kg/hr |
| Time required to peel garlic | $120/1=120$ hr | $120/50=2.4$ hr |
| Labour charges per hour | Rs. 10 per hr | Rs. 15 per hr (Rs.150 per day to one labour working for 10 hrs) |
| Total cost of peeling 120 kg garlic | $10*120=$ Rs.1200 | $15*2.4 =$ Rs.36 |
| Power consumption in peeling 120kg garlic | ----- | 0.2 units per hr (considering 2 units for 10 hrs) |
| Power charges | ----- | Rs.18 (considering Rs.9/unit for Industrial purpose in Pune) |
| Maintenance cost | ----- | Rs. 500 per annum |
| Total cost of peeling 120kg garlic | Rs. 1200 | Rs. 54 |
| Operating cost per Kg | Rs.10 | Rs.0.045 |

Table 2: Comparison of Developed Garlic Peeling Machine with Manual Garlic Peeling Machine

V. CONCLUSION

- According to feasibility, project is working efficiently. The machine is able to peel 1 kg split garlic in about 1 minute. Cost estimated for project was around \$250 USD (15,000 Rs). We completed the project in around \$260 USD (16112 Rs.). Machine satisfactorily removes the 1 kg garlic skin in one minute without any contamination. Price of other garlic peeling machines are around \$1500 USD (nearly 90000 Rs)
- We used simple components and done the project with overall cost of Rs.16112.
- With compromise only a little damage to split garlic, it may not affect our product, since at the end we used this peeled garlic for making paste for pickle and hotels.

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