

# DESIGN OF SEMI-AUTOMATIC ONION FRYING MACHINE EQUIPPED WITH TEMPERATURE, TIMER, SPEED CONTROL

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## ABSTRAK

**The purpose of this study is to provide solutions to existing problems in SME Fried Onion in Sidoarjo Region on the process of frying still conventional. The method used is to utilize technology TTS (Temperature, Timer, Speed Control) on the onion parser to produce fried onions with good quality and stable cooking temperature. The expected result is to improve the quality of fried onion productivity up to twice which initially only able to fry onion as much as 2 kg, can become 4 kg in one process of frying**

**Keywords:** *frying machine, fried onion, timer, speed regulator*

## I. INTRODUCTION

Fried onion is an important sprinkling or filling material in a dish. Almost all Indonesian specialties use this ingredient. Call it fried rice, soup, stew, rice uduk, even chicken satay. When eating these foods without fried onions must feel there is less. In accordance with the definition of complementary complement. (Wikipedia, 2015). Therefore the fried onion business is so promising. One of the SMEs engaged in the business of fried onions is SME Bawang

Goreng owned by Mr. Ahmad. SMEs Mr. Ahmad is the most dominant SMEs among SMEs living in the village Banar, District Pilang, Wonoayu regency, Sidoarjo

## II. BACKGROUND

Based on the results of research and observation with Mr. Ahmad (partner), during this process of making fried onion still using **traditional and manual way** also used machine is still **relatively simple**. Problems faced by partner SMES is on the frying process. In the process of **frying** (cooking) using artificial stoves so that the temperature is not controlled, but the frying process should require a high temperature of about 150-200<sup>0</sup>C. In the process of stirring when frying is done conventionally using a manual stirrer so easily tired and hands feel hot due to exposure to hot steam. The next problem is the process of frying takes a long time (5 minutes in a frying as much as 2 kg) so to complete 150 kg per day takes a long time. Because the narrow room makes the condition so hot that it is easy to sweat, causing less hygiene. The purpose of this CREATIVITY PROGRAM OF STUDENT is to increase the effectiveness of fried onion production with indicator: cooking process with controlled temperature, stirring machine with wiper

motor drive, frying process becomes faster with frying capacity doubled

### III. METHOD

To achieve the objective of this activity, the method used is displayed on the following flowchart

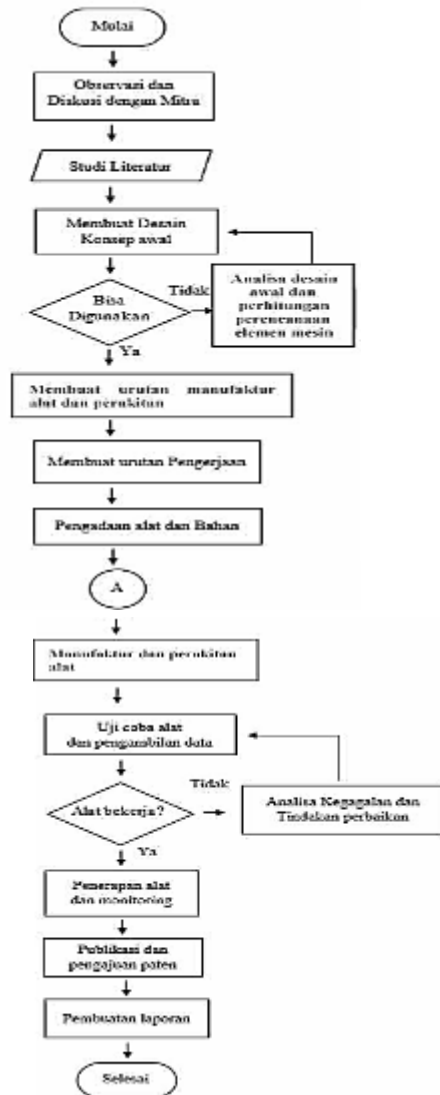


Figure1 Flow Chart of Implementation Method

#### Observation and Discussion with partners

This activity is the first step in finding the data of partner problems, such as partner production capacity, partner working hours, processed products, waste treatment,

and other sub-issues related to the economic, social and health aspects of the partners.

#### Study of literature

The literature study contain a series of search activities and reviews of relevant and reliable sources in the collection of materials and a reference in the application of technology to the making of our CREATIVITY PROGRAM OF STUDENTTT tools. The literature we use in the form of Mechanical Design Of Machine Elements And Machine by J.A. Collins., Elements - Mechanical Elements in Mechanical Design by Robert L Mott, translated by Ir. Rines M.T, et al., As well as Journals and Articles on the description of onion frying, and the results of earlier research or related tool technologies.

#### Create Initial Design / concept design

All ideas that are poured in an initial design that is also called the sketch drawing or concept drawing. The design of the machine used Autodesk Inventor 2015 Student Version software.

#### Preliminary design analysis and engine element planning calculations

From the initial design that has been made, analyzed and planned in the calculation of components of the engine elements with reference from the books that we use as a literature study. With this we can know the various possibilities in the process, whether it can be used, what in accordance with the wishes of partners, how much the cost of production, what are the constraints, how to overcome them, then what alternatives are used

#### Make the final Design / detail image

After the initial design is analyzed, planned and agreed upon by the team and lecturers, then what model will be created, then the final design or blueprint is used as a reference in the manufacture of the tool

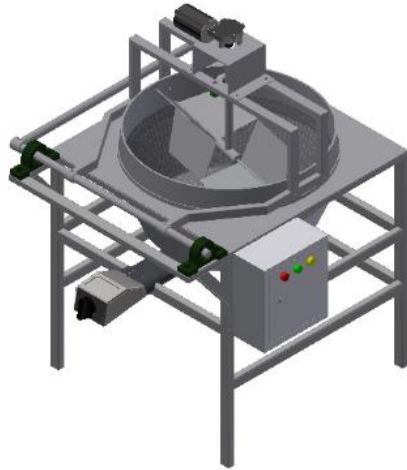


Figure 2 *Semi-Automatic Onion Frying Machine*

### **Creating manufacturing and assembly order**

The manufacturing order needs to be made to make it easier to make the tool, so that the process sequence can be done systematically

### **Procurement of tools and materials**

Before the work begins, of course, purchased materials in and tools used in tool work.

### **Manufacturing and assembling tools**

Once everything is available, including the tools to be used, the next step is to manufacture or assemble the tool. Usually this process takes a long time but done with a target of 1 month for the workmanship tool. If you encounter obstacles usually use the services of a public workshop or hire a handyman to finish making the tool

### **Trial Machine**

At this stage is done to determine the ability of tools that have been made, whether it is in accordance with the needs of partners. Testing the tool was done several times to get good results, the results of the trial then calculated to determine the performance of the tool in increasing partner productivity

### **Failure analysis and corrective action**

Not always a trial tool can instantly get satisfactory results. Therefore, if encountered unsuitable results need to be done Analysis of failure and corrective action

### **Implementation of tools and Monitoring**

Once the tool has been tested and gets good results, then tools are handed over to partners, and testimonials to get partner's opinion in tool performance. Monitoring is conducted to monitor the condition of the tools used by partners, then documented and retrieved data.

### **Publication and filing of patent**

The results of the program will dilaksanakan both scientifically and mass media with the aim that people know the benefits generated by the tools we make. Given the number of benefits generated by the CREATIVITY PROGRAM OF STUDENT made will be filed a patent through LPPM State University of Surabaya and HKI

### **Reporting**

After all the data of all activities collected then the report is made to be submitted as a responsibility for activities which will be uploaded to simbelmawa

## **IV. RESULTS**

Based on the manufacturing and assembly process, it is obtained the processing machine and semi-automatic cow milk packing system integrated 3 in 1 as shown in the following figure.





Picture 4.1 WANGSIT – *Mesin Penggoreng Bawang Semi Otomatis*

Table 1. Machine Spesification

No.	Description	Information
1	Dimension	(70 x 60 x 60) cm
2	Capacity	4 kg/process
3	Mixer	Electric motor
4	Heat source	LPG

After the machine is finished manufacturing, the next stage of activity is to test the engine to determine the engine performance.

Table 2. Data comparison of partner condition with machine

No	Perbandingan	SMES Mitra	Wangsit
1	Kapasitas	2 kg/goreng	4 kg/goreng
2	Pengadukan	Manual	Motor Listrik
3	Sistem	Konvensional	Dilengkapi ECU
4	Waktu	5 menit/goreng	

Referring to the results in Table 2 it can be said that the machine can work well. This can be seen from the performance of the machine that shows all the components work well especially in the stirring system,

the fryer that can be controlled and feels in accordance with the needs during the production process of fried onions in partner SMES.

## Discussion

Based on the results of machine implementation and monitoring in partner SMES, the results obtained that the process of stirring becomes more practical because the engine with electric motor drive, accelerate the frying process because the original only 2 kg once to 4 kg in one frying process that can save time, also more hygienic because the processing tube and stirrer is made of stainless steel. In addition, the partner SMEs are pleased with the existence of this CREATIVITY PROGRAM OF STUDENT activity, and hope that with this activity, the frying process becomes 2 times more effective and efficient so as to increase the productivity of his business menjadi 2-fold.

## V. CONCLUSION

Implementation “*DESIGN OF SEMI-AUTOMATIC ONION FRYING MACHINE*” very useful for SMES Fried Onion so that the production process becomes twice more effective and efficient which initially only 2 kg once frying to 4 kg in one process of frying. For the process of mixing becomes more practical because the machine is done with electric motor drive, the resulting product is also more hygienic because the processing tube and stirrer made of stainless steel

## REFERENCE

- [1] Biegel. J.E. 1998. *Pengendalian Produksi, Suatu Pendekatan Kuantitatif*. Terjemahan. Tarsito Bandung.
- [2] Budiman, Anton, G. Niemann, dan Bambang Priambodo. 1992. *Buku Elemen Mesin Jilid I*. Jakarta :

- Erlangga.
- [3] Hutahaean, Ramses Y. 2010. *Buku Mekanisme dan Dinamika Mesin*. Indonesia : Andi Publisher.
  - [4] L. Mott, Robert. 2009. *Buku Elemen-Elemen Mesin dalam Perancangan Mekanis*. Indonesia: Andi Publisher.
  - [5] Fuad, Ahmadi. 2001. *Karakteristik Teknologi Tepat Guna dalam Industri Skala Usaha Kecil dan Menengah di Jawa Timur*. Makalah yang disampaikan dalam rangka pelatihan produktivitas usaha kecil di Unesa. Tanggal 26 Juli 2001
  - [6] Haryono, dkk. 1999. *Buku Panduan Materi Kuliah Kewirausahaan*. Unipres UNESA Surabaya.
  - [7] Sutantra, I Nyoman. 2001. *Produktivitas Sistem Produksi dan Teknologi*. Makalah yang disampaikan dalam rangka pelatihan produktivitas usaha kecil di Unesa. Tanggal 26 Juni tahun 2001
  - [8] Sutiono. 2002. *Produktivitas SMES di Jawa Timur*. Makalah yang disampaikan dalam rangka pelatihan produktivitas usaha kecil di Unesa, Tanggal 26 Juni tahun 2002.
  - [9] Amiq, B. (2015). RANCANG BANGUN MESIN PENYANGRAI KOPI SEMI OTOMATIS DENGAN KAPASITAS 5 KG. Jurnal Rekayasa Mesin, 2(03).
  - [10] Sofyan, J., & Budijono, A. P. (2016). RANCANG BANGUN PERANGKAT PEMBELAJARAN PRAKTIKUM INSTRUMENTASI DAN KENDALI STANDAR KOMPETENSI MEMAHAMI SISTEM MEKATRONIKA DALAM PERALATAN KONTROL OTOMATIS BAGI MAHASISWA TEKNIK MESIN UNESA. Jurnal Pendidikan Teknik Mesin, 5(01).