

EFFORTS TO INCREASE TEMPE SLICING CAPACITY THROUGH THE IMPLEMENTATION OF APPROPRIATE TECHNOLOGY MACHINES FOR MSMEs IN WEST SURABAYA

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Abstrak.

Secara geografis Indonesia merupakan negara agraris. Hal tersebut sangat mendukung hasil produksi pertanian. Maka agar kualitas dan komoditas hasil pertanian (kedelai) tetap tinggi perlu adanya ide-ide atau gagasan baru salah satunya yaitu dengan mengolah kripik tempe menjadi berkualitas. Hal tersebut mendorong peneliti untuk mengembangkan sebuah inovasi peralatan yang dapat mempercepat proses perajangan tempe dengan membuat mesin teknologi tepat guna yang bisa menghasilkan rajangan tempe lebih optimal dibandingkan dengan metode konvensional yaitu 30 kg/jam. implementasi mesin teknologi tepat guna ini di gunakan pada UMKM kripik tempe kecamatan Sukomanunggal Kota Surabaya. dengan adanya mesin tersebut dapat membantu mempercepat proses perajangan tempe sehingga waktu produksi dapat ditingkatkan secara optimal.

Kata kunci: teknologi tepat guna, pengiris tempe, optimal.

Abstract.

Geographically, Indonesia is an agricultural country. It greatly supports agricultural production. So that the quality and commodity of agricultural products (soybean) remains high, it is necessary to have new ideas or ideas, one of which is by processing tempeh chips to become quality. It prompted researchers to develop innovative equipment that can speed up the tempe chopping process by creating an appropriate technology machine that can produce more optimal chopped tempeh compared to the conventional method, which is 30 kg/hour. This appropriate technology machine is implemented in UKM chips tempeh, Sukomanunggal sub-district, Surabaya City. The machine can help speed up the process of chopping tempeh so that production time can be optimally increased.

Keywords: appropriate technology, tempe slicing, optimal.

Introduction.

Indonesia is the largest tempe-producing country in the world and the largest soybean market in Asia [1]. Tempe can be made from various ingredients, including koro, peanuts and tofu dregs. However, what is commonly known as tempeh by the public, in general, is made from soybeans. Tempe is a favourite food of Indonesian people from the lower and upper classes. Apart from being cheap, the protein and other nutrients in tempeh can fulfil some of the daily nutritional needs of the Indonesian people. As with soybeans, tempeh can also be processed into several delicious, nutritious and high-value economic foods. One of the processed tempeh ingredients is tempeh chips [2]. The existence of discoveries in the field of technology proves that humanity's needs are always increasing from time to time. Time besides that, the emergence of new inventions is motivated by the use of limited human power, as is the case in UMKM tempe chips, where the process of cutting tempe is still mostly done manually. Therefore, a tool was designed to help workers cut tempe automatically, namely an automatic tempe chopper and adjust the thickness of the tempe [3].

MSMEs can always survive when the economy is not in good condition. MSME is a productive business to be developed to support macro and micro-economic development in Indonesia [4]. Small and Medium Enterprises (SMEs) in Indonesia contributed greatly to the national Gross Domestic Product (GDP) of 55.56% based on data from the Planning Bureau of the Ministry of Cooperatives and SMEs of the Republic of Indonesia in 2008. To expand market share and increase the competitiveness of SMEs, SMEs need an application that can integrate and automate SME business processes [5].

Minister of home affairs regulation number 20 of 2010 concerning Community Empowerment Through the Management of Appropriate Technology (TTG), currently the role of technology is very important to boost the performance of SMEs and overcome the difficulties they often face in this case in this case producing quality commodity goods. Through a touch of technology and supported by reliable human resources, it is hoped that the quality of products produced by SMEs can be maintained, so that they can compete with foreign products and the profits generated can also be greater. By utilizing technology, SMEs can accelerate production and provide added product value. Utilizing appropriate technology, SMEs can speed up the production process and provide added value to products. If producers still do the process traditionally, SMEs can save time and increase production capacity with machines.

The process of making tempeh chips begins with slicing the tempe into thin strips with a length of 6 cm, a width of 4 cm, and a thickness of 1 cm. Then the next step is to add seasoning to the tempeh and then the frying process. The Tempe slicing process determines the size of the production capacity of the Tempe chip business. With the increasing number of sliced tempeh that will be made into tempeh chips in a short time, they produce more tempeh chips. Currently, the process of slicing tempeh by SMEs in Sukomanunggal District, Surabaya City, is still done manually, as shown in Figure 1. The weakness of manually slicing tempeh by small and medium enterprises in Siliragung Village is that it takes a long time with non-uniform results and requires skilled labor. With faster and more tempe slicing, the tempe chips they produce will increase relatively quickly so that people's income will increase.



Figure 1. Conventional Process of Slicing Tempe

Implementation Method.

a. Field Survey

Field survey by surveying partner locations to identify the problems partners face when making tempeh chips. From the survey results to partner locations, making tempe chips, especially slicing tempeh into thin pieces, still uses the manual method, requiring particular expertise and a long time.

b. Discussion with Partners and Finding Problem Solving

Discussion with Partners and Finding Problem-Solving Based on the results of discussions with partners during the field survey, partner problems were found while making tempeh chips. The problem is the process of slicing tempeh which is still using the manual method. Based on the problems these partners face, a tool for the tempe slicing process is needed that is easy to use to reduce production time. As production time decreases, production capacity increases so that partner income increases.

c. Making a Tempe Slicing Machine

The process of making a tempe slicing machine begins with determining the design of a tempe slicing machine that is easy to operate. The next step, from the design that has been determined, is then carried out to design the components that have been determined based on the loads and other factors that occur in the Tempe slicing machine so that the machine is safe to use and has a long service life. This design stage also includes making working drawings which will later serve as a guide when making the machine [6]. A Tempe slicing machine was made at the Wijaya Putra University Mechanical Engineering Study Program workshop.

d. Testing Machine

The tempe slicing machine is finished, and before transferring technology to partners, trials are carried out on the machine that has been made [7], [8][9]. It aims to ensure that the tempe slicing machine functions optimally.

e. Implementation of the machine

The Tempe Slicing Machine Trial Is Done, And The Results Are Following The Specifications. The Next Stage Is The Handover Of The Tempe Slicing Machine To Partners In Siliragung Village, Siliragung District. During the machine handover, a brief training was also conducted on the use of the tempe slicing machine and its maintenance process so that the use of the machine can be optimal and, with good maintenance, can increase the service life of the tempe slicing machine.

This community service activity in Sukomanunggal District, Surabaya City, is a collaboration between the Faculty of Engineering, Wijaya Putra University, and the local government to improve the quality of life with a strategy of developing tempe chips small businesses for the local community which aims to carry out the planned program. The determination of the program was based on the results of brainstorming between officials, community leaders, and the Engineering Faculty Team, a community service activity program was determined, which included 1) the application of appropriate technology machines for the community and 2) increasing the quality and quantity of tempe chips small businesses.

Before the team carries out all activities, the team will socialize the program to the community to increase participation in program implementation. The activity continued by making materials, providing counseling or training, and then assisting in the field [10]–[14].

Several sources and tempeh chips sellers at traditional markets in the Sukomanunggal sub-district, Surabaya City, did this implementation. The data used in this study are qualitative and quantitative. The data is obtained directly or through primary data through interviews and questionnaires, as well as data obtained indirectly or secondary data from journals and previous research. In the first stage, the attributes of consumer needs were determined by interviews. Then the second stage is technical response data obtained from interviews with several SME entrepreneurs and

Results and Discussion.

In general, making the framework of a multifunctional Tempe slicing machine is divided into several stages: preparation of tools and materials, reduction of material volume, joining, and

finishing. Making the frame of a multifunctional Tempe slicing machine uses many cutting, drilling, milling, welding, and other supporting equipment. A manufacturing plan is needed to increase the effectiveness of the time needed for making this frame. It is necessary to have a guide that is described in general with a flowchart of the process of making the frame for a multifunctional Tempe slicing machine.



Figure 2. Counseling to Partners

Given the increasing price of basic needs today, many people are doing small and medium businesses to meet these basic needs. One of them is the business of tempeh chips. Now many small and medium businesses sell tempeh chips, one of which is in Sukomanunggal District, Surabaya City. With a savory and crunchy taste, these tempeh chips are trendy. The first step in this community service activity is to survey partner locations to identify the problems partners face when making tempeh chips. From the survey results to partner locations, making tempe chips, especially slicing tempeh into thin pieces, still uses the manual method, requiring particular expertise and a long time. For this reason, a tempe slicing machine is needed that is easy to use so that partners' production capacity increases in a short time that partners' income increases. The output of the implementation of the community service program activities is in the form of a tempe slicing machine, as shown in Figure 3.

journals.



Figure 3. Multifunctional tempe slicing machine

With this tempe slicing machine, it can reduce production time. As production time decreases, production capacity increases so that partner income increases. A comparison of slicing tempe manually and using a machine can be seen in Table 1.

Table 1. Comparison of conventional and machine sliced tempe.

Description	Konvensional	Slicing Machine
The resulting tempe	2.5 kg	30 kg
Time required	1 hour	1 hour

Conclusion.

The output of this community service activity is a tempe slicing machine which is easy to operate and maintain. The hope is that the tempe slicing machine as a result of this community service program, can increase partners' production capacity. With faster and more tempeh sliced with a

certain thickness, the product yield will also increase in a relatively short time so that partners' income will increase compared to the manual method that has been done by partners so far.

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