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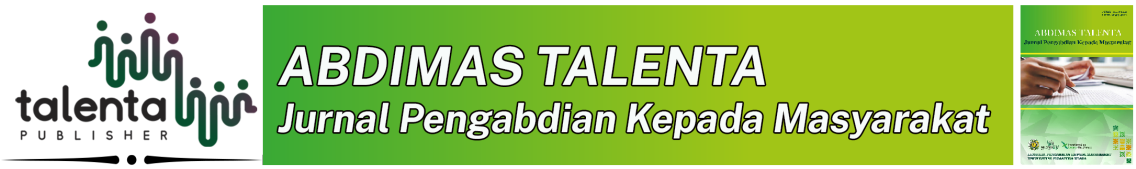

Drying Technology Improvement Rengginang to Increase Turn Over Turn Season in Sambigede Village, Malang Regency

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Abstract. The solution to the problems above that we offer is "Design of the Rengginang Drayer with Corn Cob Waste Energy as a Solution for Drying Rengginang in the rainy season in the Cap Krisna Rengginang industry in Sambigede Village, Sumberpucung District, Malang Regency". The results of this design are intended to increase income, especially community industrial groups in Sambigede Village, Sumberpucung, Malang Regency. The results of this design are the result of developing campus intellectual products that are in accordance with the urgency of the needs of the village community in the form of Rengginang drayer technology.

Keyword: Rengginang Drayer, Rengginang Industry, Corncob Energy

Abstrak. *Masalah yang dihadapi adalah 1) industri Rengginang Cap Krisna di Desa Sambigede masih kesulitan terhadap pengeringan rengginang dimusim hujan, 2) hanya industri besar dengan mesin pengering berdaya tinggi yang mampu mengeringkan rengginang disaat hujan, 3) mesin pengering yang digunakan untuk mengeringkan rengginang (Food Dehydrator) memiliki harga yang sangat mahal, 4) musim hujan menghambat pengeringan rengginang menggunakan energi sinar matahari sehingga pengeringan tidak maksimal, 5) pandangan masyarakat Sambigede terhadap solusi pengeringan rengginang dimusim hujan harus mengeluarkan modal yang besar harus dirubah. Solusi dari permasalahan di atas yang kami tawarkan adalah "Rancang Bangun Drayer Rengginang Berenergi Limbah Bonggol Jagung Sebagai Solusi Pengeringan Rengginang dimusim hujan Pada industri Rengginang Cap Krisna di Desa Sambigede Kecamatan Sumberpucung Kabupaten Malang". Hasil rancang bangun ini guna meningkatkan pendapatan terutama kelompok industri masyarakat di Desa Sambigede, Sumberpucung Kabupaten Malang. Hasil rancang bangun ini sebagai hasil pengembangan produk intelektual kampus yang seusai dengan urgensi kebutuhan masyarakat desa dalam wujud teknologi drayer rengginang*

Kata Kunci: *Drayer Rengginang, Industri Rengginang, Energi Bonggol Jagung*

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1 Introduction

The large role of MSMEs in the economic sector has been able to save the country from various economic crises that hit. MSME development is not something that is easy to do. There are obstacles that occur in carrying out development, and these obstacles are generally internal constraints in the form of limited technology and business management capabilities [1-2]. In addition, at this time the world is being shaken by the COVID-19 pandemic which has made all activities paralyzed and the economy weakened [3]. This also has an impact on the sustainability of MSMEs [4]. The pandemic situation presents a challenge in maintaining the existence of MSMEs and at the same time an opportunity to prepare MSMEs to face the industrial revolution 4.0. Therefore, the performance of MSMEs needs to be raised [5-7].

One of the efforts to raise MSMEs is carried out by Partner Village Service Program (PPDM) with Rengginang MSMEs in Sambigede Village [9]. Based on interviews with the MSME village headWhat needs to be revived is the Rengginang home industry, stamped Krisna. this SME still rely on solar energy to dry rengginang, so that during the rainy season the drying process of rengginang becomes less than optimal, as shown in Figure 1. Due to industry constraints in drying rengginang in the rainy season, equipment and skills are needed to increase efficiency and productivity in drying rengginang [10-11].

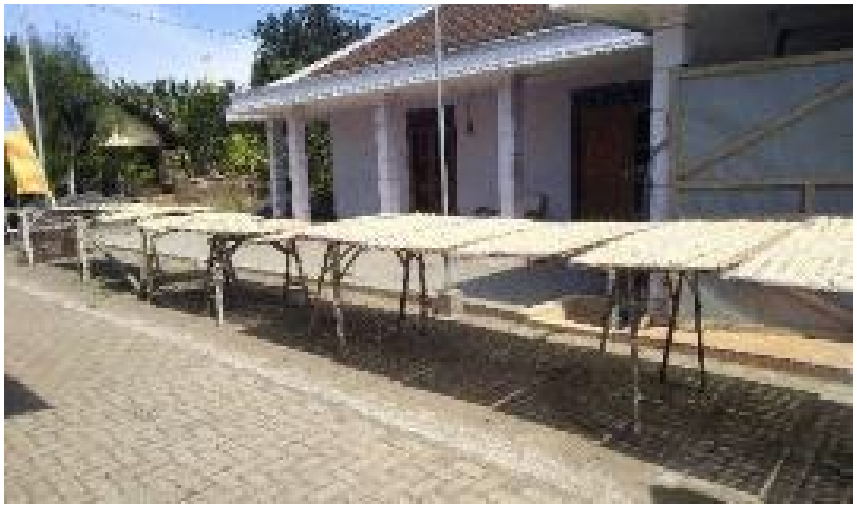

Figure 1. Rengginang Industry in Sambigede Village, Malang Regency

Kethicsa rainy season, where the drying process only depends on sunlight, making the production process limited [12]. If calculated from the current price of glutinous rice, it is around Rp. 12,500, while raw rengginang is sold for Rp. 20,000 per kg, then the gross profit is Rp. 7,500. Of course, this profit has not taken into account the costs for the packaging process, fuel, energy, time and the drying process which takes 2-3 days to dry until it is ready to sell. Rengginang drying is intended to remove or remove most of the water from a solid material by evaporating most of the water it contains using heat energy [13-15].

Usually, the water content of the material is reduced to a certain extent, where microorganisms can no longer grow on the material [16]. Drying can be done by using a dryer (Food Dehydrator) or by drying (sun drying), namely drying using direct energy from sunlight. The drying process will produce raw crackers with a moisture content of about 14% or raw crackers that are easily broken [17]. However, if the drying is not carried out properly and accurately, the dried food will potentially have a lower nutritional value than the fresh material. This means that if the drying of rengginang is hampered due to the lack of sunlight caused by the rainy season, it will result in a decrease in the efficiency of the drying process and the quality of the nutritional value of rengginang. So, in supporting the drying process of rengginang in the rainy season a Food Dehydrator machine is needed [18].

Another obstacle faced by MSMEs apart from the drying process is that they do not have good knowledge and understanding of management and packaging and labeling technology used in their products. The packaging is less attractive, namely with plastic packaging, paper labels are inserted inside the product and then closed with staples [19]. With this condition, Rengginang products have a limited market. Meanwhile, many similar products have been marketed in gift shops and supermarkets. This is not in accordance with the safety factor of food packaging. In fact, the taste of the rengginang is no less delicious than the rengginang products from other cities. Packaging and product form play an important role in consumer decision making. This is in accordance with the opinion of [20],

Based on this background, the community service team through UM's internal funds intends to hold community service as part of the tri dharma of higher education to the MSME Rengginang home industry in Sambigede with the aim of implementing the activities [21]:

1) Producing appropriate technology in the form of a Food Dehydrator machine, to improve the rengginang drying process for service partners.
2) Provide technical guidance on the use of the Food Dehydrator so that the production of rengginang can increase in terms of quality and quantity

2 Method

The method here is the pattern / system of actions to be carried out. The sequence/stages that are necessary in carrying out community service activities in the Community Partnership Program (PKM) scheme. The stages that need to be followed are as follows [22].

- Community situation analysis
- Identification of problems
- Determine work goals
- Troubleshooting plan

- Social approach
- Implementation of activities (implementation/socialization of design results)
- Evaluation of activities and results

3 Result and Discussion

Based on the problems that have been identified by the community service team, then the results of the implementation of community service can be identified as follows. First, make a Food Dehydrator machine so that it produces a machine that is really suitable for the drying process. Functional and structural approaches are used for the selection of the right machine components and materials so that the machine obtained is very efficient. After that, technical tests and engine performance as well as economic analysis were carried out. The design of this machine is planned with partners to find out the needs for the use of the machine, the required capacity, dimensions and arrangement of the tools to be used. While the manufacture of the machine is carried out in the UM mechanical engineering workshop which already has complete equipment so that it is easy to work on, assemble the machine and test it.

Working steps:

- Prepare the necessary materials and tools.
- Making the base frame (frame support) using the basic material of 3 mm square pipe which is assembled and welded to each other.
- Make a case. The casing is made of 1.5 mm steel plate which is rolled according to the size of the casing.
- Make ballast. The ballast is made of cast concrete construction, the function of the ballast is to balance the motor rotation and the stability of the tool.
- Make a filter. The filter is made of 1.5 mm stainless steel plate which is rolled according to size.
- Polishing filter assembly parts which has formed.
- Finishing, smooth the weld marks using a grinder and sandpaper.
- Base painting, to give color and prevent rust.
- Finishing painting. To give a neat shape and ready to use.

In the home industry, there are two drying methods used, namely by drying directly in the sun and by using a tool. in the direct drying method, the tools used are drying containers. However, these drying containers are generally not sterile, exposed to outside air, and use non-food grade materials in the manufacture of the containers. Meanwhile, in the drying process of rengginang by grilling, the tool used is the Food Dehydrator model. Vacuum dryer is a device used for the drying process by reducing the pressure in the isolated room. The drying process is an activity of changing the specimen (dried material) from the initial solid, semi-solid, or liquid phase, into a

solid product by taking the water contained in the specimen from the specimen to the surroundings. So, the result of the drying process is a solid product. When the pressure is reduced due to vacuuming, the relative humidity decreases as well. The decrease in relative humidity is a factor that affects the drying rate. Thus, the drying rate is not directly affected by a pressure drop, but by a decrease in relative humidity.

Assembly Material

The material used in this service is a material with a simple design so that it is easy to apply. In addition, the material used is a material that is safe for food processing (food grade) so that it can reduce the risk of harm that can be caused by the tool.

Prototype design of drying machine Rengginang as a whole (assembly) consists of 3 main parts, namely the frame, cover, and mesh. The three are assembled into a complete machine as shown in Figure 2. The assembly methods used include fastening using nuts and bolts, and welding.

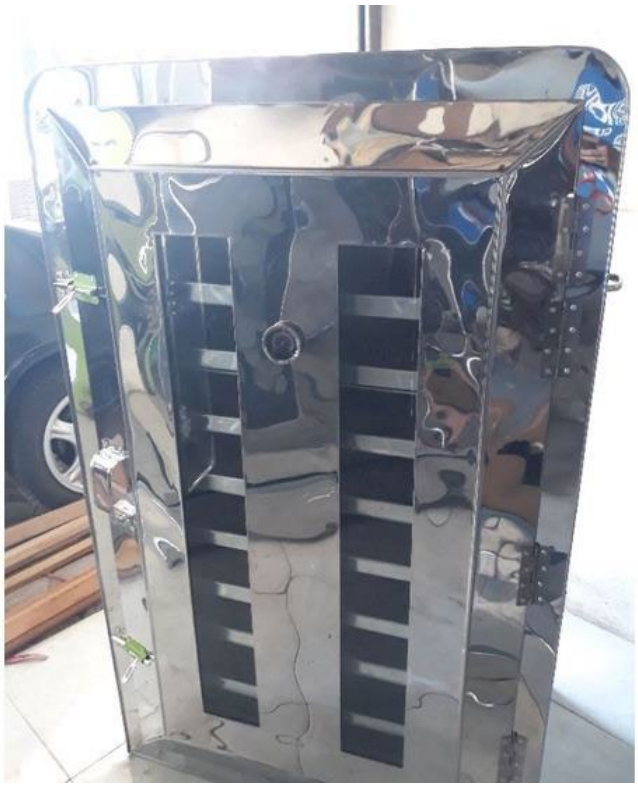

Figure 2. Rengginang Engering Machine on the Cover Made of Plate

Rengginang Drying Machine Another part that composes the Rengginang drying machine is the tray (mesh). This part is made of 1.5 mm thick stainless-steel plate, the purpose is to use stainless steel material because this part is in direct contact with food so it is not allowed to react with food (sterile). The tray section can be seen in figure 3.

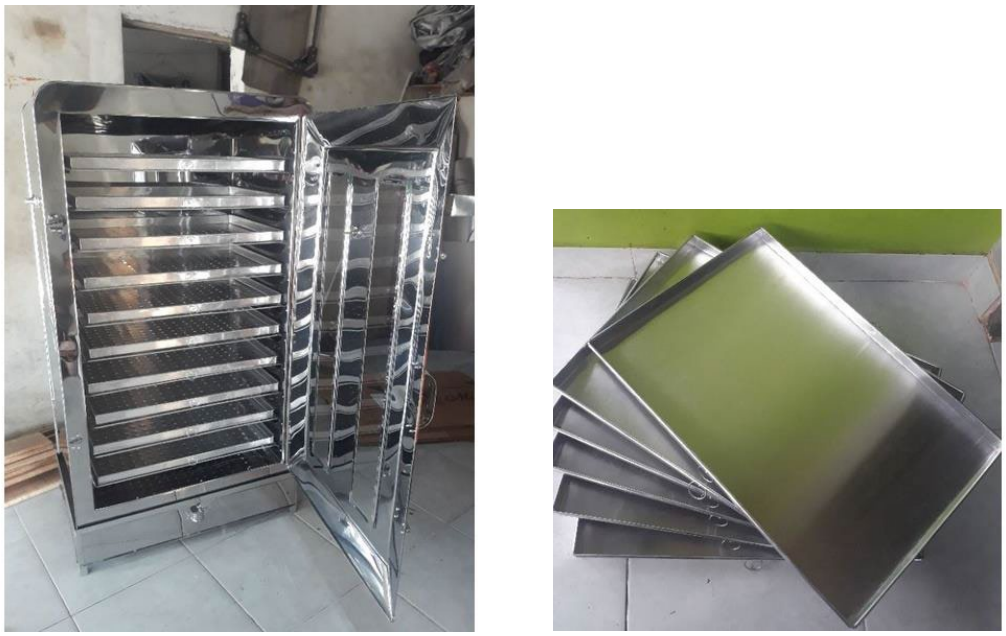

Figure 3. Inside of the Rengginang Drying Machine and Tray

In this service activity for the rengginang drying process, tools are used that can reduce the weaknesses of the previous tools used both in home industries and large industries. The tools used in this service are tools that use centrifugal force for drying and low-power blowers.

Drying process steps:

1. Open the engine cover and enter the still wet rengginang in the amount according to the engine capacity (40 kg).
2. Adjust the orientation of the rengginang in the filter so that it is evenly distributed and does not clump. If the size of the rengginang to be dried is small, then use gauze as a rengginang wrapper first, then put it in a sieve and adjust.
3. Close the engine cover and turn on the power button to drive the motor.
4. The filter and the rengginang in it will rotate in the machine, due to the rotation, the rengginang will be subjected to centrifugal force out of the center of rotation, where this force can be used to squeeze out the water content that is still in the rengginang.
5. The drying process takes about 10 minutes and can reduce the moisture content of about 75 percent of the initial content of rengginang.
6. After the drying process, the machine can be turned off and the rengginang can be removed from the machine.
7. Done.

Analysis of Water Content Contained in Rengginang Ingredients

The water content contained in food ingredients is the amount of water content per unit weight of the material, usually in % wet basis (bb) and % dry basis (wk).

$$\% bb = \frac{Wm}{Wm + Wd} x\ 100\%$$

$$\%bk = \frac{Wm}{Wd} x\ 100\%$$

Where:

%bb : Percentage of wet weight

%bk : Percentage of dry weight

Wm : mass of water (kg)

Wd : dry mass(kg)

In this service, testing of the results of drying rengginang is carried out on rengginang that has been processed from basic raw materials, which are then dried using 2 methods, namely:

1. Drying in the sun

   Sun Drying Drying Generally, business actors for making rengginang at the SME level often use this type of drying method because it is considered very easy and inexpensive to implement. However, there are several obstacles in this type of drying technique, which are related to the weather or climate and the availability of drying places. If the weather is hot then drying can be done all day but if the weather is cloudy or rainy then the drying activity will be disrupted and this can be fatal to the continuity of the rengginang business. In addition, the availability of a place for drying is also very decisive, an open place is needed where direct sunlight can enter, this requires a relatively large area and must be protected from dust and dirt.

2. Drying with a dryer

   Drying with a Dryer Due to the limitations of the conventional drying method through sun drying, a certain method that is easier and environmentally friendly is needed, namely using a moisture content dryer made by the UM community service team. This tool has a capacity of 40 kg wet weight. As for how to use are; Rengginang material that has been processed and still contains water content is then put into the dryer according to capacity. After the rengginang is inserted, the machine is closed and then turned on to carry out the drying process. The drying time carried out in this service varies from 3, 5, 7, and 10 minutes. Where the results of drying will be weighed. In this test the weight of the wet rengginang tested is 3 kg,

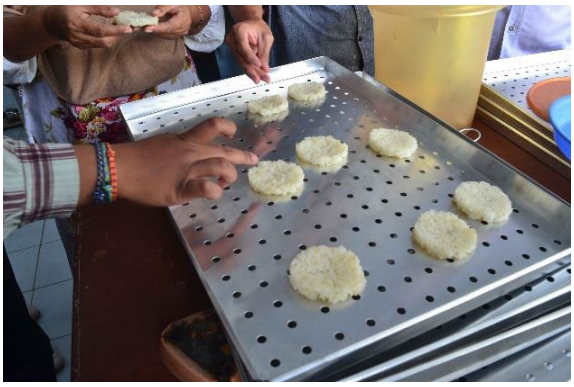


Figure 4. Rengginang Test

The next statistical test is a test of the results of the drying process using the manual drying method under the hot sun with the machine drying method with a duration of 10 minutes, the data tested can be seen in the following table.

Table 1. Drying Drying (1 hour)

No. Test	Initial weight (kg)	Sun drying weight (kg)	Weight of drying with the tool (kg)
1	3	2.79	2.63
2	3	2.81	2.60
3	3	2.78	2.65
4	3	2.82	2.58
5	3	2.81	2.60
6	3	2.78	2.62
7	3	2.83	2.56
8	3	2.81	2.60
9	3	2.79	2.62
10	3	2.80	2.62
11	3	2.79	2.63
12	3	2.80	2.63
13	3	2.78	2.65
14	3	2.78	2.65
15	3	2.81	2.60
Average		2.8	2.62

Source: Primary data processing

From the test results above, it is known that the average weight of drying using the manual method is 2.8 Kg and the average weight of drying using a machine with a duration of 10 minutes is 2.62 Kg. The test results obtained the value of sig t < (0.05), meaning that H0 was rejected, and H1 was accepted. This means that there is a significant difference between the weight of the drying method using the manual drying method and the drying method using a machine with a duration of 10 minutes.

Advantages of Using Tools

The tool designed in this service is a non-emission engine in the form of smoke and dust because this causes a lot of fuel used in the drying process so that during the drying process, we can minimize the fuel used in combustion. On the other hand. The tool that has been designed in this service is a tool that does not require electricity so that the tool can be used for a long period of time but at a fairly low cost and is environmentally friendly. In addition, because of the simple construction of the tool, it is easy to make and apply to small-scale industries. If in general the drying process in large-scale industries is very noisy, then this tool has a low noise level because the mechanization does not use gear boxes or gears.

Here are some of the advantages of this machine:

1. Does not require electricity consumption
2. Does not produce smoke and dust emissions
3. The waste produced is in the form of Rengginang juice, which is not harmful to the environment.
4. Easy to make with relatively low cost, besides that it is easy to use.
5. Does not make noise like other dryers.
6. The material on the filter components is made of food grade stainless steel which is not easy to react with food and does not cause toxins. So it is safe for the food industry.

4 Conclusion

The final stage of this activity is monitoring, mentoring and technical evaluation. Monitoring and assistance is carried out during the implementation of this activity until the training participants can do it independently. Monitoring will be carried out by members of the driving group/committee together with the PKK management to observe the implementation of the program. Meanwhile, technical evaluation will be carried out to identify the tennis characteristics of the machine made, determine the performance of the textile dye machine, analyze the economics of the machine in producing products in the form of; Cost of goods, BC ratio, BEP and calculated with the bank's interest rate. Provide assistance on packaging redesign to expand online marketing. in this activity partners and the surrounding community will be trained how to market products online via the internet on the sites shoppe.com, bukalapak.com, and tokopedia.com, this activity consists of creating an account on these sites, entering merchandise, selling, preparing goods shipping, packaging, shipping and earning revenue from the account.

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