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Technology Innovation of Ginger Spring Machine as a Traditional Jamu for Coronavirus Prevention

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Abstract*. The COVID-19 disease, including its prevention and treatment, is becoming a lively conversation in the community. There are many ways to protect yourself from the coronavirus. Apart from doing social distancing, consuming traditional drinks can also be a great way to increase endurance. Jamu has been a part of traditional Indonesian medicine for a long time. Herbal medicine is believed to provide a number of health benefits as well as to treat various diseases. Traditional spices are quite effective in maintaining endurance and are one of the solutions against the increasingly aggressive coronavirus (Covid-19) outbreak. Ginger drink is one of the traditional drinks that is easy to make and has the power to increase endurance to avoid the coronavirus (Covid-19). Ginger contains the bioactive compound gingerol which can fight the respiratory syncytial virus that causes respiratory infections. To make the ginger drink, it is necessary to squeeze ginger from the dregs. So far, the processing is done manually by using a grate and squeezing it by hand. People who grate get tired, especially if they have to grate large amounts of ginger. Based on this, appropriate technological innovations need to be applied to increase production yield and quality of squeezed ginger, namely by making the design of "Automatic Ginger Squeezing Machine" which is quite practical and can be used on a household scale with a capacity of 35 kg/hour and a power of 750 Watts. Ginger that is processed in this machine will be immediately separated from the pulp. The production process will be shorter and more efficient because the ginger juice and pulp are separated automatically with a larger capacity. This machine uses stainless steel to ensure the quality of the processed product and maintain the health of the process. This machine works automatically from the beginning to the end of the ginger pressing process.*

Keywords *- Ginger, Traditional Herbal Medicine, Automatic Ginger Pressing Machine, COVID-19*

INTRODUCTION

The COVID-19 disease, including its prevention and treatment, is becoming a hot topic of conversation in the community. There are many ways to protect yourself from the coronavirus [1]. Apart from doing social distancing, consuming traditional drinks can also be a great addition to increase endurance.

Jamu has been a part of traditional Indonesian medicine for a long time [2]. Herbal medicine is believed to provide several health benefits as well as to treat various diseases. Even recently, there has been speculation that the habit of Indonesians consuming herbal medicine makes it difficult to contract the coronavirus [3]. Traditional spices are quite effective in maintaining endurance and are one of the solutions against the increasingly aggressive coronavirus (Covid-19) outbreak [4]. Jamu is an ingredient or ingredients in the form of plant ingredients that have traditionally been used for treatment based on empirical experiences in society. Treatment using traditional medicines is an alternative in the field of medicine. The goals of treatment with traditional medicine include prevention (preventive), (promotive), and treatment. According to current research, traditional medicines are indeed beneficial for health and are now being used because they are easier to reach by the community, both in price and availability. Currently, traditional medicine is widely used because according to some studies it does not cause side effects and can still be digested by the body. One way to prevent being infected with the coronavirus (COVID-19) is to increase the body's immune system or the body's immune system. One of the ways to increase immunity and nourish the body is by consuming spices, which is supported by an expert on herbal medicine Universitas Airlangga Prof. Mangestuti Agil, MS., Apt through his research on spices for body health. Based on field observations, information was also found that many people think that this coronavirus cannot survive hot temperatures. So the community's actions to prevent the spread of this virus include consuming ginger water or ginger-based drinks (red ginger or other ginger) [5].

Ginger drink is one of the traditional drinks that is easy to make and works to increase the body's resistance to avoid the coronavirus (Covid-19) [6]. Reporting from MedicalNews Today, this spicy flavor is also proven to have anti-inflammatory, antioxidant, antibacterial, and antiviral properties so it is good for maintaining endurance [7].

Professor of Airlangga University and Chair of the Corona and Vaccine Formulation Research Team, Chairul Anwar Nidom, said that the coronavirus can be overcome with herbal medicines containing curcumin. This substance is found in empon-empon which is often used as a cooking spice, one of which is ginger. This coronavirus is one kingdom with influenza that can be prevented or prevented by curcumin. Curcumin can increase immunity so that the body's resistance to disease increases [8].

Early prevention needs to be improved to deal with these positive cases of the corona. One form of prevention that can be done is to increase endurance [9]. Endurance can be increased by regularly consuming herbal ingredients such as ginger. Routinely drinking ginger water every morning can increase endurance, make the body healthy and fresh, and avoid various viruses, including the coronavirus. Ginger contains the bioactive compound gingerol which can fight the respiratory syncytial virus that causes respiratory infections.

Research shows, gingerol also has properties to prevent cancer cells from developing. The gingerol in ginger also helps lower the risk of infection. Quoted from Healthline, ginger can inhibit the growth of viruses and bacteria. Studies have shown that ginger is very effective against the RSV virus, a common cause of respiratory tract infections [10]. Minister of Health Terawan Agus Putranto also appealed to the public to adopt a healthy lifestyle and maintain immunity to reduce the potential for virus infection. A good immune system is a key to avoiding all kinds of diseases [11].

A fit body is an important factor for being productive. Busyness sometimes makes people forget the importance of maintaining stamina to stay healthy. One way to keep the body in good shape is by consuming ginger because ginger functions as an immunomodulator to increase the body's immune system [12]. According to Professor Dodik Briawan, IPB community nutritionist, the ginger plant contains antioxidants that function as free radical scavengers. The ginger rhizome contains 19 bioactive components that are useful for the body's immune system.

Based on Dugasani's research in 2010 in Comparative Antioxidant and Anti-inflammatory Effects of Gingerol and Shogaol, ginger contains gingerol and shogaol which are proven to have the ability to increase immunity so that they are not attacked by dangerous diseases, bacteria, and viruses, including the Coronavirus. Apart from functioning as an antioxidant, this rhizome plant called Latin Zingiber officinale also functions as an antiemetic to antibacterial and inflammatory [13].

To make a ginger drink, it is necessary to squeeze the ginger from the dregs. So far, the processing is done manually by using a grate and squeezing it by hand. The problem with using this kind of manual system is that the extortion process that is done by hand can harm health. People who grate get tired quickly, especially if they have to grate large amounts of ginger [14].

Related to the above, previous research has been carried out, namely by Darmono, Lecturer at the Department of Mechanical Engineering and Building Engineering Education, FT UNY. According to the Journal of Inoteks, Vol. 7, No. 1 June 2014. Darmono made a study entitled "MAKING A GINGER EXPRESS MACHINE FOR A SMALL INDUSTRY OF POWDER GINGER COFFEE". The size of this ginger squeezer machine is 140 cm long, 70 cm wide, and 120 cm high using the power of a 4 HP gasoline motor.

The obstacles encountered at that time were:

1) During laboratory trials, the process of entering ginger into the grinding cylinder was not smooth, which was overcome by reengineering the introduction of the ginger base material.

2) While the obstacles encountered during the field trials were two, namely the ginger extract produced was still mixed, with the remains of the squeezed ginger, and the machine transfer to another place was very heavy.

Based on this, an appropriate technology innovation needs to be applied to increase the production and quality of ginger squeezed by making the design of "Automatic Ginger Squeezer" which is quite practical and can be used on a household scale that functions to separate dregs and ginger water automatically. This machine uses stainless steel to ensure the quality of the processed product and maintain the health of the process [15].

This ginger squeezer can extract ginger juice at a relatively high and consistent speed so that this tool is expected to help facilitate the work of separating the ginger juice from its dregs.

Judging from the operating technique, this automatic ginger press machine works with a fairly simple mechanism, not too difficult so that it can be used to squeeze the pulp of ginger by pressing it, so it is hoped that the time needed will also be faster and the energy will be lighter. It is hoped that an increase in efficiency and productivity will occur. Production capacity will also increase.

The construction of this machine is quite simple, namely the productivity of this ginger press is much better when compared to manual squeezing (by shredding it and then pressing it with hands). It is different if the extortion is done manually. Taking ginger juice manually requires two steps, namely grating and squeezing it yourself. Thus, the manual way of extracting ginger juice depends on the skills of the workers.

If you use this automatic ginger press machine, you will not waste anything because the juice of ginger is free from fermentation and is clean so that it can be processed into ginger drinks, while ginger dregs can be reprocessed into healthy food and have functional value by making food processing innovations, namely cakes. dry (cookies) are delicious with a variety of flavors according to taste so that it is economical. It is hoped that processing can have

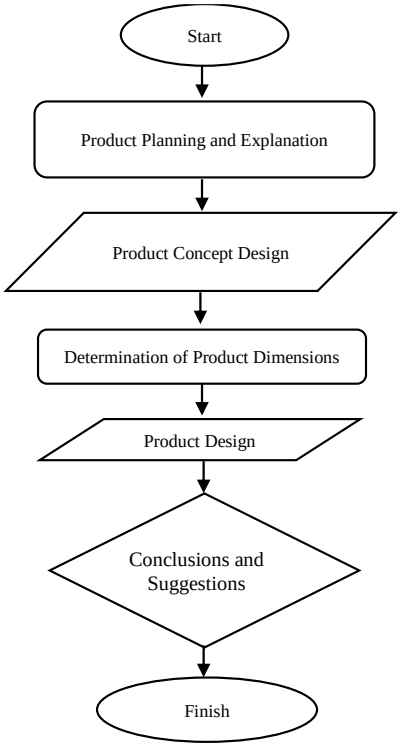
added value for food and become new business opportunities. This is a new potential development that can be developed into a Business to Increase Family Income (UP2K). Ginger is not only limited to traditional herbal medicine but the use of ginger dregs can be a job opportunity for housewives so that it can increase motivation and revive an independent creative economy [16].

The formulation of the problem in the "Automatic Making Machine for Ginger Extraction" is that there is no machine as an innovative ineffective technology with standard operating procedures that functions to separate the pulp from ginger water so that water and ginger dregs can be utilized optimally.

The specific objective is to design the Automatic Ginger Milking Machine design as an appropriate technology innovation with a standard operating procedure that functions to separate the pulp from ginger water so that water and ginger dregs can be utilized optimally. Ginger water can be used as a traditional herbal drink as a form of prevention against the coronavirus and ginger dregs can be used as healthy food preparations, namely cookies of various flavors according to taste, and is expected to be a new business opportunity to increase income and turn on an independent creative economy.

METODS

The research method used is an engineering method which is a design activity, so that there is a contribution in the form of a prototype, and tool design.



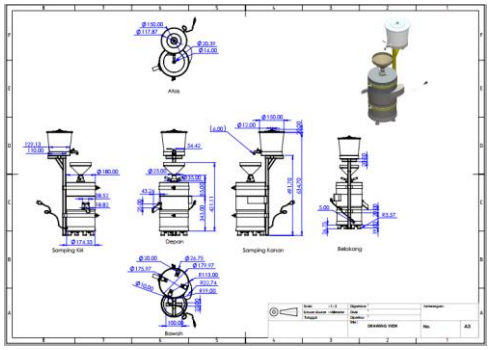
Ginger that is processed in this machine will be immediately separated from the pulp. The production process will be shorter and more efficient because the ginger juice and pulp are separated automatically with a larger capacity. This machine uses stainless steel to ensure the quality of the processed product and maintain the health of the process. This machine works automatically from the beginning to the end of the ginger pressing process. No time is wasted. The process of squeezing ginger with this machine is effective and efficient [17].

This automatic ginger press machine is superior to the conventional ginger press. This machine can produce more ginger water with quality and easy process. The process of squeezing ginger from start to finish can be done with this machine so that it can reduce costs and maximize the results to be produced. The automatic ginger press machine will make the separation process, which initially took a long and difficult time, becomes easier and shorter. This machine produces quality ginger water with better taste because the pulp is completely separated [18]. This machine is designed with a small and sleek appearance so that it can be placed in any room, even in a small area, easily. Even though it is smaller in size, this machine has a large capacity. This machine has a minimalist design following the needs of today's society. All parts of the machine can be cleaned and cared for easily without the need

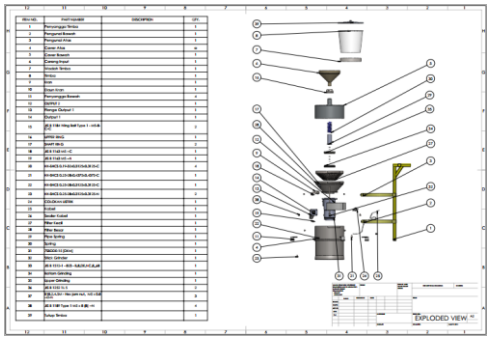
to use a special cleaning service. So that it will make this machine well maintained [19]. The material used as the base material in the machine is stainless steel or stainless steel which is more durable. The use of stainless steel makes the machine durable. The resulting ginger juice is also more hygienic [20]. This machine comes with complete features. There is no waste. The resulting ginger water is cleaner and of higher quality. The use of machines also does not require special skills because it is easy to operate [21]. This machine works automatically in separating the dregs. The use of this machine can also streamline production because the required production time tends to be shorter than with other machines or manual methods. So that the business opportunities using this machine as a tool to make ginger juice are getting bigger [22].

RESULT AND DISCUSSION

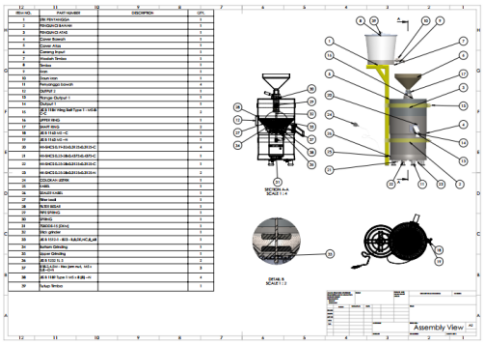
Drawing View



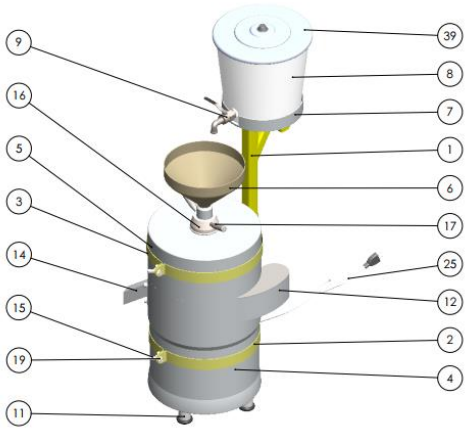
Exploded View



Assembly View



Design Tools



Automatic ginger press machine specification

1. Framework to support the water reservoir. Serves as a buffer for water reservoirs used as water reservoirs and is made of iron. P = 110 mm, w = 20 mm, t = 491.70 mm.
2. Bottom lock
   Serves as a lock under the supporting frame for the water container to the frame of the ginger press. D = 173.33 mm, t = 20 mm.
3. Top lock
   Serves as a lock on the support pole for the water container to the frame of the ginger press. D = 180 mm, t = 20 mm.
4. Bottom cover
   Serves as the bottom layer or frame of the ginger press. D = 173.33 mm, t = 343 mm.
5. Top cover
   Serves as the bottom layer or frame of the ginger press. D = 180 mm, t = 85 mm.
6. Input funnel
   Serves as a container for the initial ginger material after it is cut into small pieces before entering the machine for the squeezing process. D = 29.13 mm.
7. Place the water reservoir
   Serves as a place for placing a water storage container so that it is locked to the support frame. D = 117.87 mm.
8. Water reservoir
   Serves as a reservoir or water storage for use in the process of squeezing ginger. D = 150 mm, t = 143 mm.
9. Faucets
   Serves as water output from the water reservoir to the machine for the ginger squeeze process. P = 6 mm.
10. Leaf faucets
    Serves to adjust the size of the volume of water that comes out of the water container into the machine for the ginger squeeze process.
11. Lower support
    Functioning as the supporting legs or frame legs of the ginger press so that when it is operated, the machine is stronger and does not sway. D = 26.75 mm, t = 19 mm.
12. Ginger pulp output
    Serves as an output medium or a place to collect ginger dregs after going through the extortion process.
13. Output flange 1
    Serves as a pathway for ginger water output after going through the squeezing process. P = 43.26 mm, l = 25 mm.
14. Output from the juice of ginger
    Serves as the outlet of ginger water after going through the squeezing process. P = 43.26 mm, l = 25 mm
15. Wing bolts
    Serves as a fastener for the top lock so that the support frame the water catcher can be bonded to the frame of the ginger press.
16. Upper ring
    The top ring serves as a load so that the funnel locking bolts can be tightly attached to the ginger press. D = 35 mm.

17. Lever
    Serves to regulate the grinding pressure during the squeezing process of ginger so that the ginger can be squeezed until smooth. D = 25 mm.
18. Wing bolt / upper wing
    Serves as a binder to lock the top so that the supporting frame of the water container can be tightly tied to the frame of the ginger press.
19. Wing bolt / lower wing
    Serves as a binder to lock the bottom so that the supporting frame of the water container can be tightly tied to the frame of the ginger press.
20. Bolt L
    Serves as a lock for the output flange to tighten the frame of the ginger press.
21. Bolt L
    Serves as a lock for the machine feet so that they are tightly tied to the base of the ginger press.
22. Bolt L
    Serves as a lock for the machine feet so that they are tightly tied to the base of the ginger press.
23. Bolt L
    Serves as a lock for the machine feet so that they are tightly tied to the base of the ginger press.
24. Electric plug
    As a connector or connector for electricity to turn on the ginger press.
25. Cables
    Serves as a medium for conducting electricity to the ginger press.
26. Cable sealer
    Serves to prevent water or dirt from entering the ginger press through the electrical holes or cables.
27. Small filter
    Serves as a second filter for media that separates the pulp from ginger water
28. Great filters
    Serves as the first filter for media that separates coarse ginger pulp and finer pulp.
29. Pipe spring
    Namely, the pipe to place the pressure spring in the ginger press.
30. Spring
    It is a spring that functions as a pressure for the ginger pieces to enter the press machine and can go through the squeezing process.
31. Electric motor
    Serves as a driving force for the ginger squeeze process.
32. Stick grinder
    Namely, the shaft/axle functions to transmit power from the electric motor to rotate the grinder or grinder of ginger.
33. Bearing
    Serves as a home for the shaft rotation/axle.
34. Bottom grinding (Grinding Down)
    Serves as a ginger grinder from the bottom of the ginger press.
35. Upper grinding (grind top)
    Serves as a ginger grinder for the top of the ginger press.
36. Bolt flange
    Serves as a lock grinder so that it is firmly attached to the shaft of the ginger press.
37. Myrrh
    Serves as a grinder bolt lock
38. Bolt flange
    Serves as a lock from the electric motor
39. Close the water collection container
    Serves as a cover for the water container so that the water in the reservoir is kept clean

CONCLUSION

In designing this automatic ginger press machine, the following conclusions are obtained this design uses SolidWorks with automatic ginger press machine dimensions 174 mm x 174 mm x 644 mm, 750 Watt power, 220 Volt voltage, 25-30 Kg/hour efficiency, 2800 RPM speed, and stainless steel material and this design is based on the community's need for ginger water as a traditional herbal drink for the prevention of the coronavirus.

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