



THE DESIGN AND FUNCTIONAL TEST OF KAHWA DAUN ROASTING EQUIPMENT IN WEST SUMATRA

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Abstract : *Kahwa Daun* was herbal tea which is produced by the people of West Sumatera as a local wisdom. *Kahwa Daun* traditionally is made of the fresh coffee leaves. Traditionally processing *Kahwa Daun* need a long period of time that was 2 weeks with product yield around 750 grams. This amount is sufficient for family consumption only. Since the slogan back to nature has become popular, *Kahwa Daun* start to marketed and in demand by the public, so that *Kahwa Daun* product and industrial scale was a chance. Responding to this challenges, the research *Kahwa Daun* processing equipment was conducted. The equipment was designed consist of a rotating cylinder that was made from stainless steel with 5 rpm speed, powered by a 0,25 HP electric motor and heat energy source came from LPG stoves.

IndexTerms - kahwa daun, drying equipment, design

I. INTRODUCTION

Kahwa daun is one of the community's traditional beverage of West Sumatera. This beverage was made of dried coffee leaves which was boiled by water. Coffee leaves was dried by using traditional method that was called disangrai. The green coffee leaves was put on the fireplace and was ready to be used or packed after the color turn into brown [1]. Based on a survey conducted by [2] on makers that leaves in 3 regencies (Tanah Datar, Agam and Limapuluh Kota regencies), there are 3 techniques in making coffee leaf tea (which leaves) in the community, namely 1. Coffee leaves dried over a fireplace (in the dark), 2. Fumigation, 3. Burning. Each technique has weaknesses, such as low capacity production process, poor uniformity of yield, long and not predictable processing times. This condition, results in limited kahwa daun processing, non standard, and product was marketed locally. Since the slogan of returning to nature has become popular, Kahwa Daun began to be marketed and in demand by the public, so that the Kahwa Daun product and the industrial scale are an opportunity. Responding to this challenge, research on the Kahwa Daun processing equipment was carried out. The roasting process came from the word sangrai (in Indonesia Language) which means frying without edible oil. So that roasting can be interpreted as a process of frying ingredients without using oil. The roasting is a process of moving heat without media or using sand with the aim of getting a certain taste [3]. The equipment designed consists of a rotating cylinder made of stainless steel driven by an electric motor 0.25 HP and a source of heat energy derived from LPG stoves.

II. RESEARCH METHODOLOGY

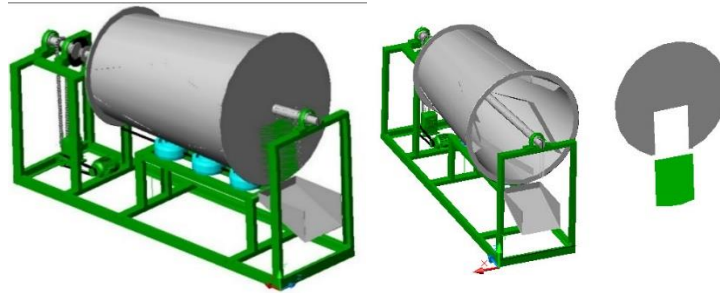
A. Material

For making roasters needed : 2 mm thick stainless steel plate, 1.5 inch stainless steel pipe, speed reducer, 0.25 HP electric motor, 4 furnace LPG gas stove, 5 kg LPG gas cylinder, elbow iron, bearing, pulley, grinding stone, oxygen gas, argon gas, electrode RB 3.2 mm, electrode RB 2.6 mm, epoxy paint, paint duco, tinner, sandpaper paper, hinges, electric welding, welding carbide / acetylene, drilling machine, lathe, electric saw machine, compressor, hand grinding machine, wire drilling machine, welding elbow, measuring elbow, shovel term, iron roller, iron chisel, big hammer, welding sledge hammer , combination pliers, grip pliers, vise, meter, roller angle roller, locks, hand hacksaw, spray paint tools, screwdrivers, work packing equipment.

B. Method

1. Roaster Design

- 1). Structural design
- 2). Functional design



The design of the coffee leaf roasting for making tea kahwa daun

Roasting Equipment Performance Testing with 4 rpm treatment (6, 8,5 10,5 and 12).

The performance test of the tools performed is the initial performance test using raw materials in the form of fresh coffee leaves as much as 5 kg with a rotating cylinder tube speed of 6 rpm. Add fresh coffee leaves to the roasting tube through an intake funnel on the back of the tube. The funnel door closes on the back of the tube and the outlet funnel door on the front with the plate that is given a hole that serves as a place for water vapor to come from the leaf's water content during roasting. Turn on the stove to start roasting. Turn on the electric motor to rotate the cylinder tube so that during the roasting process the coffee leaves will rotate following the cylinder tube rotation. Turn on the fan that will fan moisture from inside the cylinder out. Prepare the charcoal in the container provided in the smoking room and add the cinnamon leaves and the smoke produced is channeled into the roasting tube, which is intended to give aroma and flavor enhancer from the leaves produced. Roasting time is 2 hours then the stove is turned off. Replace the intake funnel lid and the funnel with a non-hollow plate so that the curing process can take place perfectly. Frying is carried out for 15 minutes. Turn off the electric motor and the roasting process for one unit of raw material is complete.

IV. RESULTS AND DISCUSSION

A. Result

1. Making roasting equipment



Tool frame



Cylinder tube



Roasting for making tea kahwa daun

2. Functional Test of Roasting Equipment

The purpose of the functional test tool is to see if the functions of the roasting device are running well, including the heating function with a heat source in the form of 3 furnace type 1 LPG stoves, a reversal function in the form of fresh coffee leaves with a rotating cylinder tube using Electric motors are reduced to 5 RPM, 6 RPM, 8.5 RPM and 10.5 RPM, and 12 RPM, functions of aroma and taste enhancers with a closed fumigation furnace, water vapor removal function from the roasting cylinder using a fan.

B. Discussion

Functional test of roasting equipment

From the results of functional roasting equipment testing, it shows that all components that support the functioning of the device can function properly. Cylinder tubes can rotate smoothly according to the rpm treatment that will be tested. This proves that the electric motor that is used as a cylinder tube drive motor is well connected to a power source. An electric motor is a tool that can convert electrical energy into mechanical energy that can cause movement in a device. Likewise, the heat source in the form of a type 1 waiting LPG stove that is used can provide even heat to the cylinder tube wall, so that the roasting process can take place well and evenly on the roasted material.

The initial trial of the roaster equipment was done by roasting 5 kg of fresh coffee leaves

picked from the experimental garden of the Payakumbuh Agricultural Polytechnic with RPM 6 and 90 minutes roasting time, yielding the leaves with a moisture content of 8.7 % and ash content of 10.5. While the water content that leaves produced by the community ranges from 5-7 % [4].

V. CONCLUSION

The results of the initial trial for the performance of the tool have not produced the product as expected because the water content is still higher, namely 8.7 and ash content of 10.5%

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