



EFFECT OF ROASTING TIME ON THE ACIDITY LEVEL OF ARABICA COFFEE POWDER (COFFEA ARABICA)

PENGARUH LAMA PENYANGRAIAN TERHADAP TINGKAT KEASAMAN BUBUK KOPI ARABIKA (COFFEA ARABICA)

Endiyani^{1*}, Renita Sri Syafitri¹, Umar Husein Abdullah², Mulla Kemalawaty³

¹Agroindustry , Politeknik Indonesia Venezuela

²Plantation Management, Politeknik Indonesia Venezuela

³ Animal Product Processing Technology, Politeknik Indonesia Venezuela

* Correspondent Author: eendiyani@gmail.com

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Abstract

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Coffee is one plantation crop that has long been cultivated and has a fairly high economic value. Data on world and domestic market demand for coffee commodities is increasing. World coffee production for arabica type is 60% and the remaining 40% is robusta type coffee. The key to the ground coffee production process is roasting. This process is the stage of forming the aroma and distinctive flavor of coffee from coffee beans with heat treatment. This study aims to determine the effect of the length of roasting carried out in the processing of coffee beans on changes in the acidity level of coffee powder. Data collection and analysis in this study used a non-factorial complete randomized design (CRD). The coffee roasting process uses a temperature of 1800 C with a roasting time of 20, 40, and 60 minutes with 3 repetitions. The results obtained showed that the acidity level of coffee powder decreased until it was close to neutral, namely P1 = 5.65%, P2 = 5.94%, and P3 = 6.27%.

Keywords: *Acidity, Coffee Powder, Roasting*

Abstrak

Kopi merupakan salah satu jenis tanaman perkebunan yang sudah lama dibudidayakan dan memiliki nilai ekonomis yang lumayan tinggi. Data permintaan pasar dunia dan domestik terhadap komoditas kopi semakin meningkat. Produksi kopi dunia untuk jenis arabika sebesar 60% dan sisanya 40% adalah kopi jenis robusta. Kunci dari proses produksi kopi bubuk adalah penyangraian. Proses ini merupakan tahapan pembentukan aroma dan citarasa khas kopi dari biji kopi dengan perlakuan panas. Adapun penelitian ini bertujuan untuk mengetahui pengaruh lamanya penyangraian yang dilakukan pada proses pengolahan biji kopi terhadap perubahan tingkat keasaman bubuk kopi. Pengumpulan data dan analisa pada penelitian ini menggunakan Rancangan Acak lengkap (RAL) non factorial. Proses penyangraian kopi menggunakan suhu 180⁰ C dengan lamanya waktu penyangraian 20, 40, dan 60 menit dengan 3 kali pengulangan. Hasil yang diperoleh menunjukkan bahwa tingkat keasaman bubuk kopi semakin menurun hingga mendekati netral yaitu P1=5,65%, P2=5,94% dan P3= 6,27%.

Kata kunci: Bubuk Kopi, Keasaman, Penyangraian



INTRODUCTION

Coffee is one of the types of plant plantations cultivated and owned for a long time mark pretty economical tall. World and domestic market demand data for coffee commodities are increasing increase. World coffee production for type arabica amounts to 60% and the remaining 40% is coffee type robusta (FAO 2015). Coffee comes from Africa ie the mountains in Ethiopia. Own coffee is newly known to the world community after being planted in the developed outside area of its origin, namely Yemen in part of southern Arabia, through Arab traders (Rahardjo, 2012).

Around the world, arabica coffee is more widely consumed than robusta coffee (ITPC Hamburg 2015; Marjan *et al*, 2022; Natassya, 2023). Meanwhile in Indonesia, Robusta coffee is produced more tall than Arabica coffee. However, according to Sriwanata *et. al* (2020), Arabica coffee tastes better and has more caffeine than robusta coffee so that safer to consume.

The key to the coffee production process is roasting. This process is the stage of forming the distinctive aroma and taste of coffee from within the coffee beans by heat treatment. Coffee beans naturally contain quite a lot of organic compounds that have the potential to form the distinctive taste and aroma of coffee. Roasting time is determined based on the color of the sangria coffee beans often called the degree of sangria. The longer the time for roasting, the color of the roasted coffee beans approaches dark blackish brown (Mulato, 2002).

Roasting is related to processes with time and temperature, where compounds the chemicals in coffee will change with the disappearance mass of partially dry coffee big as carbon dioxide and volatile gases (easy gases yawn) others as products. Around half of the carbon dioxide produced will stuck in the coffee that has been roasted together with compound flavors important natural volatile (Syafitri, 2015). Acidity or acidity is a character that is related to the brightness of the coffee and provides a more lively taste sensation on the edge of the tongue, therefore good coffee beans have acidity but at a low level. Acidity that is too high causes the resulting coffee to be too acidic and causes the resulting coffee to no longer be delicious.

Based on a study previous has disclosed the existence of several sources like phosphoric, quinic, lactic, citric, acetic, malic acids, and so on, producing acidity special for a cup of coffee. The presence of acid causes the taste of the brewed coffee to become unique, aroma, and shine in coffee drinks. Acids that are formed during fermentation and roasting give the level of sharp acidity in the brewed coffee water means produce effect pleasant for coffee drinkers (Velmourougane, 2011). Based on explanation the so is something problem for now the length of the roasting process for coffee beans can be influenced by the level of acidity of coffee powder, especially in coffee with type Arabica.

RESEARCH METHODS

Study This uses equipment that is form stove, digital scale, pH meter, stopwatch, filter, scissors, glass, spoon, label paper, plastic clear, mortar and pestle pounder, ingredients used is



distilled water, arabica coffee beans that have been through the processes of sorting, peeling, fermentation, washing and drying for 1 week.

Method used in the study This is method Completely Randomized Design (CRD) nonfactorial. Pre-cooked coffee beans through several stages post-harvest Then the roasting process is carried out at a temperature of 180⁰ C at each time forever roasting namely 20 minutes, 40 minutes, and 60 minutes with repetition 3 times. Inclusion curve change temperature to time works For strengthen accuracy moment study with take notes phases level roasting based on time travel roasting (Maulid *et. al* 2021).

Formula Completely Randomized design (CRD) are :

$$Y_{ij} (t) = \mu + P(t) + \epsilon (t)$$

Where:

i = 1,, 2,..n and t=1, 2,..n

Y_{ij} (t) = Value observation of row I, column to j who gets treatment to t

μ = General average value

P(t) = Influence treatment to t

ε(t) = Influence obtaining error treatment to t

Table 1. Combinations Treatment is as Follows.

Temperature	Time	Test		
		U1	U2	U3
180 ⁰ C	20 minutes	SW1U1	SW1U2	SW1U3
	40 minutes	SW2U1	SW2U2	SW2U3
	60 minutes	SW3U1	SW3U2	SW3U3

Procedure Study

The procedure study that prepared Arabica coffee as much as 3 kg went through the processes of sorting, peeling, fermentation, washing, and drying for 1 week. Then coffee beans are divided into 3 parts, each of which has a weight of 1000 gr. In the next process coffee beans are divided again, each based on treatment time forever roasting namely 20, 40, and 60 minutes at a temperature of 180⁰ C. After the roasting process when finished, the coffee beans are ground and the data analysis process is carried out, namely with do measurement level acidity Arabica coffee powder produced.

RESULTS AND DISCUSSION

Stages carried out in the measurement pH value of Arabica coffee powder that is with smooth coffee beans that have been roasted 9 parts and mixed with distilled water, then pH measurement using a pH meter. Based on the results research conducted so can conclude that the interaction of roasting time is very influential to the level of acidity of Arabica coffee powder. This matter can seen in Table 2 below :

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Table 2. Interaction of Roasting Time to Level Acidity Arabica Coffee Powder

Temperature	Time	Test		
		U1	U2	U3
180 °C	20 minutes	5.65	5.65	5.65
	40 minutes	5.92	5.95	5.95
	60 minutes	6.14	6.33	6.33

Acidity value the lower along with the length of the roasting process in every treatment and repetition. Acidity level at 180 °C for 20 minutes with U1 which is 5.65, U2 which is 5.65, and U3 which is 5.65. Temperature of 180° C for 40 minutes with U1, namely 5.92, U2, namely 5.95, and U3, namely 5.95 and a temperature of 180° C for 60 minutes namely U1 which is 6.14, U2 which is 6.33, and U3 which is 6.33. The decrease in acidity value is due to the evaporation of some acidic substances when the coffee beans are roasted. This matter is in accordance with the statement by Mulato, (2002) which states that coffee beans experience contain various types of compounds such as aldehydes, furfural, ketones, alcohols, esters, formic acid, and acids acetate which have characteristic easy evaporate. Compounds that cause an astringent or sour taste such as tannins and acids acetate will give color chocolate.

From each treatment carried out the acidity value increases at 60 minutes but the acidity level decreases, this is due to the evaporation of acidity in the roasted coffee, the longer the coffee is roasted, the closer the acidity level is to neutral, coffee is said to be neutral if it has pH value 7. In the 60-minute treatment it can be seen that the results of each repetition with the same roasting time, the acidity value is close to the neutral acidity level. The data on the effect of each treatment of 20 minutes, 40 minutes, and 60 minutes with 3 repetitions can be seen in Figure 1 below:

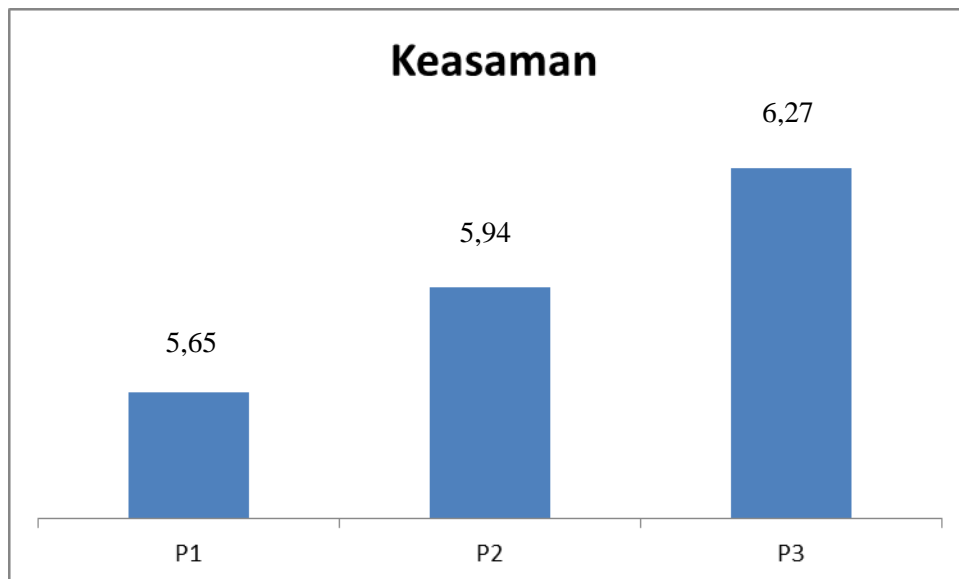


Figure 1. Histogram of the Effect of Roasting Time on the Acidity Level of Arabica Coffee



From picture 1 above can be seen that P1 which is 5.65 has a low value, however own level of acidity is strong, and the different influences are very real to the P2 treatment is 5.94 which also has a level of strong acidity in the P3 treatment, namely 6.27 high value However level acidity is sour weak approaching neutral.

Based on the results analysis fingerprint variety influences the treatment of acidity coffee grounds after roasting very differently. Where is the temperature and duration of very roasting influential to acidity, then next with different tests real smallest (TRS). After further testing, the effect of roasting time was very different from Arabica coffee powder. As for the results analysis fingerprint variety different real smallest (BNT) can be seen in Table 3 below.

Table 3. Real Difference Test Smallest Mark Acidity Arabica Coffee Powder

Acidity	BNT 0.01	Notation
5.65	5.83	a
5.94	6.12	b
6.27	6.45	c

CONCLUSION

The length of roasting is very influential to level the of acidity inside the Arabica coffee powder produced, increasingly forever roasting, the level of acidity of coffee grounds is said to sour weak and that will approach level neutral.

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