

## The Effect of Roasting Time on The Organoleptic Characteristics of Excelsa Wonosalam Jombang Coffee

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### ABSTRACT

*There are many types of coffee plants in Indonesia, including Robusta, Arabica, Liberika and Excelsa. One type of coffee found in Wonosalam District is excelsa coffee, Wonosalam excelsa coffee is a species of coffee plant in the genus Coffea. Roasting is the process of developing the aroma and taste of coffee, separated from the inside of the coffee beans by heat treatment. Coffee beans contain organic compounds that give aroma and taste in it. This research aims to determine the effect of roasting time on the organoleptic characteristics of Excelsa coffee, and to determine the appropriate length of time for the roasting process of Excelsa coffee. This research uses a qualitative approach, data collection used in this research is in the form of (1) sampling method, (2) interview method, (3) documentation method, (4) questionnaire method. This research used a Completely Randomized Design (CRD), using 3 treatments and 3 repetitions, P1 (10 minutes), P2 (15 minutes), and P3 (20 minutes) using a roasting temperature of 200°C. The data processing method used is the Analysis of Variance (ANOVA) with a further BNT test at a level of 5%. The results of the research show that the length of roasting time has a significant effect on the color, taste and aroma of Excelsa coffee. The selected results were obtained at a roasting temperature of 200°C with a roasting time of 15 minutes which had an average color value of 13.53 (dark brown), aroma of 12.42 (fragrant), and taste of 11.30 (like)*

**Keywords:** *Excelsa Coffee, Organoleptic, Roasting, Wonosalam.*

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### INTRODUCTION

Indonesian coffee is located on the equator which has many advantages, including rich agricultural natural resources, plantations and fisheries. Indonesia has many types of coffee, including Robusta, Arabica coffee, Liberica and Excelsa coffee. One type of excelsa coffee found in Wonosalam District, a superior commodity that will be developed in the Wonosalam area to support the economic development of the surrounding community. Harvested coffee beans require special handling, one of which is coffee bean processing. The stages of coffee processing itself cannot be separated from the roasting process. Roasting is the key to forming the taste and aroma of coffee. Coffee beans that are consistent in size, density, texture, water content and chemical structure, then the roasting process is relatively easy to control, but in reality coffee beans vary greatly in size and require special handling during processing so that the roasting process can be more controlled (Rahayoe et al., 2009). The production process of excelsa coffee processing can affect the quality, especially the taste. According to Farida et al. (2013) the length of roasting time affects the taste of Excelsa coffee. which is in Wonosalam District. Based on these considerations, it is necessary to conduct research on the roasting process of Excelsa coffee beans, Wonosalam related to the length of roasting time with the aim of determining the effect of roasting time on the organoleptic characteristics of Excelsa Wonosalam Jombang coffee.

## **METHOD**

The data collection technique used in the study was using a descriptive qualitative analysis method. Sampling was carried out using Purposive Sampling with a completely randomized research design (CRD) method using 3 treatments and 3 replications at different variations of Excelsa coffee roasting time, namely P1 (10 minutes), P2 (15 minutes), and P3 (20 minutes) with the same roasting temperature, namely 200 °C in each treatment. The data analysis technique used ANOVA (Analysis of Variance) method and if it had a significant effect, it was continued with a further BNT test at a level of 5%. Excelsa coffee samples with different roasting times were obtained from the Notorejo Wonosalam Jombang coffee plantation. The organoleptic test was carried out at the researcher's house in Brangkal Village, Bandarkedungmulyo District, Jombang Regency.

## **RESULT AND DISCUSSION**

### **Result**

The resulting coffee flavor is also influenced by the length of the roasting process. The roasting process in this study used a Feike brand mini roaster type W600i made in Indonesia. This roasting machine uses a roasting cylinder tube made of stainless steel with a capacity of 1 kg which is heated with LPG gas fuel. This machine has several components such as a thermometer for the temperature of the roasting room and the temperature of the roasting cylinder, a control lever for the roasted beans, a regulator for the size of the fire used, and also a cooling container for the roasted coffee beans.

The coffee beans used were 200 grams in each treatment, then the coffee beans were roasted at a temperature of 200 °C with different roasting time treatments (10, 15, 20 minutes) with 3 repetitions. After the roasted coffee was produced, the weight of the coffee was weighed, then resting was carried out for 7 days. After the resting process was complete, the coffee beans were ground to turn the coffee beans into powder. After that, filtering was carried out with an 80 mesh sieve, so that the coarse and fine coffee powder were separated. Furthermore, each treatment of coffee was subjected to organoleptic tests. Organoleptic tests include color, aroma, and taste.

Table 1 Organoleptic Color Test Value

<b>No</b>	<b>Treatment</b>	<b>Color</b>
1	P1	8,33
2	P2	13,53
3	P3	10,93
BNT 5%		1,79

The color value of P1 with a value of 8.33 is lower than P3 which has a value of 10.93. This shows that P3 has a more attractive color than P1 and is significantly different in the 5% BNT test. Treatments P1 and P3 have lower values (not attractive) than the value of P2 (very attractive) which has a value of 13.53 and treatment P2 is significantly different from treatments P1 and P2 in the 5% BNT test.

Table 2 Organoleptic Aroma Test Value

<b>No</b>	<b>Treatment</b>	<b>Aroma</b>
1	P1	10,89
2	P2	12,42
3	P3	11,82
BNT 5%		1,55

Treatment P2 (12.42) and P3 (11.82) have higher values compared to treatment P1 (10.89) which means that treatments P2 and P3 have a very good aroma compared to treatment P1 which has an unpleasant aroma. Treatment P3 is not significantly different from treatment P1, but treatment P3 is significantly different from treatment P2 in the 5% BNT test. Likewise, treatment P3 is significantly different from treatment P2 in the 5% BNT test.

Table 2 Organoleptic Taste Test Value

No	Treatment	Taste
1	P1	7,90
2	P2	11,30
3	P3	8,97
BNT 5%		1,96

Treatment P3 with organoleptic taste test value of 8.97 is higher than treatment P1 value of 7.90. This shows that treatment P3 has a better taste than treatment P1 but is not significantly different in the 5% BNT test. While treatment P3 has a lower value compared to treatment P2 which obtained a color value of 11.30 and was significantly different in the 5% BNT test which showed that treatment P2 had a very good taste compared to treatment P3 and treatment P1.

## Discussion

Table 4 Average Value of Organoleptic Test Results

Treatment	Average Value of Organoleptic Test Results		
	Color	Aroma	Taste
P1	8,33	10,89	7,90
P2	13,53	12,42	11,30
P3	10,93	11,82	8,97

The color of the P1 treatment has a light brown color, then in the P3 treatment it has a black color, and the highest value of the organoleptic test of the color of Excelsa coffee is in the P2 treatment which has a blackish brown color. The difference in color in each treatment is due to the difference in roasting time which causes the color in each treatment to be different. According to Putri (2015), another factor that affects the color of the resulting coffee brew is the sugar caramelization process which causes a blackish brown color to appear. Different roasting times with the same roasting temperature, namely (200 °C) affect the color of the resulting coffee. According to Marpaung and Lutvia (2020), the formation of color in coffee beans is first determined by the fermentation process, where in the fermentation process the formation of candidate colors occurs due to the activity of microorganisms and enzymatic reactions. Furthermore, color formation is determined by the temperature and time of the roasting process. During roasting, a pyrolysis (caramelization) process occurs in the coffee beans. Chemically, this process is characterized by the release of large amounts of CO<sub>2</sub> gas from the roasting room. Physically, pyrolysis is characterized by a change in the color of coffee beans from greenish to light brown to blackish brown. This stage is often called the browning stage.

Coffee beans roasted for 15 minutes were preferred by the panelists, while those roasted for 10 minutes were slightly preferred. At 20 minutes of roasting, the coffee beans had become burnt so that the resulting aroma began to deviate. Roasting coffee beans for 15 minutes produced coffee beans with a better level of maturity (not too burnt) so that it produced a distinctive aroma of coffee powder in general. The length of roasting time affects the level of aroma of Excelsa coffee. The aroma of coffee detected by the sense of smell is the result of the evaporation of volatile compounds (Mulato and Suharyono, 2012). Volatile compounds that affect the aroma of roasted coffee are formed from the Maillard reaction or non-enzymatic browning reaction, degradation of free amino acids, degradation of trigonelline, degradation of sugar and degradation of phenolic compounds. This is because the distinctive aroma of coffee will slowly appear after the roasted beans are cooled. The longer the roasting, the more volatile compounds will evaporate, which will affect the aroma of ground coffee (Purnamayanti, 2017).

The coffee powder brewed for 15 minutes with an average value of 11.30 was more preferred by the panelists, while the slightly preferred taste was with a roasting time of 10 and 20 minutes. The coffee powder brewed for 15 minutes with an average value of 11.30 was more preferred by the panelists, while the slightly preferred taste was with a roasting time of 10 and 20 minutes with an average value of 7.90 and 8.97. The coffee powder brewed for 15 minutes with an average value of 11.30 was more preferred by the panelists, while the slightly preferred taste was with a roasting time of 10 and 20 minutes.

The best treatment of the organoleptic test of Excelsa coffee is P2 with a roasting time treatment of 15 minutes. Excelsa coffee with the best treatment obtained a color score of 13.53, aroma 12.42, and

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taste 11.30. Excelsa coffee with the best processing has a dark brown color and a distinctive coffee aroma and taste.

## CONCLUSIONS

Based on the research, it can be concluded that the roasting time has a significant effect on the color, taste and aroma of excelsa coffee. The best results were obtained in the P2 treatment with a temperature of 200°C with a roasting time of 15 minutes which had an average color value of 13.53 (blackish brown), aroma 12.42 (fragrant), and taste 11.30 (like). The right time for roasting excelsa ground coffee is 15 minutes (treatment P2).

## REFERENCES

- Farida, A., Ristanti, E., & Kumoro, A. C. (2013). *Penurunan Kadar Kafein Dan Asam Total Pada Biji Kopi Robusta Menggunakan Teknologi Fermentasi Anaerob Fakultatif Dengan Mikrobi Nopkor Mz-15*. *Jurnal Teknologi Kimia dan Industri*, 2(2), 70-75.
- Marpaung, R., & Lutvia, L. (2020). *Pengaruh Lama Penyangraian Yang Berbeda Terhadap Karakteristik Dan Mutu Organoleptik Seduhan Bubuk Kopi Liberika Tungkal Komposit*". *Jurnal Media Pertanian*, 5(1), 15-21
- Purnamayanti, N. P. A., Gunadnya, I. B. P., & Arda, G. (2017). *Pengaruh Suhu Dan Lama Penyangraian Terhadap Karakteristik Fisik Dan Mutu Sensori Kopi Arabika (Coffea arabica L)*. *Jurnal BETA (Biosistem Dan Teknik Pertanian)*, 5 (2), 39-48.
- Mulato, S., dan Suharyanto, E. 2012. *Kopi, Seduhan dan Kesehatan*. Pusat Penelitian Kopi dan Kakao Indonesia, Jember.
- Putri, Rinjani Mitha. (2015). *Pengaruh Pemberian Seduhan Kopi Robusta (Coffea Canephora Var.Robusta) Terhadap Ketebalan Dinding Corpus Vertebrae Tikus Strain Wistar Jantan (Rattus Novergicus Strain Wistar)*. Master skripsi.
- Rahayoe, S., J. Lumbanbatu, dan W. K. J. Nugroho. 2009. *Pengaruh Suhu dan Lama Penyangraian terhadap Sifat Fisik-Mekanis Biji Kopi Robusta*. *Jurnal Penelitian*. Yogyakarta: UGM.