Hedonic attributes evaluation of mixed Arabica coffee-cocoa beverages

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Abstract. Arabica coffee has superior quality and taste compared to others. Chocolate is one of the most special processed cocoa products compared to other products and is the most popular with the public because of its distinctive taste, this research aims to find out which formulation is the best blending between arabica coffee with cocoa, this study uses a Complete Randomized Design (CRD) with 4 different ratios of Arabica coffee mixture with cocoa, each of which is carried out 3 repeats for each ratio in order to obtain 12 units of experimental tests were obtained using 20 panelists, Hedonic test was conducted to see consumer acceptance of Arabica coffee mixture with cocoa with comparison of AK1 (20:80), AK2 (40:60), AK3 (60:40) and AK4 (80:20) from 100 grams. The observed parameters are color, aroma, taste and texture using the Likert scale. Organoleptic test results showed that the formulation of Arabica coffee mixture with cocoa was most liked by panelists namely AK4 at a ratio of 80:20 Arabica 80 cocoa 20. The ratios of a mixture of arabica and cocoa coffee has a real effect on the aroma treatment.

1. Introduction
Coffee is a strategic plantation plant that is commonly consumed in the form of refreshing beverages. At the beginning of its development coffee was only limited to be produced and consumed in middle Eastern countries such as Saudi Arabia, but now it extends to the rest of the world and is widely consumed in Europe and America [1]. The rapid development of coffee makes this drink already part of the customs and culture of Indonesian people both in rural and urban areas. Coffee consumption different from the consumption of other beverages, due to the calmness and focusing factor obtained without side effects such as alcoholic beverages.

Arabica coffee has special characteristics and taste, caffeine content is lower compared to other types of coffee that is cultivated commercially in Indonesia, so it has a more expensive selling price [2]. Chocolate is one of the most beneficial cocoa processed products and most popular by the people of Indonesia, especially Aceh because of its distinctive taste, chocolate has three main properties that
distinguish it from other products, namely the peculiarities of taste, texture, and color. Chocolate solids provide taste and color, while fat in chocolate plays a role in controlling the texture of the product. The distinctive taste of chocolate is nothing but a balanced combination of bitter, sour and sweet basic flavors composed of unique components in chocolate [3].

Cocoa and Arabica coffee each have advantages and disadvantages, thus research and is necessary to have an innovation is needed that can maximize the advantages and minimize the deficiencies contained in cocoa and Arabica coffee, for example coffee contains caffeine and excess acid, which if consumed in excess can have a negative impact on health such as an increased heart high rate and increased blood pressure in humans, coffee can cause stomach pain [4].

The mixture of Arabica coffee formulations with cocoa has the potential to be developed because it is favored by the people of Indonesia, when these two products were mixed, it is lower in caffeine [5]. Therefore, research was carried out on the best formulation of Arabica coffee mixture with cocoa to get the taste of quality drinks.

2. Methods

The research was conducted in sensory analysis laboratory of Department of Agricultural Products Technology, Syiah Kuala University Banda Aceh and Servay field in July to September 2020. The ingredients used in this study were Gayo Arabica coffee and Trinatario type cocoa from the Bandar Baru District, Pidie Jaya Regency. The Equipment used in this study include cups, analytical scales, separating funnels, 100 ml cups, measuring flask 500 ml, pH meter, measuring glass 250 ml, measuring pipette 50 ml, handler, stabilizer, funnel, cotton, 6.5 mm stainless pickle size, a roaster (brand: Probat, type: Brz 2, capacity: 100-300 g), funnel a roaster, coffee a grinder (brand: Latina, type: 206 N Grand , capacity: 250 g), plastic clip, labels, spoons 10 g, glass, tissue, and cocoa roaster (brand: Desheller).

2.1 Research design

This study used a Complete Randomized Design (CRD) with 4 ratios of mixed Arabica coffee with cocoa each with the ratio of coffee and cocoa formulations as shown with 3 repeats for each times so that 12 experimental units are obtained.

![Figure 1. Formulation mixed Arabica coffee with cocoa.](image-url)
2.2 Research variable
The organoleptic test using 20 panellists hedonically, to see the acceptance of panellists against Arabica coffee mixture with cocoa on the test of color, aroma, taste and texture.

2.3 Sample treatment
Arabica coffee and cocoa that has been in the container and then mixed in accordance with the ratio of Arabica coffee mixture with cocoa, mixing both done 100 grams, each coffee mixture 20: cocoa 80, coffee 40: cocoa 60, coffee 60: cocoa 40, and coffee 80: cocoa 20. After mixing process then brewed with 150 ml hot water with temperature 90°C for 5 minutes.

2.4 Sample testing
The organoleptic assessment of Arabica coffee blend ratios with cocoa includes aroma, color, taste and texture test, organoleptic testing done with favorite test. Favorite scale 1-5. Coffee-cocoa samples with different formulations using water as much as 150 ml with a temperature of 90°C, stirred for 1 minute after the temperature is equal to room temperature, samples are presented for the favorite test [6].

2.5 Panellist preparation
All the panellists were asked to refrain from food before testing Arabica coffee and cocoa mixtures in order to neutralize their sense of smell and taste. This is done so that when the panellists smell the aroma, drink the coffee liquid, and swallow it, which feels is the original taste of the brewing mixture of coffee and cocoa drinks, not from the traces of aroma and taste of other beverages. A Panellist must be in good health, not flu, cough, and laryngitis, should also be relaxed and not tense [6].

2.6 Data analysis
The organoleptic test data were analyzed using Analysis of Variance (ANOVA) at a 95% significance level. With this method if the results showed a significant effect, researcher was proceeded with the Duncan Test [7].

3. Result and discussion
The organoleptic value is an important factor to test consumer acceptance of a food and beverage product. Organoleptic assessment of Arabica coffee mixture formulation with cacao and Robusta coffee with cocoa includes aroma, color, texture and taste test, organoleptic testing conducted with favorite test [6].

3.1 Aroma test
Aroma is one of the attributes of food products that are most easily enjoyed by consumers. Aroma here is an attribute of quality that requires sensitivity of the sense of reformer to determine the fragrance or not of a coffee drink product. Aroma is very important for a delicious drink and is one of the most unstable things its components are coffee. In this study, the addition of cocoa powder to provide additional functional characteristics in the drink, thus obtaining a high antioxidant content and a new taste [6].
Figure 2. Graph of mixture of Arabica coffee with aroma coffee.

Based on Figure 2, the results of Arabica coffee mixture with cocoa shows that the average panellist prefers Arabica coffee mixture with cocoa in the aroma test that is at AK4 level, with the ratios of Arabica coffee mixture 80 cocoa mixture 20 compared to other treatments, higher favoured by panellists namely AK4. Organoleptic test results showed that the panellist’s preferred level of Arabica coffee mixture formulation with cocoa in aroma was an average of 3.67, that the treatment of the ratios of Arabica coffee mixture with cocoa has a real effect on the aroma of the drink.

3.2 Taste Test
Taste is one of the important factors in a food product [8], the taste of chocolate is strongly influenced by fermentation and drying factors of cocoa beans, when cocoa beans are fermented, precursor compounds will be formed and will develop during the roasting process. Similarly, coffee beans at the time of roasting will form a distinctive aroma and taste.

Figure 3. Graph of a mixture of Arabica coffee with taste coffee.

Figure 3, the formulation of Arabica coffee mixture with cocoa shows that the average panellist prefers Arabica coffee mixture with cocoa in the taste test that is at ak3 level. With the ratios of Arabica coffee mixture 60 cocoa mixtures 40 compared to other treatments, higher preferred by panellists namely
AK3. Organoleptic test results showed that the panellist's preferred level of flavor of Arabica coffee mixture with cocoa was an average of 3.15. That taste plays a role in determining the quality of coffee brewing that is measuring using the taster senses. The longer the roasting, the blacker the coffee will be and the more bitter it will be [9].

3.3 Color test

The color of coffee is fundamental when we drink coffee or chocolate, interesting color is important, because wana is a direct selling attraction and affects organoleptic response to flavor that ultimately greatly affect consumer acceptance. In addition, the process of roasting coffee beans and cocoa is also very influential on the color of coffee and cocoa produced [10].

Figure 4. Graph of a mixture of Arabica coffee with color coffee.

Figure 4, the formulation of Arabica coffee mixture with cocoa shows that the average panellist prefers Arabica coffee mixture with cocoa in the colour test that is at AK3 level, with the ratios of Arabica coffee mixture 60 cocoa mixture 40 compared to other treatments, higher favoured by panellists namely AK3. Organoleptic test results showed that the level of preference panellist against the ratios of Arabica coffee mixture with cocoa in texture is an average of 3.65. colour parameter values between treatments have no real effect on the panellist's level of preference. The process of processing coffee beans into coffee powder is the process of roasting also affects the colour to be produced [10, 11].

3.4 Texture test

Figure 5 below shows the ratios of Arabica coffee mixture with cocoa shows that the average panellist prefers Arabica coffee mixture with cocoa in the texture test that is at AK4 level, with the ratios of Arabica coffee mixture 80 cocoa mixture 20 compared to other treatments, more tingi preferred by panellists namely AK4. Organoleptic test results showed that the level of preference panellis to the texture of Arabica coffee mixture formulation with cocoa is an average of 3.55. Arabica coffee blend with cocoa has no real effect on the texture of soft drinks [12-14], the length of the roasting process causes the roasted coffee beans and cocoa will be more fragile so that it is easily crushed and becomes a fine powder when ground.
4. Conclusion
The formulation of a mixture of Arabica coffee and cocoa has a real effect on the aroma of the drink while the ratios of Arabica coffee mixture with cocoa is most liked by AK4 comparison panellists which is 80:20 Arabica 80 Cocoa 20
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