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The Effect Of The Composition Of A Blend Of Arabica Coffee (Coffea Arabica) With Robusta Coffee (Coffe Acanephora) And Maltodextrin Concentration On The Characteristics Of Instant Coffee

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Abstract

The purpose of this study is to obtain instant coffee and to determine the characteristics of the instant coffee. This study includes a preliminary study that is to find out the levels of caffeine in Arabica coffee powder and Robusta coffee. The main research used Randomized Block Design (RBD) consisting of two factors, namely coffee ratio (80% Arabica: 20% Robusta), (60% Arabica: 40% Robusta) and (40% Arabica: 60% Robusta)), and maltodextrin concentration (10%, 15% and 20%)). The response in this study is physical analysis including solubility. Chemical response which includes analysis of water content, caffeine content and total acid. And organoleptic responses to the attributes of color, aroma and taste. Preliminary research results obtained caffeine levels from Arabica coffee powder by 1.48% and robusta coffee by 2.90%. The main research results show that the comparison of Arabica coffee and Robusta coffee and maltodextrin concentration affect water content, caffeine content, total acid, solubility and organoleptic attributes of color, aroma and taste of instant coffee. The selected product is a1b3 treatment (coffee ratio (80% Arabica: 20% Robusta) and maltodextrin concentration 20%) has a moisture content of 1.80%, total acid content of 2.78%, caffeine content of 1.60% and solubility of 97, 33%.

Keywords: Instant, Coffee, caffeine, Maltodextrin, and Organoleptic.

INTRODUCTION

Coffee is a refreshing ingredient that is consumed by various groups. The coffee drink, which is the result of processing coffee beans, has a distinctive taste and is much favored by all levels of society. Processed coffee products that are often found are in the form of ground coffee and instant coffee (Pastiniasih, 2012). World coffee consumption reaches 70% of the arabica coffee variety and 26% comes from the robusta coffee species. Instant coffee is coffee that is soluble in water (soluble) without leaving residue. The essential processing of instant coffee is in the form of coffee extract production through the following stages: roasting, milling, extraction, drying (Spray Drying or Freeze Drying), and product packaging.

Mixed Arabica and Robusta coffee will generally produce coffee products that have a higher selling value and are expected to be favored by more consumers, because the coffee produced has the best taste, body and color quality. Robusta coffee in mixed form plays a role in increasing the extraction value and reducing the sour taste in Arabica coffee. Meanwhile, the role of Arabica coffee (slightly acidic) can reduce the bitter taste and generally increase the resulting aroma. The mixing of Arabica and Robusta coffee needs to be considered the appropriate composition or formula, so that the desired quality of the coffee can be fulfilled. Robusta coffee has a higher caffeine content than Arabica coffee, so the brew has a bitter taste. Arabica coffee with less caffeine has a better taste because the less caffeine content the better the taste of the coffee produced. One of the practical and easy products to prepare is dry product, whether it is whole or powdered.

Practical and easy food or drinks in their presentation not only have a good appearance but are also beneficial for the body (Nofrianti, 2013). In the manufacture of powder products, fillers are added to increase the volume and weight of the resulting powder and accelerate drying (Gonnissen et al., 2008). The filler used is maltodextrin. The use of maltodextrin in industry includes flour products, can hold water, increase viscosity and texture, without adding sweetness to the product. The advantage of maltodextrin is that it dissolves easily in cold water. The properties of maltodextrin include rapid dispersion, have high solubility and form a film, form low hygroscopic properties, are able to form a viscous appearance, have low browning properties, are able to inhibit crystallization and have a strong binding capacity.

Several studies on the processing of instant coffee have been carried out in order to obtain instant coffee that consumers like, including treatment of the amount of water and extraction time in instant coffee with microencapsulation, decaffeinated instant coffee with a single column reactor, and low caffeine instant coffee with a crystallization process caffeine. However, the coffee used in instant coffee is only robusta coffee. This is because robusta coffee dominates coffee plantations in Indonesia. There has been no research on the processing of instant coffee from a mixture of two types of coffee (robusta and arabica).According to Asri (2013), the level of fineness plays an important role in the solubility of instant drinks because the finer the powder, the more perfect the solubility in instant drinks will be, there will be no precipitation. Precipitation occurs because the size of the powder is too large so that the solubility and instant drinks are not very good and make the appearance less good. The small solute (powder) dissolves more easily than the large solute. According to the quality requirements, if the food ingredients are turned into powder, the fineness of the food ingredients must pass through an 80 mesh sieve. In powdered solutes, more and more the touch surface between the solute and the solvent. Finally, the solute in the form of powder dissolves faster than the large solute. Separation occurs on the basis of the solubility of the

components in a mixture of solvent and solute. Apart from mixing the two types of coffee, the characteristics of the instant coffee produced are also influenced by the extraction process. The extraction process carried out with different compositions of coffee: water can also affect the characteristics of the instant coffee produced, different volumes of water used differ in the number of components that can be dissolved.In the extraction process, water is heated to 90 ℃ in order to dissolve the components contained in coffee. Heating makes the water expand and the bonds between its molecules become loose, so that it can dissolve the components of coffee (Andar, 2011). The water temperature for extraction ranges from 85-90 ℃ to avoid damage and loss of flavor and aroma components. The extraction process lasts for 1.5 hours (until cold). According to Balya, et al. (2013), in the coffee processing process, it was proven that the nicotine acid contained in coffee has an effect on the color, aroma and flavor of coffee. According to Gusti (2011), filler material functions as a suspension stabilizer, traps and prevents the evaporation of volatile components, filler acts as a capsule material to maintain nutrient content that is easily damaged during processing and to increase the yield of the final product. The more maltodextrin is added, the water content decreases.

Drying is a process of reducing or removing moisture from a material until it reaches a certain value. The drying speed and moisture content of the final product are very important in the drying process. In addition, there are other factors that affect the success of drying, including surface area, differences in temperature and surrounding air, air flow velocity, and air pressure (Haryani, 2015). In drying the liquid material, the filler is needed to increase the total amount of dissolved solids so that the resulting yield is higher than if the filler is not added. Fillers are added at a concentration that does not change the taste or flavor of the dried ingredients. The drying process is carried out non-natural or artificial drying, namely by using a drying device.

Based on this background, research has been carried out to determine whether the composition of arabica coffee with robusta coffee and the concentration of maltodextrin have an effect on the characteristics of instant coffee? The purpose of this study was to determine and obtain the condition of instant coffee with the best characteristics.

MATERIALS AND METHODS

The materials used in this study were robusta coffee and medium ground Arabica coffee, aquadest, as well as maltodextrin filler. The materials used for chemical analysis were distilled water, 0.103 N NaOH, 1% phenolphthalein, chloroform, H2SO4 (Sulfuric Acid), and 1% KOH (Potassium Hydroxide).

The preliminary research conducted was the analysis of caffeine content in arabica coffee powder and robusta coffee powder which are used for instant coffee making in the main study.The

main research carried out was the making of instant coffee, which then carried out a variable response analysis with the parameters of the water content test, caffeine content, total acid test, solubility test and organoleptic test in terms of aroma, color and taste. The main research consisted of a treatment design, experimental design, analysis design, and response design.

The treatment design used in the main study consisted of two factors, namely the composition of arabica coffee and robusta coffee (A) which consisted of 3 levels, namely a_1 (80% Arabica: 20% Robusta), a_2 (60% Arabica: 40% Robusta), and a_3 (40% Arabica: 60% Robusta). And the concentration of maltodextrin (B) consists of 3 levels, namely b_1 (10%), b_2 (15%), and b_3 (20%).

The experimental design used in this study was a randomized block design (RBD) with a 3 x 3 factorial pattern, each treatment was repeated three times, in order to obtain 27 experimental units.The design analysis uses Analysis of Variance (ANOVA) to get conclusions about the effect of treatment. If the hypothesis is accepted regarding the characteristics of instant coffee, then Duncan's further test is carried out.

Response designs that have been carried out in major research include chemical, physical and organoleptic responses. The chemical response carried out in the main research includes the determination of water content (AOAC, 2005), determination of caffeine content (gravimetric method) and determination of total acid (AOAC, 1995). The physical response carried out in the main research is the determination of solubility (Yuwono&Susanto, 1998) and the organoleptic response is the hedonic test (preference) with a total of 30 panelists.

RESULTS AND DISCUSSION

Preliminary Research

Determination of raw material caffeine content

Preliminary research was carried out to determine the caffeine content of raw materials. In this preliminary study, samples of Arabica coffee powder and robusta coffee were used. The response taken is the calculation of caffeine levels.

Table 1. Caffeine Levels of Robusta Coffee and Arabica Coffee.

Coffee Type	Caffeine Concentration (%)
Robusta	2,90
Arabica	1,48

Based on table 1, it can be concluded that the caffeine content of robusta coffee has a higher level than Arabica coffee, which is 2.90%. Meanwhile, Arabica coffee has a caffeine content of 1.48%.

Main Research

Chemical Response

Water Content Analysis

Based on the analysis of variance (ANOVA) results showed that the treatment of variations in the composition of coffee types, the concentration of maltodextrin, and their interactions had a significant effect on the water content of instant coffee, so Duncan's continued test was carried out. The effect of the interaction between coffee composition and maltodextrin concentration on water content can be seen as follows:

Table 2. The Interaction Effect of Coffee Composition and Maltodextrin Concentration on Water Content

Composition of Coffee	**Maltodextrin Concentration**		
	b_1(10%)	**b_2 (15%)**	**b_3 (20%)**
a_1 (arabica80%: robusta 20%)	1,95 B c	1,84 B a	1,80 C b
a_2 (arabica 60%: robusta 40%)	1,95 B b	1,90 C b	1,80 A a
a_3 (arabica 40% :robusta 60%)	1,77 A b	1,60 A a	1,55 B c

Note: Capital letters are read horizontally, lowercase letters are read vertically. Each different letter shows a significant difference based on Duncan's Advanced Test at the 5% level.

Based on Table 2, it can be seen that the results of the analysis show that the interaction between the composition of arabica coffee and robusta coffee and the concentration of maltodextrin produces a significant difference in water content. The water content of an ingredient needs to be known, because water can affect its taste. Water content affects the durability of materials during storage. The water content in the material determines the resistance to attack by microorganisms. The water content in food will change according to the environment, and this is closely related to the shelf life of the food. The expected moisture content of instant coffee obtained from the

treatment is the lowest water content. The lower the water content, the water absorption is relatively faster. This will maintain food security from the influence of contamination by microorganisms during storage. The increase in water content causes damage to the product in which the instant coffee produced will agglomerate or agglomerate. Instant coffee moisture content is strongly influenced by the humidity (relative humidity / RH) of the extraction room. Instant coffee is hydroscopic, instant coffee will absorb moisture from the air until it reaches the moisture content (EMC) equilibrium point. Equilibrium moisture content (EMC) is a point of equilibrium between water content in materials and water vapor in the surrounding environment. The higher the RH value of the room, the higher the water content of the instant coffee produced.

In the drying process, the RH of the room greatly affects the moisture content of the diamond coffee produced. The drying room has high humidity with an average RH of 85%. Water vapor in the air is absorbed by instant coffee which is hydroscopic, so that the water content becomes high. Arabica coffee beans are oval or elongated, the line in the middle of the bean does not extend downward, while the robusta coffee beans are larger, round in shape, the line at the center of the bean is deep and extends downward. According to Mulato (2012), differences in the size of the coffee beans will affect the water content contained in the coffee beans. In addition, this phenomenon is related to the size and number of the 6 constituent cells in the coffee bean. The maximum water content in ground coffee is 7%, this is in accordance with SNI 01-3542-2004. The addition of large amounts of maltodextrin can reduce the moisture content of the product. The higher the maltodextrin concentration, the lower the water content produced. This is because the increase in the concentration of the filler increases the total solids content in the solution which means a decrease in the concentration of water in the solution, so that after drying the water content of the material will be smaller too. Maltodextrin's ability to bind water is better than that of other fillers. The total amount of solids in the material can be increased by the addition of fillers such as maltodextrin, which causes the amount of water content in the material to be small. Maltodextrin can coat the components of the flavor, the total solids can be increased in number, and reduce the damage from the dried material (Oktaviana, 2012).

Acid Content Analysis

Based on the results of the analysis of variance (ANOVA), it shows that variations in the composition of types of coffee, the concentration of maltodextrin, and their interactions have a significant effect on the total acidity of instant coffee, so Duncan's continued test is carried out. The effect of the interaction between coffee composition and maltodextrin concentration on total acid can be seen as follows:

Table 3. The Interaction Effect of Coffee Composition and Maltodextrin Concentration on Total Acid (%).

Composition of Coffee	Maltodextrin Concentration		
	b_1(10%)	**b_2 (15%)**	**B_3(20%)**
a_1 (arabica 80%: robusta 20%)	2,78 B b	2,78 C b	2,24 C a
a_2 (arabica 60%: robusta 40%)	2,22 AB b	1,85 B b	1,68 B a
a_3 (arabica 40% :robusta 60%)	2,04 A b	1,51 A a	1,33 A a

Note: Capital letters are read horizontally, lowercase letters are read vertically. Each different letter shows a significant difference based on Duncan's Advanced Test at the 5% level.

Based on Table 3, it can be seen that the results of the analysis show that the interaction between the composition of arabica coffee and robusta coffee and the concentration of maltodextrin produces a significant difference to the total acid. Independently, the composition of the type of coffee shows a significant difference in the acid content of instant coffee, that is, for the composition of a large type of Arabica coffee, it shows a greater acid content, this is because Arabica coffee has a higher acid content than robusta coffee thus impacting the acid content of instant coffee. More acid content indicates a lower pH value in the formation of flavors and aromas.The acidity of coffee is also influenced by the type of coffee and the way it is processed. Wet coffee processing causes high acidity, especially in Arabica coffee, while dry processing for Robusta coffee causes low acidity. In making instant coffee, the temperature of the extraction water affects the acidity level because it determines the amount of organic acids that are extracted (Panggabean 2011).The total acid of instant coffee is affected by the total acid of ground coffee used. In general, Arabica coffee has a higher total acidity than Robusta coffee and shows a significant difference. Arabica has several acidic compounds that Robusta does not have, so Arabica has a distinctive sour taste that Robusta does not (Albanese et al. 2009). The total acid of ground coffee from the composition of Arabica: Robusta shows significantly different from one another. However, in the extraction process there is a change in the total acid because the total acid in the ground coffee is not completely dissolved. According to Panggabean (2011), acids in ground coffee are volatile and non-volatile compounds. Volatile acids are very susceptible to heat, because they degrade when exposed to heat. During the extraction and

drying process acid degradation occurs due to heat, so that instant coffee has a smaller total acid than ground coffee.

Meanwhile, the maltodextrin filler process showed no significant difference to the acid content, this is because maltodextrin has no effect on the acid content of instant coffee.

Analysis of Caffeine Content

Based on the results of the analysis of variance (ANOVA), it shows that the treatment of variations in the composition of types of coffee with maltodextrin fillers and their interactions significantly affects the caffeine content of instant coffee, so Duncan's continued test was carried out. The effect of the interaction between the composition of arabica coffee and robusta coffee and the concentration of maltodextrin on caffeine content can be seen as follows:

Table 4. The Interaction Effect of Coffee Composition and Maltodextrin Concentration on Caffeine Content

Composition of Coffee	Maltodextrin Concentration		
	b_1(10%)	**b_2 (15%)**	**B_3(20%)**
a_1 (arabica 80%: robusta 20%)	1,65 A a	1,63 A a	1,60 A b
a_2 (arabica 60%: robusta 40%)	1,79 B a	1,78 B a	1,77 B a
a_3 (arabica 40% :robusta 60%)	2,18 C a	2,17 C a	2,16 C a

Note: Capital letters are read horizontally, lowercase letters are read vertically. Each different letter shows a significant difference based on Duncan's Advanced Test at the 5% level.

Based on Table 4. The results of the analysis of caffeine content show that the interaction between the composition of arabica coffee and robusta coffee and the concentration of maltodextrin produces a significant difference in caffeine content. However, the independent effect for variations in the composition of coffee types shows a real difference, the higher the composition of the type of robust coffee, the higher the caffeine content of the instant coffee. The effect independently for the variation factor of maltodextrin shows that the caffeine content is not significantly different. So the percentage of maltodextrin does not affect the caffeine content of instant coffee. According to Arwangga et al (2016), that different levels of caffeine in coffee are due to the presence of water and caffeine content in raw coffee which is still in the form of bonds with other organic compounds.

This affects secondary metabolites. The caffeine content of blended coffee grounds is lower than raw coffee due to the drying and roasting process of the coffee beans. Separation of caffeine from coffee samples was carried out by the extraction method which was previously carried out by dissolving the coffee sample in hot distilled water. The use of hot distilled water aims to maximize caffeine which can dissolve 1.5 parts of boiling water according to. The caffeine obtained is then filtered to separate the precipitate and the filtrate, after which the solid calcium carbonate (CaCO3) is added to the filtrate into a separating funnel. The addition of calcium carbonate serves to break the caffeine bonds with other compounds, so that the caffeine will be in the free base. The caffeine in the free base will be bound by the chlorophome, because chlorophome is an extracting solvent that does not mix with the original solvent.

Physical Response

Solubility

Based on the results of the analysis of variance (ANOVA), it shows that the concentration of maltodextrin and its interactions have a significant effect on the solubility of instant coffee, while the treatment of variations in the composition of coffee types shows no significant difference. The effect of the interaction between coffee composition and maltodextrin concentration on solubility can be seen as follows:

Table 5. The Interaction Effect of Coffee Composition and Maltodextrin Concentration on Solubility (%).

Composition of Coffee	**Maltodextrin Concentration**		
	b_1(10%)	**b_2 (15%)**	**B_3(20%)**
a_1 (arabica 80%: robusta 20%)	94,33 A a	96,33 A ab	97,33 A b
a_2 (arabica 60%: robusta 40%)	93,67 A a	95,67 A ab	98,00 B b
a_3 (arabica 40% :robusta 60%)	94,67 A a	96,67 A ab	98,00 B b

Note: Capital letters are read horizontally, lowercase letters are read vertically. Each different letter shows a significant difference based on Duncan's Advanced Test at the 5% level.

Based on Table 5, it can be seen that the results of the analysis show that the interaction between the composition of arabica coffee and robusta coffee and the concentration of maltodextrin produces a significant difference in solubility. Independently, variations in the composition of coffee types showed no significant difference, while for variations in treatment, the concentration of maltodextrin showed a significant difference.

This study shows that a greater increase in maltodextrin concentration in each treatment will increase the solubility of instant coffee, as in the b3 treatment (20% maltodextrin concentration) results in higher solubility than other treatments. This is because maltodextrin contains a DE (Dextrose Equivalent) value of 20. The higher the DE value, the higher the solubility value (Hidayah, 2011). Solubility is the maximum amount of a substance that can dissolve in a certain amount of solvent or solution at a certain temperature. Water serves as a material that can disperse various compounds present in food ingredients. Heating can reduce the attraction between the water molecules and provide enough energy to the water molecules to overcome the attraction between the molecules. The treatment of maltodextrin concentration has a significant effect on the solubility value of instant drinks. This is because when the powder drink is dissolved, the hydroxyl groups contained in the maltodextrin will interact with water so that the solubility of the powder increases. The more free hydroxyl groups in the filler, the higher the solubility level. This means that if the solubility value obtained is higher, it indicates the better quality of the product produced, because the serving process will be easier (Yuliawaty et al, 2015). Solubility is related to the water content of the material, where the higher the water content, the smaller the solubility, because if the high water content results in the formation of clumps, it takes a long time to break the bonds between particles and the ability of the product to break bonds between particles and the ability of the product to dissolve. will decrease. The solubility of instant coffee produced in this study is normal, meaning that it has good solubility in cold water and hot water. The good solubility of instant coffee is because only substances that dissolve in the solvent (in this case water) are extracted (Mulyanto et al, 2012). Besides, Yulisa et al (2013) stated that one of the factors that causes instant coffee to be in great demand is that it is not spoiled (practically soluble), while Satyajaya et al (2014) state that the dissolution rate parameter is one of the important parameters for instant coffee.

Organoleptic Response

Color

Based on the results of the analysis of variance (ANOVA), it shows that variations in the composition of coffee types, the concentration of maltodextrin and their interactions have a significant effect on

the organoleptic parameters of the color of instant coffee. The effect of the interaction between coffee composition and maltodextrin concentration on color parameters can be seen as follows:

Table 6. Effect of Interaction between Coffee Composition and Maltodextrin Concentration on Color parameters.

Composition of Coffee	**Maltodextrin Concentration**		
	b_1(10%)	**b_2 (15%)**	**B_3(20%)**
a_1 (arabica 80%: robusta 20%)	2,39 B b	2,31 A a	2,40 C b
a_2 (arabica 60%: robusta 40%)	2,29 A b	2,33 B c	2,21 A a
a_3 (arabica 40% :robusta 60%)	2,28 A a	2,29 A b	2,27 B a

Note: Capital letters are read horizontally, lowercase letters are read vertically. Each different letter shows a significant difference based on Duncan's Advanced Test at the 5% level.

Based on Table 6. These organoleptic results indicate that the interaction between the composition of arabica coffee and robusta coffee and the concentration of maltodextrin resulted in significant differences in color parameters. Color is the most important quality parameter. Even though a product has high nutritional value, good taste and good texture, if the color is not attractive it will cause the product to be less attractive because the color is visible visually. The color of instant coffee is influenced by the ingredients used in making instant coffee. Instant coffee colors can be grouped based on the addition of fillers in the instant coffee making itself. Pure instant coffee has a darker color compared to instant coffee made with the addition of maltodextrin. The addition of fillers was carried out for differences in economy class. Fillers such as maltodextrin reduce the browning rate of the coffee grounds that are produced. The addition of maltodextrin has no real effect on color. Maltodextrin can be used in high temperature applications, because it has a low reducing sugar content so that it does not form dyes in the browning reaction. Color greatly affects the consumer's ability to identify the type of flavor and his ability to estimate the intensity and quality of the flavor.

Aroma

Based on the results of the analysis of variance (ANOVA), it shows that the concentration of maltodextrin has a significant effect on the organoleptic parameters of the instant coffee aroma,

while the treatment of variations in the composition of coffee types and their interactions shows no significant difference. The effect of maltodextrin concentration on aroma parameters can be seen as follows:

Table 7. Effect of Maltodextrin Concentration on Aroma Parameters.

Maltodextrin Concentration	Average Value (Real Level 5%)
(b_1) 10%	2,82 [a]
(b_2) 15%	3,78[ab]
(b_3) 20%	4,06 [b]

Note: The average value followed by different letters is significantly different according to Duncan's continued test at the 5% level.

Based on Table 7, it can be concluded that with the increase in the added concentration of maltodextrin, there is a significant increase in the real aroma of instant coffee. This study shows that increasing the concentration of maltodextrin in each treatment will increase the aroma of instant coffee, such as the 20% concentration of maltodextrin in the treatment produces a higher aroma than other treatments. This is because maltodextrin can maintain the flavor of food during the heating process, has a bland taste so it is very suitable to be used as a filler in various food / beverage systems without disturbing the taste and aroma of the food / beverage. Aroma is an odor caused by chemical stimulation that is smelled by olfactory nerves in the nasal cavity. Scent has more to do with the five senses of smell. Odors can be recognized, if in the form of vapor and molecular odors the odor has to touch the olfactory cells. In general, the smell that the nose and brain can accept is a mixture of the four main smells, namely fragrant, sour, rancid, and charred.

The aroma of brewed coffee arises due to the evaporation of volatile compounds possessed by ground coffee when ground coffee is brewed so that it is captured by the human sense of smell (Baggenstoss et al., 2008). The aroma of instant coffee powder arises because of the volatile compounds. The volatile compounds from coffee are formed during the roasting process. In making instant coffee, these volatile compounds are dissolved in hot water to extract them and form the resulting instant coffee aroma (Bhumiratana et al. 2011). Most of the volatile compounds that are not resistant to heat will suffer damage during the extraction and drying process. The aroma of instant coffee that is formed is a fishy aroma. This scent can easily be recognized when the instant coffee grounds come out of the dryer. Aroma is an indicator that gives research results whether the product is accepted or not. However, the smell or smell itself is difficult to measure, so it usually gives rise to many different opinions in assessing the quality of aroma. The addition of maltodextrin with various concentrations can protect the aroma of powdered soy milk yogurt because maltodextrin has a characteristic odor that is almost odorless. Maltodextrin is used in the encapsulation process to protect compounds that are sensitive to oxidation or heat. Maltodextrin can protect flavor stability during spray drying. The existence of influence or no effect between each treatment interaction is caused because it

comes from the point of view of the panelist's visual value on the aroma of the product, where the aroma is influenced by the perception of a person who varies from one panelist to another.

Taste

Based on the results of the analysis of variance (ANOVA), it shows that the treatment of variations in the composition of coffee types, the concentration of maltodextrin, and their interactions have a significant effect on the parameters of instant coffee taste. The effect of the interaction between variations in coffee composition and maltodextrin concentration on the parameters of instant coffee taste can be seen as follows:

Table 8. Effect of Interaction between Coffee Composition and Maltodextrin Concentration on Taste Parameters.

Composition of Coffee	**Maltodextrin Concentration**		
	b_1(10%)	**b_2 (15%)**	**B_3(20%)**
a_1 (arabica 80%: robusta 20%)	5,00 C a	4,90 C a	5,03 C a
a_2 (arabica 60%: robusta 40%)	4,59 B b	4,52 B b	4,31 B a
a_3 (arabica 40% :robusta 60%)	3,77 A a	3,67 A a	3,62 A a

Note: Capital letters are read horizontally, lowercase letters are read vertically. Each different letter shows a significant difference based on Duncan's Advanced Test at the 5% level.

Based on Table 8, this organoleptic result shows that the treatment of variations in the composition of coffee types and their interactions shows a significantly different taste, while variations in the concentration of maltodextrin show significant differences. Taste is one of the parameters that every consumer takes into account, as well as instant coffee, that taste is strongly influenced by the composition of the coffee mix, where the composition of Arabica coffee types and robusta coffee types each contribute to the taste and aroma of steeping instant coffee. As with the nature of each type of coffee, Arabica coffee is predominantly sour and contains higher sugar than the Robusta coffee, while robusta coffee contains higher caffeine content and tastes more bitter than Arabica. The results of this study indicate that the variation in the composition of the mixture of Arabica and Robusta coffee types based on organoleptic tests with taste parameters gives a real difference and variations in the composition of the mixture of types of arabica coffee 80% with 20% robusta give the best taste according to the taste tests conducted by panelists as a representation of instant coffee consumers.

CONCLUSION

Based on the results of the research that has been done, it can be concluded that the variation factor in the composition of the mixture of Arabica and Robusta coffee types shows significantly different results on the response to the parameters of water content, caffeine, total acid, taste, and color, but shows no significant difference in solubility and solubility parameters aroma. The variation factor in the concentration of maltodextrin showed significant differences in the response of water content, solubility, color and aroma parameters, but showed no significant difference to the response parameters of acid, caffeine, and taste. Overall, the interaction between the various factors in the composition of the mixture of Arabica coffee and robusta and the concentration of maltodextrin shows a significant difference. If you compare it to choose the best categorized formulation, the composition of 80% arabica coffee with 20% robusta and 20% maltodextrin concentration shows the best based on the response parameters tested.

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