

Original article

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Consumer Preference Level on *Cinnamomum burmanii* Tea with Analytic Hierarchy Process Method

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ABSTRACT

Cinnamon is one of the popular ingredients used as food additives or nonfood. Cinnamon has smells fragrant and sweet taste, it can be used as additional ingredient for tea bag production. Tea with additional cinnamon is one of product innovation of tea bag for increase functional value of tea. The purpose of this research is to know consumer preferences level of cinnamon tea based on internal attribute (colour, taste, and scent) and external attribute (packaging design, packaging material, information label, size and content of packaging) using Analytic Hierarchy Process (AHP) method. The result of consumer preferences of cinnamon tea based on Analitic Hierarchy Process (AHP) method as primary alternative for internal attribute based on color, taste, and smell is 2:1 formulation of ratio tea powder and cinnamon powder. The primary alternative of external attribute based on design, material, information label, size of packaging is prototype C (carton packaging).

Keywords: AHP (Analytic Hierarchy Process), cinnamon, external attribute, internal attribute , tea.

1. Introduction

Cinnamon is one of the plants the skin by a rod, branches and not go over the bough is used as an ingredient of spices and it has automatically become one commodity for showed Indonesia exports. A plant cinnamon (*Cinnamomum Burmanii*) been a long time has been developed in Indonesia and is one of the commodities which are considered profitable smelling spices so that they who become a thing of the main clean them of sin they since the days of colonial (Denian, 1996).

Cinnamon potential in South Kalimantan in 2016 was high enough to create of two 1635 tons/years with their land 2679 acres (bps kalsel, 2017).

Being immersed in water cinnamon tea and drunk could reduce blood cholesterol levels diluting the body and so both a stroke for patients. The results of the study in Sweden stated that consume a tablespoon cinnamon powder eating may hold the increase in blood sugar because powder cinnamon prevent suction sugar on dividing it would be as if the intestines and anonymous, 2006).

Cinnamon smells fragrant and tasteless sweetness that can be used as the additional innovation making tea. The increase of population and the knowledge on the benefits a chemical compound contained in cinnamon, so development of cinnamon still have the prospects for increase farm incomes and foreign exchange state (Rusli and Abdullah, 1988).

The purchase decision was the selection of two or more, it means that someone can make decisions, shall be available to choose, as in cinnamon tea bags products where can be done attribute in a decision at the colour, a sense, the fragrance and attribute the outer packaging material, packaging design, info label and the size of the content packaging so that it can be have led to the disturbing process in the decision done (Schiffman et al, 2004).

One of the methods that can be used to do the determination of the level of preference of consumers on tea bags cinnamon using a method of AHP (Analytical Hierarchy Processes). AHP is a technique quantitative developed for cases who have a range of stage analysis of a hierarchy. This method is a way of practice to handle in a variety of functional a complex network of nodes. A method of AHP was used comparison in pairs, counting factors of weight, and to analyze it was to produce priority relatively among the alternatives. AHP was a method of simple and flexible that accommodate creativity for a problem (Aziz, 2010).

2. Research Methods

The place and time of research

This study was conducted in May-August 2017 uses the method purposive sampling with filling out of the questionnaires by 100 respondents at the Banjarmasin, Banjarbaru, and Martapura.

Research Methods

The experimental work on this material that is used is the tea, cinnamon powder, sac (a bag that which was made of a filter paper (a paper bag bags of material tissue and hold heat, packaging tea bags cinnamon of material mica and material cardboard and paper filling out the questionnaire by respondents. A research phase can be seen from figure 1.

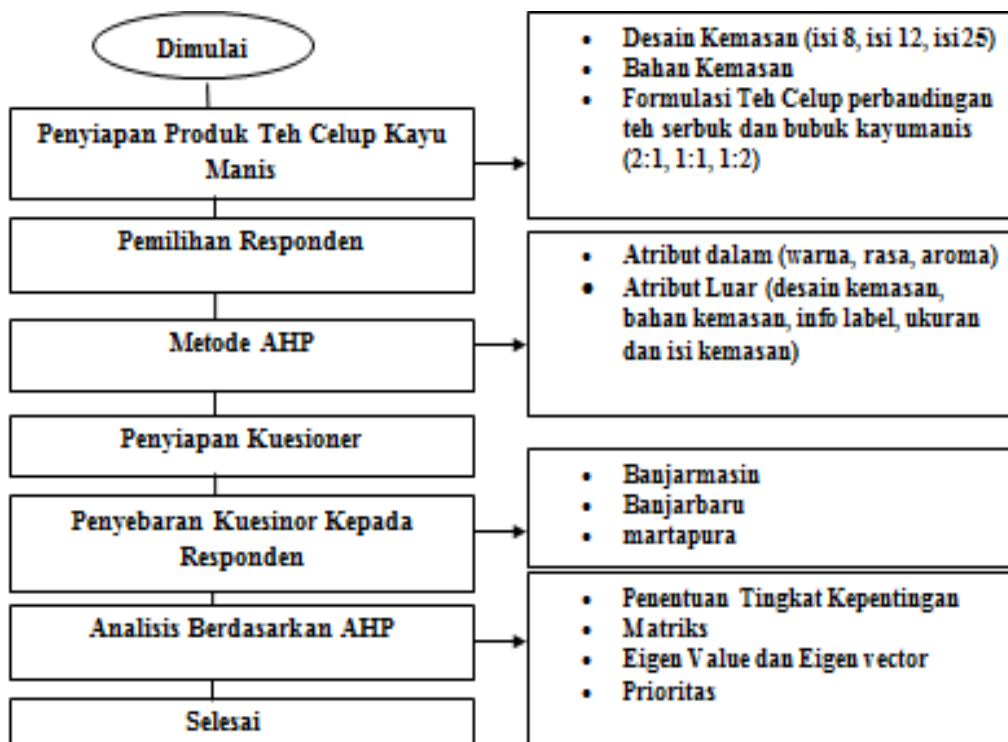


Figure 1. Diagram Research

3. The Results And Discussion

Characteristics of Respondents

Characteristics of respondents serve in order to provide on the identity respondents so that can be seen the extent to which the identity of respondents in this research. Respondent ; woman consumes tea of 54 % and the man of 46 %.

Based on their age was about 34 % 31- 40 years old, 28 % 20-30 years old, 27 % 41-50 old years and 11 % aged > 50 years. There were a lot of students and adults as respondents.

Based on the highest work 30 % that was a housewife or traders, learner or college students will receive 29 %, civil servants by 16 %, employees 13 % and entrepreneurs as much as 12 %. The role of housewives at an election a product in general based on the kind of product, product price and conformity and needs of the in the family.

Based on the level education, high school of 48 %, an undergraduate degree as 40 %, junior high school 8 %, other (did not receive any education) to 5 % and primary schools of 4 %. Respondents most often in tea consumption is 1 to 5 times in 1 week, is as much as 51 %, 5 to 10 times in 1 week by 28 %, > 10 times in 1 week of 13 % and 1 time a week 8 %. Consumption purposes tea beside beneficial to health the body, respondents made tea as steeping that can give freshness when consumed.

The Determination of Priority with Analytical Hierarchy Process (AHP)

Matrix in pairs

The determination of priority with hierarchy analytical process (AHP) was a part of the process calculation. AHP was a model advocates a decree being developed by Thomas L. Saaty. Model advocates this decision outlines problems multi-factors being a hierarchy. Saaty (1993), a hierarchy defined as a representation of complex problems in a structure multi the level in which the level of first is the purpose, followed the level of factors, criteria, sub-criteria, and so on down until the last level of alternatives.

The determination of criteria priority inside attributes

Attributes was an attribute influential interest in buying important for consumers and used as a base decision making. Attributes in the tea bags of cinnamon (Figure 2) composed of a colour, taste, and scent. Third each of criteria have an important role for those at the time-consuming tea bags of cinnamon, so consumers can assess whether main priorities attributes in tea bags of cinnamon based on the criteria colour, taste, and scent.

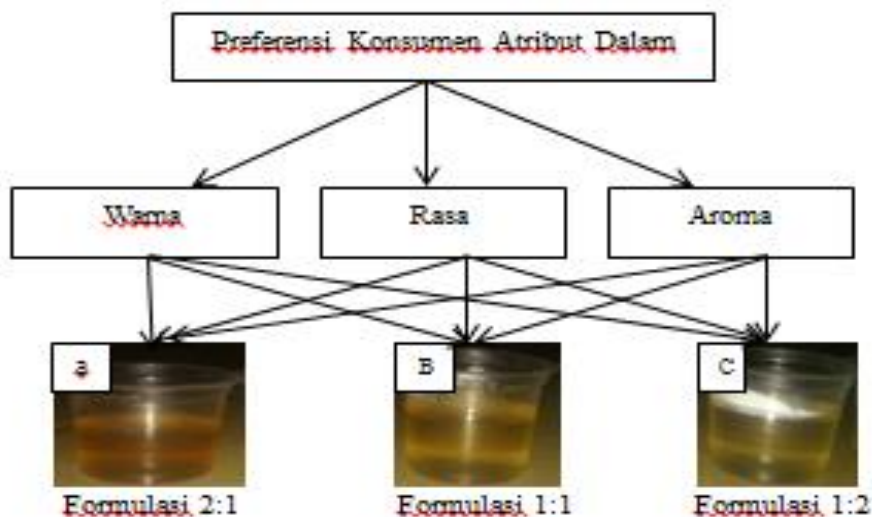


Figure 2. Attributes in preference of consumers

Table 1 attribute in criteria

K \ B	Egien Vector	Rangking	VJT	Vector Konsistensi
Warna	0.152	3	0.466	3.064
Rasa	0.592	1	1.783	3.011
Aroma	0.256	2	0.777	3.034
Jumlah λ				9.109
λ Maks				3.036
CI				0.018
CR				0.031

Description :

- B = Bobot ,
- CI = Konsistensi Indeks,
- CR = Konsistensi Rasio
- VJT = Vector Jumlah Tertimbang
- K = Kriteria

Table 1 shows that criteria attributes in respondents dominant weight choose to think as a main priority in decision making an egien vector with the highest and the lowest 0,592. This means that in

consuming tea bags of cinnamon the respondents prioritize than colour and scent. Then the value of the consistency in tea bags of cinnamon 0,031 was consistent and opinions decision making acceptable.

The Priority Criteria of Colour

Soekarto (1990), said that the colour was important because it can influence the criteria of the consumer, in addition, the colour is the first assessed by consumers before another element as the texture, the scent and some of the other physical.

Table 2. Criteria of color

A \ B	Egien Vector	Rangking	VJT	Vector Konsistensi
2 : 1	0.671	1	2.025	3.018
1 : 1	0.226	2	0.692	3.061
1 : 2	0.102	3	0.32	3.135
		Jumlah λ		9.214
		λ Maks		3.071
		CI		0.036
		CR		0.062

Description :

B = Bobot, VJT = Vector Jumlah Tertimbang
 CI = Konsistensi Indeks, A = Alternatif
 CR = Konsistensi Rasio

Table 2 was the majority criteria of respondents, they choose formulations tea bags and powdered 2 cinnamon: 1 as weights main priority in decision making namely the highest egien vector 0,671. The value of the consistency colour tea bags, so the cinnamon 0,062 making decision acceptable.

The Determination of Priority Criteria

Wood (2007), said that the aspect of sensory was the most important in some products. There were many variations of the four basic taste namely sweet, salted, lose and bitter combined for creating a sense of unique to a type of product.

Table 3. criteria of sense

A \ B	Egien Vector	Rangking	VJT	Vector Konsistensi
2 : 1	0.505	1	1.525	3.02
1 : 1	0.303	2	0.918	3.03
1 : 2	0.193	3	0.589	3.052
		Jumlah λ		9.102
		λ Maks		3.034
		CI		0.017
		CR		0.029

Description :

B = Bobot, VJT = Vector Jumlah Tertimbang
 CI = Konsistensi Indeks, A = Alternatif
 CR = Konsistensi Rasio

Table 3 shows the criteria for a sense of tea bags cinnamon by which respondents select the formulation of tea bags and powdered of cinnamon 2:1 as the weight of the main priority in the decision making of the main supply that value of egien of vector 0,505. The value of the test had been approved by the consistency of the criterion in the selection of participants to flavour tea bags cinnamon was 0,029 so that the decision making process can be received.

The Determination of Scent Priority Criteria

Melgaard (2000), explained that scent as a sensory was very subjective and difficult to measure, that was because every person has different sensitivity and preferences. Even they can detect, but every individual having different fondness.

Table 4. The Criteria of Scent

A \ B	Egien Vector	Rangking	VJT	Vector Konsistensi
2 : 1	0.539	1	1.622	3.009
1 : 1	0.294	2	0.888	3.02
1 : 2	0.166	3	0.504	3.035
Jumlah λ				9.064
λ Maks				3.021
CI				0.011
CR				0.019

Description :

B	= Bobot ,	VJT	= Vector Jumlah Tertimbang
CI	= Konsistensi Indeks,	A	= Alternatif
CR	= Konsistensi Rasio		

The criteria of scent for cinnamon tea bags (table 4) respondents select the formulation of a tea bags and cinnamon powdered 2:1 as the main weight in the making decision of supply the vector 1,622 and value of the consistency test for the scent of cinnamon tea bags is 0,019 so that the decision process can be accepted.

A Consumers Preference Election of Attribute Priority

Planit (2001), explained that preference of consumers means choice or choose, where consumers can judge a product.

Table 5. The whole respondents priority at attributes internal

A \ K	Warna	Rasa	Aroma	Atribut Dalam	Egien Vector	Rangking
2:1	0.671(r)	0.505(r)	0.539 (r)	0.152 (u)	0.539	1
1:1	0.226 (s)	0.303(s)	0.294 (s)	0.592 (u)	0.289	2
1:2	0.102 (t)	0.193(t)	0.166 (t)	0.256 (u)	0.172	3

Description :

K = Kriteria
A = Alternatif

From table 5 can be concluded that on an internal attribute cinnamon tea bags products based on the color criteria, superior taste and aroma of whole respondents have a comparison formulation of tea and cinnamon powder 2:1 with a the highest value of egien vector was 0,539.

The Determination of Priority Criteria for external Attribute

The external attribute was one of attributes that attached to a product. The external attribute has an important role because it's one of the factors which was considered by consumers before buy that product.

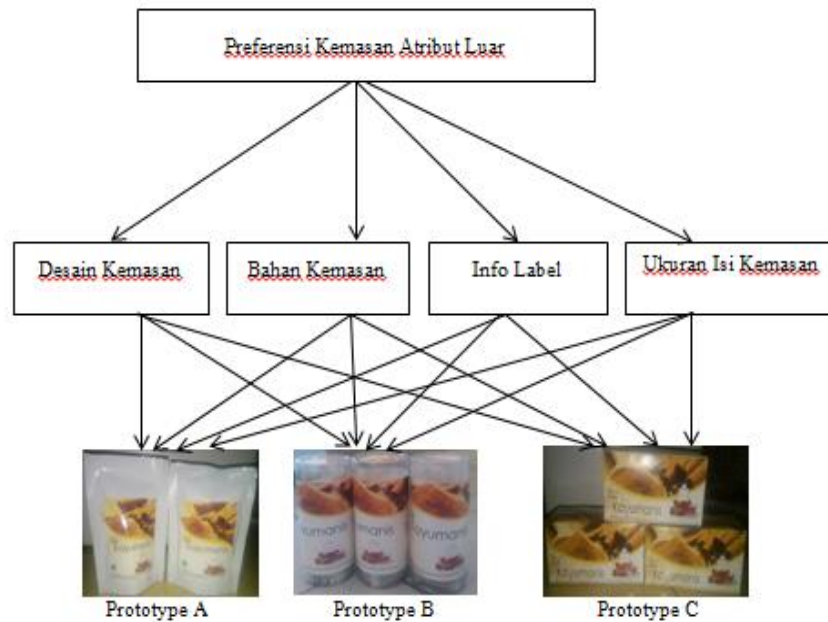


Figure 3. Preference of consumers

Table 6. The external criteria

B	Egien Vector	Rangking	VJT	Vector Konsistensi
K				
Desain Kemasan	0.141	4	0.567	4.019
Bahan Kemasan	0.195	3	0.783	4.015
Info Label	0.348	1	1.394	4.006
Ukuran Isi Kemasan	0.316	2	1.267	4.01
		Jumlah λ		16.049
		λ Maks		4.012
		CI		0.004
		CR		0.005

Description :

B = Bobot, VJT = Vector Jumlah Tertimbang
 CI = Konsistensi Indeks, K = Kriteria
 CR = Konsistensi Rasio

The Determination of Criteria Packaging Priorities Design

Packaging design the main consideration viewed by consumers, because of the pull consumers usually focus on the beauty of prominent, products and packaging would influence the buying decisions.

Table 7. Criteria Packaging Priorities

B	Egien Vector	Rangking	VJT	Vector Konsistensi
A				
Aluminium Foil	0.366	1	1.126	3.076
Mika	0.317	3	0.913	2.881
Karton	0.318	2	0.975	3.066
		Jumlah λ		9.022
		λ Maks		3.007
		CI		0.004
		CR		0.006

Description:

B = Bobot, VJT = Vector Jumlah Tertimbang
 CI = Konsistensi Indeks, A = Alternatif
 CR = Konsistensi Rasio

Table 7 explained that design criteria packaging the cinnamon tea bags the majority of respondents choose aluminum foil as weight main priority in decision-making namely value eigen vector 0,366 and value of the consistency or index the ratio of design criteria packaging the cinnamon tea bags is 0,006 and decision-making acceptable.

The priority criteria packaging material

Material packaging was one of the alternatives to distinguish product to another. A material in a good can affect consumers to choose and purchase products that are packed, criteria material packaging the cinnamon tea bags consisting of alternatives aluminum foil, mica and cardboard.

Table 8. Criteria packaging material

A \ B	Egien Vector	Rangking	VJT	Vector Konsistensi
Aluminium Foil	0.359	1	1.078	3.004
Mika	0.312	3	0.935	2.997
Karton	0.329	2	0.987	2.999
		Jumlah λ		9.000
		λ Maks		3.000
		CI		0
		CR		0

Description:

B = Bobot, VJT = Vector Jumlah Tertimbang CI = Konsistensi Indeks, A= lternatif
CR = Konsistensi Rasio

In table 8 criteria packaging material of cinnamon tea bags in aluminum foil dominant respondents chose as the main priority in making decision which has the vector egien 0,359 and the ratio value criteria of consistency is 0 and making decision was accepted.

The Determination of Criteria Priority Information Label

At this point, except the criteria of product has good qualities, the other important aspects also has good qualities. One of these has the information from the label's packaging. The consumers start concerning the aspects priority such as number of PIRT (health department), halal certificate, a production code, etc.

Table 9. Criteria Priority Label

A \ B	Egien Vector	Rangking	VJT	Vector Konsistensi
Aluminium Foil	0.315	3	0.946	3.002
Mika	0.232	2	0.971	3.006
Karton	0.362	1	1.086	2.999
		Jumlah λ		9.007
		λ Maks		3.002
		CI		0.001
		CR		0.002

Description:

B = Bobot, VJT = Vector Jumlah tertimbang
CI = Konsistensi Indeks, A = Alternatif
CR = Konsistensi Rasio

In this table, the respondents choose the packaging that used cardboard as the main priorities during making decision process with a value eigen vector was 0,362 and ratio index criteria of cinnamon tea bags was 0,002 so that the decision making process can be accepted.

The Determination of Criteria Priority Size and The Contents of Packaging

Size and the contents of packaging are kind of the factors consideration consumers in making decision, the contents of packaging products adjusted to the needs of the consumers so it used as one of the choice of product.

Table 10. Criteria Priority Size

A \ B	Egien Vector	Rangking	VJT	Vector Konsistensi
Aluminium Foil	0.208	3	0.625	3.005
Mika	0.263	2	0.789	3.001
Karton	0.529	1	1.585	2.996
Jumlah λ				9.002
λ Maks				3.001
CI				0.003
CR				0.005

Description :

B = Bobot, VJT = Vector Jumlah Tertimbang
 CI = Konsistensi Indeks, A = Alternatif
 CR = Konsistensi Rasio

Most of the criteria size cinnamon tea bags packaging respondents choose the cardboard as main priority because it has value egien vector 0,529 and the ratio index of design criteria packaging cinnamon tea bags was 0,005 and decision-making acceptable.

The Elections of Consumers Preference in The External Attribute

Amirullah (2002), explained that the making decision by consumers means as evaluation process and the selection of various alternatives in accordance with certain interests by assigning a choice that which are considered most profitable.

Table 11. The external attributes respondents priority

A \ K	Desain kemasan	Bahan kemasan	Info label	Ukuran isi kemasan	Atribut luar	Egien Vector	Rangking
a	0.366 (r)	0.359(r)	0.315(r)	0.208 (r)	0.141(u)	0.297	3
b	0.317(s)	0.312(s)	0.323(s)	0.263 (s)	0.195(u)	0.301	2
c	0.318 (t)	0.329 (t)	0.262(t)	0.528 (t)	0.347(u)	0.367	1
					0.316(u)		

Description :

K = Kriteria, A = Alternatif, a = Aluminium Foil
 B = Mika, c = Karton

From table 11 we can conclude that the external attribute of cinnamon tea bags respondents want to design, material, label information and the content of size packaging that was around cardboard with the highest value of egien vector was 0,367.

4. Conclusions And Recommendations

The result of consumer preferences of cinnamon tea based on Analitic Hierarchy Process (AHP) method as primary alternative for internal attribute based on color, taste, and scent has 2:1 formulation of ratio tea powder and cinnamon powder. The primary alternative of external attribute based on design, material, information label, size of packaging is prototype C (carton packaging).

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