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Purwaceng Coffee Formulation Based on Consumers Preference

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Abstract: Purwaceng (*Pimpinella pruatjan* Molk.) is one of Indonesian herb used to improve stamina and blood circulation, therefore, it has potential to be functional food. As functional food component, it could be blend with other material such as coffee which improve customers acceptance. The aim of the research is to identify the quality attributes of purwaceng coffee beverage desired by consumers and to develop the concept of purwaceng coffee beverage in accordance to consumer preferences. Value Engineering approach was used to formulate purwaceng coffee, which consists of three phases: information phase, creative phase, and analysis phase. Information phase consists of in-depth interview and gathering information using questionnaire. Creative phase consists of creating FAST diagram and obtaining product concepts using Fully Randomized Design. Analysis phase consists of sensory analysis to obtain product performance and value. According to the research, there are 4 preferable attributes which considered on purwaceng coffee formulation: health benefit, aroma, taste, and intensity. The best concept was composed of robusta coffee powder (7.5 g), full cream milk powder (2.5 g), sugar (15 g), and purwaceng powder (0.35 g). Compared with market product as competitors, the selected concept has advantages on the aroma, taste, intensity, and the performance.

Keywords: coffee, functional food, purwaceng, quality attributes, value engineering

1. Introduction

Food Supplements are found both in the form of beverage products and of tablets or pills. Many people consume this supplement food to stay their healthy and to improve their stamina. However, long term consumption of food supplement have implicated on human health because of their side effects [1]. The best way to improve the quality of life is having a healthy diet. The functional compounds contained in foods or beverages has a positive effect on one's physical and spiritual health in addition to its nutritional content and taste.

Purwaceng is herb used for ingredient in the functional food which allegedly could increase human stamina. Purwaceng can be used as a medicine or as an additive for any kind of beverages, such as coffee. It has a bitter taste, which was almost similar to that of coffee, let to combined both of them into a healthy coffee drinks. However, the research concerning consumer preference on purwaceng coffee products was not so far available. Therefore, it is necessary to optimize the purwaceng coffee formula by exploring their quality attributes according to consumer preferences. In this study, purwaceng coffee products were developed using value engineering methods approach. The value in value engineering is determined by the lowest cost to fulfill the functions or services needed in the certain time and place with basic quality [2]. The aim of this study is to identify the quality attributes of purwaceng coffee products desired by consumers, to develop the concept of purwaceng coffee products in accordance with consumer preferences and to determine the level of consumer preference for the products developed.

2. Materials and Methods

The main material used in this research were robusta coffee from Gunung Kelir, Semarang, Central Java and purwaceng (Pimpinella pruatjan Molk) harvested from Dieng, Wonosobo, Central Java. Both of these were then formulated with additional substances to be herb coffee regarding on customer preferences.

Formulation of purwaceng coffee was performed by value engineering using the steps as follow:

2.1. Information phase.

Information phase in this study aims to find out customer desires toward the product being developed. Information phase consists of product quality attributes data collection and importance level determination. In this study, product quality attributes collected by in-depth interview and questionnaire. Then, the priority order of product quality attributes was measured by calculating importance level and weight. Importance level is the average of importance of each quality product attribute. Importance level was measured by Formula 1.

$$Importance\ level = \frac{the\ importance\ value\ number\ of\ each\ quality\ product\ attribute}{the\ number\ of\ respondents}, \quad (1)$$

Importance weight is the percentage of importance level of each quality product attribute compared to total importance level. Importance weight was measured by Formula 2.

$$Importance\ weight = \frac{the\ importance\ level\ of\ each\ quality\ product\ attribute}{total\ importance\ level}\ x\ 100\%, \quad (2)$$

2.2. Creative phase.

The aim of creative phase is to develop alternatives to fulfill its main function. This phase consists of creating FAST diagram, determination of product specification, developing concept and creating purwaceng coffee prototype. FAST diagram is used to create product specification which obtained by the translation of customer desires become a technical requirement. Product specification obtained was then used to develop product concepts. In this study, product concepts developed by using Completely Randomized Design. Product concepts were then made into prototype for further analyzed in the next phase.

2.3. Analysis phase.

In this phase, purwaceng coffee prototypes were analyzed by using organoleptic test to get the number of performance and value. The chosen concept will be compared to the similar commercialized product. Organoleptic tests was carried out on the prototype through giving scores to the product quality attributes by at least 30 respondences [3]. The result of organoleptic test is used to calculate performance using Formula 3.

$$Performance = quality\ attribute\ weight\ x\ the\ number\ of\ respondent\ rating \quad (3)$$

Furthermore, value was then calculated to determine which concept will be selected as the best concept. The selected concept has highest value among the other. The value was calculated using Formula 4.

$$Value = \frac{Performance}{Cost}, \quad (4)$$

3. Results

3.1. Product Quality Attributes and Importance Level Determination

In this study, product quality attribute was obtained by in-depth interview and questionnaire. The result showed that customer have consider on their taste, viscosity, aroma, and benefit. Importance level and weight of product quality attribute was described in Table 1.

Table 1. Importance level and weight of product quality attribute

Primary Attributes	Secondary Attributes	Importance Level	Importance Weight (%)	Rank
Benefit	Improve stamina and immune system	3.63	16.26	1
Aroma	Original coffee	3.35	15.01	2
Taste	Balance	3.35	15.01	3
Aroma	Strong	3.10	13.89	4
Viscosity	Enough pulp	3.09	13.84	5
Taste	Contain additional substances	3.00	13.44	6
Aroma	According to additional substances	2.80	12.54	7
	Total	22.32	100.00	

3.2. Product Concept Creation

Product quality attributes were identified and analyzed in order to find the factors influencing product quality attributes. Correlation between factors was presented on FAST diagram. Purwaceng coffee FAST diagram was shown in Figure 1. Based on FAST diagram, purwaceng coffee specification consists of robusta coffee powder as the main substance, purwaceng plant was in the form of simplicia, sugar used as sweetener, and milk used as additional substances. According to [4], maximum dose of purwaceng simplicia without any healthy risk was 500 mg.

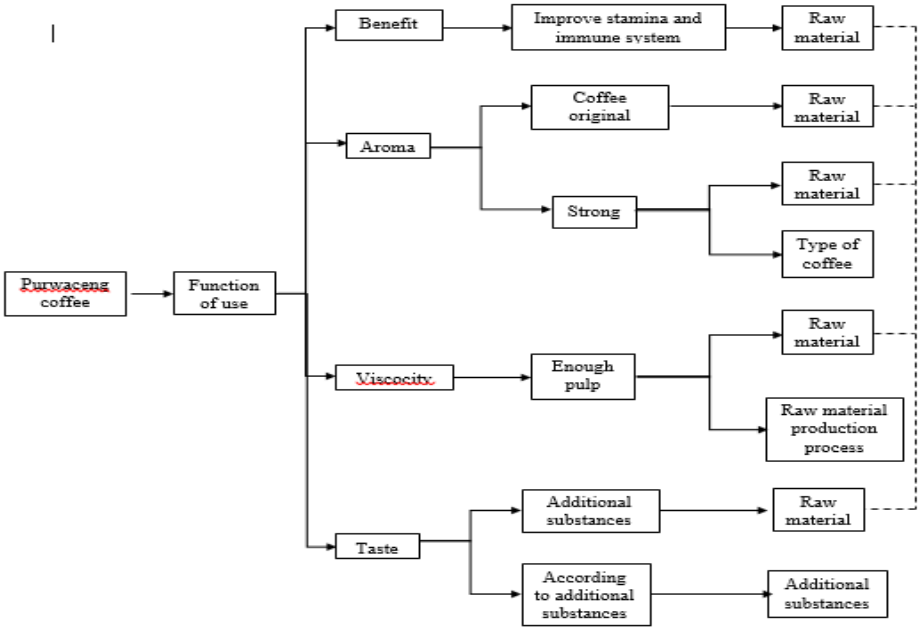

Figure 1. Purwaceng coffee FAST diagram

Drafting of purwaceng coffee concept refers to product specification. It was created by Factorial Completely Randomized Design. There were four factors used to create the concepts, i.e. the amount of robusta coffee powder, full cream milk powder, sugar and purwaceng powder as presented in Tabel 2. Each factors consists of three levels. Product specification created into 9 concepts which was presented in Table 3.

Table 2. Variation of purwaceng coffee composition

	Factors	Level		
		1	**2**	**3**
A	The amount of robusta coffee powder (g)	5	7,5	10
B	The amount of full cream milk powder (g)	7,5	5	2,5
C	The amount of sugar (g)	10	12,5	15
D	The amount of purwaceng powder (g)	0,2	0,35	0,5

Table 3. Purwaceng coffee concept

Concepts	**Factors (gram)**			
	The amount of robusta coffee powder	**The amount of full cream milk powder**	**The amount of sugar**	**The amount of purwaceng powder**
A	5	7,5	10	0,2
B	5	5	12,5	0,35
C	5	2,5	15	0,5
D	7,5	7,5	12,5	0,5
E	7,5	5	10	0,2
F	7,5	2,5	15	0,35
G	10	7,5	15	0,35
H	10	5	10	0,5
I	10	2,5	12,5	0,2

Organoleptic test was used to analyze and identify these 9 prototypes to get the best concept. Quality product attributes which consists of taste, aroma, and viscosity were used as judgment parameter in this test. The result of organoleptic test showed that concept F has the highest value on taste, aroma and viscosity.

3.3. Product Performance Analysis

The result of organoleptic test and product quality attribute influence the amount of product performance [5]. The result of product performance calculation was shown in Table 4.

Table 4. The result of prototype analysis

Concepts	**Product Quality Attribute**			**Performance**	**Cost**	**Value**
	Taste	**Aroma**	**Viscosity**			
A	110	137	133	127	1,550.00	0.0819
B	130	133	127	130	1,518.75	0.0856
C	132	132	125	130	1,487.50	0.0872
D	131	136	133	133	2,143.75	0.0622
E	123	130	131	128	1,575.00	0.0813
F	150	139	144	144	1,587.50	0.0909
G	139	150	142	144	2,287.50	0.0629

Table 4. The result of prototype analysis (continued)

Concepts	Product Quality Attribute			Performance	Cost	Value
	Taste	Aroma	Viscosity			
H	104	126	123	118	2,125.00	0.0555
I	128	137	135	133	1,643.75	0.0812

Each purwaceng coffee concept has different performance. The highest performance obtained by concept F and G, conversely, the lowest performance obtained by concept H.

3.4. Cost Analysis

In this study, expenses other than material expenses was ignored. As shown in Table 4, purwaceng coffee concepts has various total cost, possibly caused by the different amount of material and material cost. Total cost of concept G was highest and those of concept B was lowest.

3.5. Value Analysis

Value of a product influenced by the amount of performance and cost. The amount of performance has linier comparison to product value. Meanwhile, the amount of total cost has inverse comparison to product value. The best concept of purwaceng coffee was once that has the highest value. Each value of purwaceng coffee concepts showed in Table 4.

According to Table 4, the chosen product was concept F that has the highest value, which supported by the high performance and the low total production cost. Concept F was then compared to the similar product sold in market in order to identify customer level of preference. The comparison between product F and the competitors were shown in Table 5.

Table 5. Comparison between selected product and their competitors

Characteristics	Product F	Product X	Product Y	Product Z
Size	25,35 gram	25 gram	7 gram	25 gram
Composition Purwaceng	Yes	Yes	Yes	Yes
Coffee	Robusta powder	Powder	Powder	Powder
Sweetener	Sugar	Glucose	No	Sugar
Addition	Milk	No	No	No
Other herbs	No	Ginger Habbatussauda Cinnamon Cardamon	Ginger Habbatussauda	No

Organoleptic test is used to identify the level of customer preference between selected concept and their competitor. Based on the result, concept F has the highest value on taste, aroma and viscosity. Concept F has the highest performance among the samples. Performance of each sample showed in Table 6.

Table 6. Performance of selected product and their competitors

Consept	Quality Product Attribute			Performance
	Taste	Aroma	Viscosity	
F	105	111	104	107
X	96	82	86	88
Y	51	72	77	67
Z	99	94	87	93
Total	351	359	354	

4. Conclusions

The quality attributes of purwaceng coffee considered in the product formulation were the health benefits, aroma, taste, and texture. The F concept was selected from total 9 developed concepts using a Completely Randomized Design. Compared to the competitor product found in the market, the F concept has advantages in terms of taste, aroma, viscosity and performance.

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