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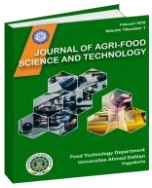

Hedonic Test Analysis and Feasibility of The Selling Price of Cocoa Seed Waste Products in PT XYZ Kulon Progo, Yogyakarta

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ABSTRACT

Innovative use of waste into herbal beverage products the waste treatment process starts from the stage of roasting cocoa beans, breaking the beans and peeling the skin, sorting, drying, preparation of packaging and materials, filling and mixing, giving silica gel and labelling the expiration date. The raw materials needed are cocoa bean husk, dried cardamom, and cinnamon powder. While the packaging material uses PET plastic bottle packaging. Before the product is marketed, it is necessary to conduct a feasibility analysis of the selling price. The analysis shows that the selling price of chocolate product of Rp. 15,000 is feasible because profit taking is 48% with the selling price per unit more than the cost per unit. The net profit margin of chocolate product of 32.6% means that the company is considered efficient in determining the selling price of its products and successfully controlling costs in it because the NPM figure is > 5%. Hedonic tests were also conducted to determine consumer acceptance of the product through a hedonic test of 20 panelists based on the parameters of color, aroma, taste, and packaging. The hedonic test scale 1 shows that consumers do not like it very much, a scale 2 does not like it, a scale 3 likes it, and a scale 4 likes it very much. The average level of preference for color parameters is 3.58, aroma is 3.31, taste is 3.47, and packaging is 3.84 which indicates that the panelists like these 4 parameters.

1. INTRODUCTION

Cocoa bean husk is one of the industrial wastes produced from chocolate processing, which is about 15% of the total weight of cocoa beans (Utami et al, 2017). Cocoa bean husks contain active compounds that are not much different from the active compounds contained in fruit skins and cocoa beans (Yumas, 2017). Cocoa bean husk contains polyphenols with a total

phenolic compound of 5.78%. Polyphenols in cocoa bean husks include prociadin, epicatechin, hydroxybenzoic acid, anthocyanins, proanthocyanidins and clovamid, so cocoa bean husks tend to be used as a source of antioxidants (Utami, et al 2017).

Cocoa bean husks contain phytochemical components that are thought to have the potential to be used as natural preservatives. The first peak that can be identified from the cocoa bean shell extract is 2,3-butanediol which is one of the compounds that play a role in the distinctive aroma of cocoa (Kayaputri, Sumanti, Djali, Indiarto, & Dewi, 2014). (2,3-butanediol is colorless and exists in liquid or crystalline solid form. 2,3-butanediol is one of the organic compounds produced from the fermentation process of cocoa beans In addition, this compound is also found in cocoa butter. Many derivatives of 2,3-butanediol have the potential to be used as solvents, plastics and as antifreeze agents (levo-form of 2,3-butanediol) because they have a low freezing point, besides that they can also be used as flavoring agents in food products if converted to diacetyl by the dehydrogenation process (Syu & biotechnology, 2001).

The large number of potential compounds in the husk of cocoa beans causes the need for innovation to utilize this waste because there are quite a lot of them from each chocolate production. Utilization of the herbal drink chocolate product is the right innovation to get the benefits contained in it. Herbal drinks are a rich source of natural bioactive compounds such as carotenoids, phenolic acids, flavonoids, coumarins, alkaloids, polyacetylenes, saponins and terpenoids, and others. Scientific evidence shows that these bioactive compounds exert a myriad of biological effects, such as antioxidant, antibacterial, antiviral, anti-inflammatory, antiallergic, antithrombotic and vasodilating, as well as antimutagenic, anticarcinogenic and antiaging effects. This contribution provides an overview of the constituent antioxidants and bioactivity of herbal drinks (Chandrasekara, Shahidi, & medicine, 2018)

The product chocolate product is a new product that comes from the utilization of industrial waste. It takes some analysis to make sure the product is worth buying and selling. The initial analysis that can be done is the feasibility analysis of the selling price. This analysis is used to determine whether the selling price that has been set can provide benefits to producers and consumers get benefits that are proportional to the costs they incur to buy the product. In addition, a hedonic test analysis is also needed. This analysis aims to determine consumer acceptance of the sensory from the herbal drink chocolate product and also the suitability of the selected packaging.

The writing of this report is about the processing of cocoa bean husk waste into the herbal drink product chocolate product It is important to handle epidermis waste to minimize the negative impact on the environment and increase the selling price of the waste, so the author needs to explain this explanation. In addition, the author also describes a discussion of the feasibility analysis of the selling price and the analysis of the average level of consumer preference for the chocolate product product.

2. MATERIALS AND METHODS

2.1. Materials

chocolate samples, google form, 20 panelists

2.2.Research Methods

First step is Feasibility Analysis of Selling Price The feasibility analysis of the selling price uses a full costing approach considering the total cost of production in it. Second step is SWOT analysis SWOT analysis is used to determine the advantages and disadvantages of the product that can be used as additional consideration for the feasibility of the selling price of the product. And the third step is Consumer hedonic test, the hedonic test or

consumer preference is carried out by asking 4 questions related to consumer preferences for the color, aroma, taste, and packaging of the chocolate product product. Testing is done by giving samples to 20 panelists, then panelists assess their range of preferences through the google form that has been provided. The panelist criteria used in the hedonic test are:

1. Age 20 – 60 years.
2. Not working or working in any sector.
3. Have consumed herbal drinks before.

The diversity of the panelists tested is expected to represent the broad consumer.

3. RESULT AND DISCUSSION

The processing process is divided into several processes, namely roasting, stripping beans, drying, packaging preparation, filling and mixing, and giving silica gel. Analysis of the product before being marketed is carried out by analyzing the feasibility of the selling price. The materials used consist of product raw materials and packaging materials. The details of the raw materials used and their prices are as follows:

Table 1. Raw material and packaging material

Raw material			
Name of Material Requirement	Needs	Purchase price (IDR)	Total (IDR)
Cocoa bean husk	900 g	18,000	18,000
Dried cardamom	245 g	20,000	49,000
Cinnamon Powder	5 g	2,500	2,500
Packaging Material			
Name of Material Requirement	Needs	Purchase price (IDR)	Total (IDR)
Jar plastic packaging	50 pcs	100,000	100,000
Packaging labels	50 pcs	30,000	30,000
Bottle cap label	50 pcs	20,000	20,000
Total (IDR)			219,500

Direct labour costs

Direct labour is labour that can directly convert raw materials into a product and the cost assignment can be traced to each type of product produced. PT XYZ employs 1 person in the production of chocolate product in the production, packaging, and marketing divisions. The payroll system is to pay labour IDR 1,000 per unit that can be produced. The total direct labour cost is IDR 50,000 because it can produce 50 units of chocolate product

Overhead production cost

Production overhead costs are costs incurred or charged in a production process other than raw materials and direct labour. This cost is part of the production cost that is not visible or cannot be traced directly either to the product itself or to the volume of production. Overhead costs can be grouped into elements:

Indirect materials (auxiliary or auxiliary materials)

Indirect materials are materials that are not the main element in a product, only as a complement or to facilitate a production process, for example materials such as fuel and other materials for capacity maintenance. PT XYZ requires auxiliary materials in the form

of silica gel and gas cylinders for the roasting process.

Table 2. PT. XYZ auxiliary materials

Ingredient	Needs	Purchase price (IDR)	Total (IDR)
Silica gel	50pcs	11,000	5,000
Gas cylinders	1pcs	21,000	21,000
Total (IDR)			26,000

Repair and maintenance costs

Repair and maintenance costs are costs incurred to repair damaged machines or keep machines in good condition in order to facilitate the production process. The cost used is IDR 100,000 to repair the roaster machine and buy cleaning materials.

Indirect costs

Indirect costs incurred for payment for electricity, water, transportation, and internet for product marketing in E-markets in producing 50 pcs chocolate product. Table 3 is a breakdown of indirect costs.

Table 3. Indirect cost

Fee type	Price (IDR)	Total (IDR)
Electricity and water	60,000	60,000
Transportation	20,000	20,000
Internet	30,000	30,000
Total (IDR)		110,000

Production overhead costs are a combination of the cost of auxiliary materials, repair and maintenance costs, and indirect costs. Table 4 is a breakdown of production overhead costs.

Table 4. breakdown of production overhead costs

Fee Type	Permanent (IDR)	Variable (IDR)
Cost of auxiliary materials	-	26,000
Repair and maintenance costs	100,000	-
Indirect costs	-	110,000
Total	100,000	136,000
TOTAL (IDR)	236,000	

Total production costs are fixed costs and variable costs incurred to produce a product in a certain period. The total production cost of chocolate product PT XYZ Chocolate consists of raw material costs, direct labour costs, and production overhead costs. Table 5 is a breakdown of the total production costs. From the table above, it is known that the total production cost is Rp. 505,500. The total cost can produce 50 pcs of chocolate product herbal drink products. Then the calculation of the selling price per unit with the desired profit of 48% is Table 6.

Table 5. Breakdown of the total production costs

Fee Type	Amount (IDR)

Amount	219,500
Direct labour costs	50,000
Production overhead costs	236,000
TOTAL	505,500

The calculation of production costs using the full costing approach is a calculation of all costs used in the production process which will be classified as production costs or cost of goods manufactured (HPP), both variable and fixed. The cost of production (HPP) is all costs incurred to produce an item (service) sold during the period concerned) (Kuswadi, 2005). Table 6 is the calculation of production costs with a full costing approach.

Table 6. Calculation of production costs with a full costing approach

Raw material cost	IDR 219,500
Direct labour costs	IDR 50,000
Production overhead costs	IDR 236,000
Cost of goods sold	IDR 505,500

It is known that chocolate product net profit margin is 32.6%. NPM figures can be said to be good/healthy if > 5%. The higher this net value, the company is considered efficient in determining the selling price of its products and successfully controlling costs in it. Even though it is feasible, the profit of 48% is relatively large so it is necessary to analyze the attractiveness and advantages of chocolate product so that consumers still want to buy the product. Analyzing product advantages can be done through SWOT analysis. SWOT analysis is an analysis that can be used to identify factors systematically in evaluating a product. This analysis is based on logic that can maximize strengths and opportunities, however can simultaneously minimize weaknesses and threats (threat). It is called with situation analysis. SWOT analysis is an assessment of the identification of a situation to find out whether a condition is said to be a strength, weakness, opportunity, or threat (Rangkuti, 1998). Table 7 is the results of a SWOT analysis of chocolate product herbal drink products.

With a price of IDR 15,000 per pcs which can be drunk up to 7 times, one drink is priced at IDR 2,142 which is believed to be able to compete with competitors of similar products. However, the chocolate product drink needs to develop its product to be able to compete with other manufacturers.

Hedonic Test Analysis

Organoleptic assessment with hedonic test is one type of acceptance test. In this test, panelists were asked to express their personal responses about likes or dislikes, in addition, they also expressed their level of liking or disliking. These levels of liking are referred to as hedonic scales, for example very much like, very like, like, somewhat like, neutral, somewhat dislike, dislike, very dislike and very dislike. These levels of preference are called the hedonic scale The hedonic scale is different from other categorical scales and the response is not expected to see with increasing physical characteristics, however show something peaks (preference maximum) above and a rating that decreases below (Raharjo, 1998). With this hedonic scale, the test can indirectly be used to determine the difference (Rahayu, 1997). Although physical and chemical tests as well as nutrition can show a high-quality food product, it means nothing if the food product cannot be eaten because it is not tasty (Soekarto, 1985).

Table 7. SWOT Analysis

SWOT Analysis	
Strength	• Can be developed with appropriate technology. • Easy way of presentation. • Herbal drink with functional properties that are good for health. • Without preservatives. • Delicious and can be consumed as a daily drink. • Raw materials are cheap and easy to get. • Does not require a lot of human resources.
Weakness	• *Weak chocolate flavour*. • New products so that people do not know. • Profit taking is relatively large. • Lack of product development.
Opportunity	• Improve processing processes to improve product quality • Able to prevent degenerative diseases as the first cause of death in Indonesia. • Waste management innovation is trending among the community. • Broad target market. • Many online sales platforms are able to market products more broadly. • The COVID-19 pandemic has led consumers to buy healthy products.
Threat	• The number of competitors is increasing.

The hedonic test or consumer preferences was carried out by asking 4 questions related to the panelists' preferences for the color, aroma, taste, and packaging of the chocolate product. The test was carried out by giving samples to 20 panelists, then their range of preferences was assessed through the google form provided. A scale of 1 means that the panelists do not like the proposed parameters, a scale of 2 does not like it, a scale of 3 likes and a scale of 4 that the panelists really like. Table 8 is the results of the panelists' hedonic test on the herbal drink product chocolate product.

Table 8. Hedonic test

Parameter	Likelihood Average
Color	3.58
Scent	3.31
Flavour	3.47
Packaging	3.84

a. Color

Color is a physical attribute that is assessed first in determining food quality and can sometimes be used as a measure to determine taste, texture, nutritional value and microbiological properties Color affects the acceptance of a food ingredient, because generally the acceptance of the first material seen is color. Attractive colors will increase product acceptance. Color may change during cooking. This can be caused by the loss of

some pigment due to the release of cell fluid during cooking or processing, the color intensity decreases (Elviera, 1988)

Based on the hedonic test that has been carried out, the average preference of 20 panelists for the color of chocolate product herbal drink products is 3.58 which indicates that the panelists like the color. The color of the Chocolate product drink itself is a light brown which represents herbal drinks in general. The brown color comes from the skin cocoa bean extract which has gone through the process of fermentation, drying, and roasting. The brown color is formed from the oxidation of polyphenol compounds and non-enzymatic browning that occurs during roasting. The oxidized compound then polymerizes with amino acids to form a yellowish-brown melanin compound. During roasting, through non-enzymatic browning driven by temperature and oxygen availability, these compounds and other compounds such as residual flavonoids, anthocyanins, amino acids, and carbohydrates form complex compounds that have different colors. Tannin compounds such as flavones and flavan 3-ol are responsible for the formation of the brown color of the cocoa bean skin during the roasting and alkalization process (Bonvehi and Coll, 2002).

Figure 1. Color Product

The light brown color of Chocolate product drink is produced from the tannin compound in the husk of the cocoa beans and the addition of cinnamon powder which dissolves during the brewing of Chocolate product. This color is similar to tea drinks and stimulates the panelists' thinking that this drink is not bitter, so they like it.

b. Scent

Aroma is one of the parameters that affect the perception of the delicious taste of a food. In the food industry, the aroma test is considered important because it can quickly provide an assessment of the results of its production, whether the product is liked or not by consumers. The aroma of a product is determined when volatile substances enter the nasal passages and are responded to by the olfactory system (Meilgaard et al., 1999).

Based on the hedonic test table data, it is known that the average preference of 20 panelists for the aroma of Chocolate product herbal drink products is 3.31 which indicates that the panelists like the aroma of the beverage product. This figure is the lowest average number compared to other parameters.

The high intensity of the aroma and taste of chocolate is achieved by roasting at a high temperature of around 120-150°C. Chocolate aroma components consist of volatile compounds which are mainly formed from amine and carboxyl groups. The last two compounds are the result of peptide and carbohydrate reforms that take place during the fermentation process (Biehl et al., 1985) The candidate compounds for forming a distinctive chocolate aroma consist of hydrophobic amino acids, hydrophilic peptides, and reducing sugars (Voi et al, 1994). The Maillard reaction which takes place intensely during the roasting of cocoa beans produces volatile compounds consisting of alcohol groups of ether, furan, thiazole, pyrone, acid, ester, aldehyde, imine, amine, oxazole, pyrazine, and

pyrrole. The distinctive aroma of chocolate was not determined singly by these compounds, although the compound 2-phenyl-5-methyl-2-hexanal was mentioned as a compound that characterizes the aroma of chocolate (Jinap, 1998). The content of cinnamaldehyde compounds in cinnamon causes a distinctive cinnamon aroma, so that if the concentration is high it can produce a pungent aroma (Rusli, 2010).

Cardamom seeds have a delicious and sharp aroma like spices in general. The aroma comes from volatile compounds that form a specific aroma in cardamom. The combination of fermented sour chocolate aroma, quite sharp sweet aroma from cinnamon and very strong spice aroma from dried cardamom seeds was not familiar and not acceptable to the 4 panelists. However, the other panelists liked and could well accept the aroma of Chocolate product because it was still more natural than the smell of herbs or other spiced drinks.

c. Flavour

The taste of a food is one of the factors that determine consumer acceptance of a product. The taste of food is a combination of taste, smell and experience stimuli that involve the tongue a lot (Winarno, 2002). Based on the panelists' assessment, it is known that the average preference of 20 panelists for the taste of the "Chocolate product" beverage product is 3.47 which indicates that the panelists like the taste of the drink. The taste of the "Chocolate product" drink is sweet due to the addition of rock sugar and there is a warm sensation from the addition of cardamom and a little astringent taste at the end of the taste.

During roasting, polyphenols will be damaged, so the astringent and bitter taste will be reduced, accelerated by heat. In roasting, the acid taste is removed by the evaporation of volatile organic acid components, such as acetic acid, which is very dominant in the bean fermentation process. In addition, the main components such as tannins that cause astringent bitter taste can be oxidized during the roasting process. While the development of flavour components can be seen from the aroma formed

The taste of cardamom seeds is slightly bitter and gives a warm sensation when consumed. While cinnamon gives a spicy taste that comes from the compound beta-caryophyllene. The combination of the taste of cocoa bean husk, dried cardamom, and cinnamon powder which is not too bitter and gives a warm sensation when drunk by consumers. What's more, the addition of rock sugar, balances the combination of all three flavours. Several panelists considered that this drink was very tasty if defined as an herbal drink that seemed bitter.

d. Packaging

Packaging is a process of designing and manufacturing a container or wrapper for a product so that it looks attractive and attracts customers to buy the product (Suryono, 2018). The more attractive the packaging design and the suitability of the packaging on the product increase the potential for consumers to buy a product.

Based on the preference test of 20 panelists on the packaging of Chocolate product herbal drink products, an average of 3.84 was obtained which indicated that the panelists liked the packaging. The average value is the highest value of the panelists' preference for Chocolate product products. Chocolate product packaging uses plastic bottles equipped with packaging labels that contain information and information about this product such as the name of the manufacturer, product name, net product, product advantages, composition, brewing suggestions, halal logo, and expiration date. The dominant packaging label is brown which represents the color of the raw material used, namely cocoa bean husk waste. The packaging chosen is also in accordance with Chocolate

product products and displays an exclusive impression more than just herbal drinks.

4. CONCLUSIONS

Based on the analysis that has been done, it can be concluded that the determination of the selling price shows that the analysis of determining the selling price of Chocolate product at Rp. 15,000 is feasible because profit taking is 48% with the selling price per unit more than the cost per unit. net profit margin is 32.6%. The NPM figure is said to be good if >5% because the company is considered efficient in determining the selling price of its products and successfully controlling costs in it. While 2. Hedonic test analysis shows that the average level of preference of panelists on color parameters is 3.58, aroma is 3.31, taste is 3.47 and packaging is 3.84 shows panelists like these 4 parameters.

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