

## **Consumer preferences on the product design of red bean nugget**

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**Abstract:** *The community need, which tends to be practical; this is the reason for the availability of food products that are ready to cook and ready to eat. One of the food products that suit these needs is a nugget. Nugget is a food product from ground meat, given the addition of seasoning, formed then smeared with bread flour on the surface. The main ingredient of processing nugget is usually derived from animal food. Efforts to replace animal-based ingredients in nuggets can be used as vegetable-based ingredients, such as red beans. This study purposed was to capture consumer preferences related to product attributes for red bean nugget. The data collection instrument used questionnaires distributed online. Respondents consisted of 100 consumers of nugget products. Descriptive analysis was used to describe consumer preferences. The results showed that based on intrinsic attributes, the desired attributes of respondents were shape attribute with animal, alphabet, dimension variants; flavor attributes with red bean dominant and content dominant variants; and weight attribute with 15-20 gram and 20-25 gram variants. The extrinsic attributes that the respondents wanted were packaging materials with vacuum plastic and laminated cardboard variants, and packaging designs with simple and varied design variants.*

**Keywords:** *Red bean nugget, Consumer preferences, Intrinsic attribute, Extrinsic attribute.*

### **1. Introduction**

The current needs of the community are all practical, making the reason for the availability of processed food products that are ready to cook and ready to eat. One of the processed food products that suit these needs is the nugget. Nugget is one of the processed products from ground meat, given the addition of seasoning, formed and then coated with bread flour on its surface. The main ingredient in making nuggets comes from animal food ingredients, beef, chicken, or fish meat. Efforts to replace

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animal-based ingredients with non-animal or vegetable-based ingredients will be processed, artificial meat products. One alternative vegetable material is red beans.

According to Astawan (2009), the red bean has an advantage compared to animal protein, which is a cholesterol-free. Compared with other beans, red beans have the highest carbohydrate content, protein content, which is equivalent to green beans, the fat content that is much lower than soybeans and peanuts and has fiber levels equivalent to green beans, soybeans, and peanuts. According to Winarno (2004), protein is an important nutrient needed for the body. The study of Utama (2016) concluded that red bean analog meat with 15% substitution of soy protein isolate had the highest protein content (11.6%), highest fiber (1.90%), and lowest fat (1.48%). The choice of basic ingredients of the red bean is expected to have a number of advantages, namely high protein and fiber and low fat, suitable for vegetarians and children to meet their needs and be cholesterol-free, can be enjoyed by all people, affordable prices and as an alternative in meat consumption.

Product design must consider quality aspects. Quality can define as the time when consumers receive information about the characteristics of the product when buying or after consuming it (Fandos and Flavián, 2006). Thus, consumers can evaluate the function or benefit of products based on their needs.

This quality clue is a stimulus that is informative to consumers related to the product and known by consumers through the five senses. Through these quality guidelines, consumers can judge whether a product has a quality that matches their preferences or not. Various explanations above encourage research to find out the attributes of red bean nuggets products desired by consumers. This study aimed was to determine and identify the attributes of red bean nuggets products that consumers want as the basis for designing red bean nugget products.

## **2. Theoretical Framework**

Product is anything that can be offered to a market to fulfill wants and needs. The product marketed includes goods and physical goods, services, places, organizations, and ideas (Kotler, 2005). In general, all parts and properties contained in a product and

product form are called product characteristics. Product characteristics that function as evaluative attributes during decision making are referred to as product attributes.

Assessment of product attributes can describe the attitudes of consumers toward these products and at the same time, can reflect consumer behavior in spending and consuming a product. The producer must pay attention to consumer preferences to the attributes to design products. Food product attributes are generally grouped into two types of attributes, namely intrinsic attributes and extrinsic attributes (Fandos and Flavián, 2006). The intrinsic attribute is the quality of a product based on the function and physical properties of the product, while extrinsic attributes are aspects related to the product, but there is physically not part of the product itself.

Based on intrinsic and extrinsic attributes, several previous researchers conducted studies on the attributes of product quality in food products. Among them are Fandos and Flavián (2006), review about attributes meat ham, namely intrinsic attributes (fine, flavor, delicate, aroma, appearance, and color) and extrinsic attributes (shapely, elongated and rounded form of the ham, brand); Iop *et al.* (2006) review food product attributes based on intrinsic attributes that include color, aroma, taste, and texture, as well as extrinsic attributes that include brand, price and context. Other than that, Espejel *et al.*, (2007) have examine the attributes of traditional food products, which include intrinsic attributes (color, taste, aroma, appearance) and extrinsic attributes (brand, denomination of origin, and traditional product image); Hersleth *et al.* (2015) examines dry-cured ham products based on intrinsic attributes (appearance, smell, taste, texture) and extrinsic attributes (price, nutritional value and processing conditions); Nishimura *et al.* (2016) examines the onion concentrate product attributes based on flavor, aroma, and texture; also Lee *et al.* (2015) review fruit juice products based on extrinsic attributes of brand, ingredients label, shelf-life, price, and manufacturing countries.

Consumer preferences occur at the alternative evaluation stage; consumer build preferences for brands in a collection of choices. The alternative evaluation stage is the stage where consumers will select a number of choices based on the expected benefit to get specific alternatives that are to meet their wants and needs.

Some previous studies regarding the preference of chicken nuggets include Rahmawati (2004) and Rahardjo (2016). Research conducted Rahmawati (2004), classifying consumer preferences based on respondent characteristics where the attributes used are aroma, texture, easy of absorbing oil, tenderness, taste, and organoleptic test. Rahardjo (2016) examined the factors that become consumers' preferences in buying frozen food products. The result shows that the most important factor in influencing consumer preferences in choosing a frozen food product was taste, where the preferred taste is savory, salty, and spicy. The next factor is price, packaging, and brand. Meanwhile, Wedowati *et al.* (2018) have reviewed customer preferences for customized products based on three aspects, namely functionality, usability, and pleasure aspects. Attributes in each aspect consist of taste, color, aroma, and nutritional content (functionality aspect), shape and material packaging (usability aspect), and health benefits, appearance, and type of topping (pleasure aspect).

### **3. Research Method**

This research was conducted to reveal consumer preferences for consumer decisions in the attributes of red bean nugget products. This study used a survey method that is research that uses samples from a population. The approach technique used to obtain research data is the distribution of questionnaires to respondents.

According to Walpole (1995), suggests that the determination of a sample of at least 30 people empirically already has an average opportunity distribution that will follow the normal distribution. In this study, the sample size of 100 respondents was determined with a distribution deadline of 2 weeks. The questionnaire was distributed via online media or email by spreading email address links through several social media applications.

Design attributes of red bean nugget products were grouped into two types of attributes, namely intrinsic and extrinsic attributes. Intrinsic attributes studied include shape, nugget content, flavor, the weight of the nugget per piece, nugget thickness, nugget skin, and texture. While the extrinsic attributes examined include packaging material, packaging weight, packaging design, and labels.

The data obtained were then analyzed by descriptive analysis. Descriptive analysis is a tool to describe consumers obtained through a questionnaire and also the overall background of consumers and to determine product attributes and consumer preferences for red bean nuggets products.

#### 4. Results and Discussion

##### 4.1 Intrinsic Attribute

Intrinsic attributes actually come from the physical product. Changes in attributes can be evaluated by looking at changes in the physical character of the product. Intrinsic attributes were evaluated on red bean nugget product design, include shape, nugget content, flavor (taste and aroma), nugget weight per piece, thickness, nugget skin, and texture. Intrinsic attributes and their variants can be seen in Table 1.

Table 1.  
Intrinsic attributes of red bean nugget product

| Attributes                      | Variants                            | Attributes              | Variants              |
|---------------------------------|-------------------------------------|-------------------------|-----------------------|
| Nugget shape                    | Dimension                           | Nugget weight per piece | 10-15 grams (small)   |
|                                 | Alphabet                            |                         | 15-20 grams (medium)  |
|                                 | Animal                              |                         | 20-25 grams (large)   |
|                                 | Number                              | Nugget thickness        | 0.5 cm                |
| Nugget content                  | Processed vegetables                |                         | 1.0 cm                |
|                                 | Processed fish meat                 | Nugget skin             | Breaded               |
|                                 | Processed chicken                   |                         | No bread crumbs       |
| Flavor (taste and aroma) nugget | Dominant red beans                  | Nugget texture          | Soft (slightly solid) |
|                                 | By following the variant of content |                         | Solid                 |

The shape of the nugget has an important role in eye attractiveness. The unique and attractive shape of the nugget is the reason for respondents to choose pieces of animals because, in the market, the nugget pieces are still square in general. The red bean nuggets variant attribute was intended to increase the nutritional content and the selling value of the red bean nuggets product. In this attribute, the respondent chooses the variant of the contents of processed chicken meat because chicken meat is easy to get and easy to process.

The attribute of flavor (taste and aroma) was the overall impression (sensation) by the sense of taste and aroma when the respondent eats nugget products. At this attribute of respondents chose the flavor that variant content dominant, so that it can add flavor, so as to the taste of red bean was not dominant.

The attribute of the weight of the nugget per piece (size of the nugget), the weight is known after the dough is cooked with the skin. This attribute showed the respondent chose a medium size nugget with a weight of 15-20 grams because this size can be categorized as a standard size of the nuggets in general. The thickness attribute of the nugget, this attribute was measured by the thickness when the dough was cooked, which was coated with bread flour. The attribute level that many respondents wanted a nugget with a thickness of 1.0 cm. This showed that the thickness will affect the characteristics of the nugget product.

The nugget skin attribute was the outer layer of the nuggets that can affect consumers. Nugget skin that consumers want was nuggets coated with bread flour because the nuggets on the market have the characteristics of these products. The nugget texture attribute is the nature or characteristics of the nugget product that can be felt during tasting or eating. Consumer attributes desired texture was a slightly dense texture (soft), so soft when consumed and in accordance with the texture in general. The highest percentage of respondents' choices for each intrinsic attributes were shown in Table 2.

Table 2.  
The most desired intrinsic attributes of red bean nugget product

| <b>Attributes</b>               | <b>Variants</b>          | <b>Percentage (%)</b> |
|---------------------------------|--------------------------|-----------------------|
| Nugget shape                    | Animal                   | 50                    |
| Variant of nugget content       | Processed chicken meat   | 82                    |
| Flavor (taste and aroma) nugget | Dominant variant content | 77                    |
| Nugget weight per piece         | 15-20 grams              | 70                    |
| Nugget thickness                | 1.0 cm                   | 67                    |
| Nugget skin                     | Coated bread flour       | 81                    |
| Nugget texture                  | Soft                     | 67                    |

*4.2 Extrinsic Attribute*

Extrinsic attributes tend to be associated with efforts to increase the product’s selling power. Extrinsic attributes can be included trademark, certifications, and brand. Extrinsic attributes reviewed in this research included: packaging material, packaging weight, packaging design, and labels. Extrinsic attributes and their variants showed in Table 3.

Table 3.  
Extrinsic attributes of red bean nugget product

| <b>Attributes</b>  | <b>Variants</b>                                   |
|--------------------|---|
| Packaging material | Vacuum plastic                                    |
|                    | Mica plastic                                      |
|                    | Laminated cardboard                               |
| Packaging weight   | 250 gram  |
|                    | 500 grams   |
|                    | > 500 grams                                       |
| Packaging design   | Simple/visible product on the packaging           |
|                    | Variative/product is not visible on the packaging |
| Label              | The label printed on the sticker                  |
|                    | The label printed directly on the package         |

The packaging raw material was adjusted to the nature of the nugget product, to prevent damage to the nugget product. The packaging that consumers want is packaging material from vacuum plastic, because the packaging material is by following the nature of the nugget that is easily contaminated and storage methods in cold temperatures. The packaging weight attribute is used to explain the net (net weight) and the number (contents) of the nugget. The respondent's choice on this attribute is a packaging weight of 500 grams because the weight is by following the wishes and needs or the adequacy of consumption.

The packaging design attribute was made to attract consumers from outside the packaging. Respondents choose simple packaging design attribute because consumers prefer products that are visible on the packaging. The packaging label attribute contains information about product composition, storage instructions, production date, expiration date, and company identity. The choice of attribute desired by the respondent was the label printed directly on the package because with the label

printed directly on the packaging, it is expected that the label information is not easily lost and damaged. The highest percentage of respondents' choices for each intrinsic attributes showed in Table 4.

Table 4.  
 The most desired extrinsic attributes of red bean nugget product

| Attributes              | Variants                                  | Percentage (%) |
|-------------------------|---|----------------|
| Packaging raw materials | Vacuum plastic                            | 59             |
| Packaging weight        | 500 grams                                 | 66             |
| Packaging design        | Simple                                    | 38             |
| Packaging label         | The label printed directly on the package | 79             |

Overall, the intrinsic and extrinsic attributes desired by respondents that show a total value  $\geq 50\%$  and frequency distribution data of consumer preferences for each attribute or variant of the “wanted” and “very wanted” score was added up and selected showed a total value  $\geq 50\%$ . Selected attributes and variants of consumer preferences showed in Table 5.

Table 5.  
 Selected attributes and variants builder red bean product design

| Attributes               | Variants                         | Attributes         | Variants             |
|--------------------------|----------------------------------|--------------------|----------------------|
| Nugget shape             | Animal                           | Nugget size        | 15-20 grams (medium) |
|                          | Alphabet                         |                    | 20-25 grams (big)    |
|                          | Dimension                        | Packaging material | Vacuum plastic       |
| Flavor (taste and aroma) | Red bean dominant                |                    | Laminated cardboard  |
|                          | According to the content variant | Packaging design   | Simple               |
|                          |                                  |                    | Variative            |

## 5. Conclusion, Implication and Limitation

### 5.1. Conclusion

Products that consumers like are products that can satisfy the wants and needs of consumers. Knowing what consumers want is very important so that the market can accept red bean nuggets products. Consumer preferences for product design attributes of red bean nugget that consumers want were selected. Product attributes concluded as follows: animal cuttings, content variants of processed chicken meat, flavor tends to be on content variants, medium size (weight per piece 15-20 grams), thickness of 1.0



cm, coated breadcrumb, slightly texture, packed in plastic vacuum, packaging weight of 500 grams, varied packaging design, and packaging label printed directly on the packaging.

As the basis for the design of red bean nugget products, three intrinsic attributes selected, namely nugget shape, flavor, and nugget size, as well as two extrinsic attributes, namely material and packaging design. Nugget shape with variants animal cut, alphabet chunks, and dimensional pieces. Flavor with variants dominant red beans and dominant contents. Nugget size with variants medium size (15-20 grams) and big size (20-25 grams). Packaging materials with two variants, namely plastic vacuum and laminated cardboard. Packaging design with simple and varied designs.

### *5.2. Implication and Limitation*

The producers must pay attention to the attributes that have been selected to meet the wants and needs of consumers for red bean nugget products. Furthermore, based on the attributes and their variants that have been selected can be used as a basis for developing product design by combining those attributes.

The combination of attributes intrinsic and extrinsic can be used for further research to create new products with the best combination of 5 attributes comprising of three intrinsic attributes and two extrinsic attributes with their variants using conjoint analysis to determine the attributes which are the most important according to consumers. Stimuli that are calculated or designed manually will get a lot of combinations of stimuli, so this will cause difficulties for respondents in the ranking. So to simplify a procedure is needed to reduce the number of stimuli, namely by orthogonal design.

The limitation of this paper was not to include elements of market segmentation to identify product attributes so that the selected attributes do not reflect the intended market segments. This limitation can be tried as future research, to deepen further studies related to consumer preferences for food products.

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